Maxillo-facial surgery

Oral bone tissue reconstruction using both marine or non-marine substitutes: a review

Giulia Amoroso, Luca Fiorillo, Francesca Gorassini, Roberta Mastroieni, Cristina Maria Rosa Scoglio, Stefania Marino, Floriana Lauritano, Roberto Lo Giudice, Gabriele Cervino, Marco Cicciù

Department of Biomedical and Dental Sciences and Morphological and Functional Imaging, University of Messina, Italy

Aim: The aim of the present investigation was to systematically analyze the literature on the reconstruction of facial bone defects using marine collagen or not and to evaluate a predictable treatment for their clinical management.
Methods: This systematic review also aimed to evaluate the potential of reconstructive marine biomaterials used like scaffolds for growth factor in order to provide better results in comparison to others. The review was performed searching MEDLINE and EMBASE databases from 2007 to 2017. Clinical trials and animal in vitro studies that had reported the application of bone substitutes or not for reconstruction of bone defect and using marine collagen or other bone substitute materials were recorded following Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The first selection involved 1201 citations. After screening and evaluation of suitability, 39 articles were added at the revision process. Numerous discrepancies among the papers about bone defects morphology, surgical protocols, and selection of biomaterials were found. All selected manuscripts considered the final clinical success after the facial bone reconstruction applying bone substitutes.
Results: Nowadays, collagen is considered the major constituent of the extracellular matrices of all animal and metazoans. For this reason, collagen derived from marine sponges can be evaluated as available substitute for uses like scaffolds in the bone regenerative procedures for facial large bone defects regeneration in order to have a substantial quantity of material and to avoid a second surgery site. Marine species present a distinct advantage as a lower known risk of transmission to humans of infection-causing agents and are thought to be far less associated with cultural and religious concerns regarding the human use of marine derived products. Marine organisms like coral or sponge are rich in mineralized porous structures and their microstructures seem to replace the human bone features. Recently, Lin et al. developed a novel scaffold, derived from fish scales, as an alternative functional material with sufficient mechanical strength for medical regenerative applications. Fish scales, which are usually considered marine wastes, were acellularized, decalcified and fabricated into collagen scaffolds. Marine collagen seems to favor the dimensional stability of the graft and it could be an excellent carrier for growth factors. Authors concluded that the use of rhBMP-2 without concomitant autogenous bone grafting materials in large critical-sized mandibular defects secondary to a large mandibular tumor produced excellent regeneration of the treated area.
Conclusion: The scientific evidence regarding the advantages of the application of a biomaterial versus autologous bone still remains debated.

Temperature-controlled continuous cold flow device versus traditional icing system for the management of perioperative pain and

swelling after removal of follicular cysts of mandibular third molar teeth

D. Caruso, I. Barca, W. Colangeli, A. Giudice, E. Giofrè, R. Cordaro, D. Novembre, M.G. Cristofaro

CristofaroDepartment of Experimental and Clinical Medicine, Unit of Oral and Maxillofacial Surgery, University "Magna Graecia" of Catanzaro, Italy

Aim: The aim of this study is to evaluate the effectiveness of temperature-controlled continuous cold flow device, Hilotherm system, in controlling perioperative edema and pain and to compare the results with those obtained with conventional cryotherapy (ice bag).
Methods: Investigators selected 24, in good health, patients with follicular cyst of mandibular third molar teeth, all cysts have an average diameter of 3 to 4 cm. Two groups were created, cryotherapy with ice-bag (group A) and a Hilotherapy system (group B); all patients received same surgical and pharmacological treatment. Diagnosis of follicular cysts was obtained radiographically, such as dental orthopantomographic examination and mandibular CT scan, and confirmed by histopathological evaluation. The general health conditions of each patient were examined. Surgical treatment was ostectomy and cystectomy using Partsh II; drug treatment was paracetamol 1 gr cp every 6 hours for 24h. Facial swelling was preoperatively quantified measuring skin segments (called α, β, γ and δ), pain and patient satisfaction were measured for each subject with VAS questionnaires.
Results: Seventeen male patients (70.8%) and seven female patients (20.1%) participated in the research. 100% of patients did not have sensitivity damage. 2 (16.6%) patients in group A and 1 (8.33%) patient in group B had transient damage resolved with medical therapy. No major adverse events were recorded in the two groups, in group A transient skin flushing was recorded in 3 patients (25.0%). All patients in group B reported good comfort, while only 70% of patients in group A reported poor comfort. Pain control was best in group B with return to pain VAS values between 2 and 3 in about 60% of patients within 12 hours. Data analysis showed a lower increase in soft tissue values with a consequent better control of edema in group B (Hilotherapy system).
Conclusion: The use of Hilotherapy system in post-surgical treatment has shown better control of pain and remission of edema, this appears due to temperature control and increased patient compliance. Therefore this temperature control technique plays an ever greater role in post-operative comfort of oral-maxillofacial surgery.

Partial and complete rehabilitations with zygomatic implants

Dino Re, Andrea Enrico Borgonovo, Susanna Ferrario, Cesare Lacaita, Massimiliano Bruschi, Albino Bianchi

University Department of Dental Aesthetics, ISI, University of Milan, Italy

Aim: The introduction in dentistry of implant techniques in the 80s was a turning point because it allowed the realization of new treatment plans. Despite the numerous technical opportunities available today, the implant-prosthetic rehabilitation turns out to be a very complex challenge if it involves treatment of a severe bone resorption of the maxilla. Over the years many practices that include a minimally invasive approach (such as inclined implants, short implants, etc.) or a reconstructive approach, with the application of different methods such as maxillary sinus augmentation, the use of autologous bone grafts or the use of GBR techniques, have been introduced. Zygomatic implants are part of this scientific panorama. Simplicity of the treatment decreases the biological cost of the intervention, the post-operative morbidity and the healing time, if compared to the major pre-prosthetic reconstructive interventions. The possibility of carrying out, immediately, except in special situations, the immediate loading of the implants is added as an important advantage. However, even partial unilateral rehabilitations with zygomatic implants are normally performed for treatment of hemimaxillectomies or large maxillary resections, especially in case of simultaneous reconstructions of soft tissues caused by oncological problems.
Methods: The clinician has several solutions available and the type of treatment is defined according to the morphology of the maxillary defect and the availability of bone in the frontal region. Usually only patients presenting a severe atrophy of the jaw of class V/VI/VII, according to the classification Cawood and Howell, are considered suitable for this type of implant rehabilitation. In the most serious cases of resorption, four zygomatic implants are inserted, to allow full-arch rehabilitation. These rehabilitations are defined as Quad Zygoma, with four zygomatic implants accompanied, or not, by a traditional fixture inserted into the nasal spine with the function of prosthetic "stress-breaker". This treatment presents a difficult aesthetic management as a disadvantage. Alternatively, it is possible to make a prosthesis supported by two zygomatic implants in the posterior regions, inserted more mesial than in the previous case, and by two or more traditional fixtures in the frontal area of the maxilla. This last type is indicated by the term Hybrid Zygoma. Partial rehabilitation is an absolute indication after hemimaxillectomy or

large maxillary resections, especially in the case of contemporary soft tissue reconstructions caused by oncological problems. On the other hand, the use of single or bilateral partial treatments in the presence of valid teeth is still not defined. Literature indicates that the insertion of other traditional implants in association with zygomatic implants is clearly foreseen. However, this is a solution reserved for selected cases that needs to be assessed over a long term.
Results: The rehabilitation on zygomatic implants, carried out on selected cases according to the indications of the method, has proven to be a valid alternative to bone reconstruction in the treatment of maxillary atrophy, as it has high success rates validated by several studies in the scientific literature.
Conclusion: This report underlines the variety of implant rehabilitations through the use of zygomatic implants. It also shows an example of the possible uses of zygomatic implants in the future years for partial rehabilitation. Until now, in fact, precise indications for partial rehabilitation are still missing and the cases treated are limited, requiring additional clinical studies to validate the method.

Surgical procedures performed to improve the prosthetic prognosis in case of maxillary defects: a review of the literature

Gennaro Ruggiero[1], Norma Bocca[2], Gabriele Magrini[3], Antonio D'Addona[3], Stefano Carossa[2], Gianfranco Gassino[2]

[1] Department of Neurosciences, Reproductive and Odontostomatological Sciences, Division of Prosthodontics and Digital Dentistry, University "Federico II" of Naples, Italy
[2] Department of Surgical Sciences, Interdipartimental Center of Research (CIR), Dental School, Oral and Maxillofacial Rehabilitation, University of Turin, Italy
[3] Department of Dental Clinic, Catholic University of the Sacred Heart of Rome, Italy

Aim: The purpose of this review was to provide the surgical procedures that need to be followed by the clinical team to obtain a maxillary defect that can be suitable to receive a prosthesis.
Methods: The authors performed an extensive search of the literature, published until January 2019, on the databases of PubMed/Medline and Scopus, in addition to congress proceedings and books related to the prosthetic rehabilitation of the maxillary defects, written in English or Italian language. Literature search was performed using combinations of the following keywords: ("obturator prognosis" OR "palatal obturator" OR "obturator prosthesis" OR "prosthetic prognosis") AND ("maxillectomy" OR "maxillary defect"); 35 articles, 2 books and 3 congress proceedings were included.
Results: After the study of the records included in this review, it was found that surgeons must preserve the anterior maxilla as much as possible, because it is the most suitable site for the placement of implants. In certain edentulous patients, the alveolar process under the maxillary sinus, like maxillary tuberosities, might offer sufficient bone for a proper implant placement. Furthermore, if the implant site is involved in post-operative radiotherapy, it is advisable to know the x-ray dose of such exposition. It is worth noticing that the maxillectomy should be performed making the bone resection at the center of the alveolar socket of the adjacent, previously extracted, tooth. It is critical that the line of incision of the mucosa is made laterally to the bone cutting line, so subsequently the mucosa will be reflected to cover the medial margin of the defect. Moreover, the surgical cut should preserve mucosa and bone support around the tooth adjacent to the defect, and keratinized mucosa should cover the palatal margin of the defect; when less than one-third of the posterior aspect of the soft palate is left postsurgically the entire soft palate should be removed. Furthermore, when mandible moves downward and forward, the coronoid process can cause the displacement of the disto-lateral portion of the obturator and/or the inflammation of the adjacent mucosa. Therefore, surgeon should remove the coronoid process, particularly when the resection extends posteriorly into the soft palate. It is equally important to prepare an adequate access to the defect, because the turbinates and the bands of oral mucosa may prevent the prosthesis from engaging key areas of the defect, impairing function.
Conclusion: A complete knowledge about the construction techniques and biological/mechanical principles of maxillofacial prosthesis is essential to perform surgical interventions that enhance a possible prosthetic rehabilitation.

New double level split crest technique combined with autologous PRF

Matteo Tomeo[1], Antonio Borri[1], Giuseppe Cesaro[1], Giuseppe D'Antonio[2], Antonio Cortese[3]

Department of Medicine and Surgery, University of Salerno, Salerno Italy
[1] MD, Private Practice
[2] Student
[3] MD DDS, Aggregate Professor, Unit of Maxillofacial Surgery

Aim: Different strategies and treatment techniques are currently proposed to perform alveolar bone augmentation. The most common techniques are:

guided bone regeneration (GBR), the split crest and autologous bone grafting. These techniques have bone regenerative properties of osteoinduction and osteoconduction in relation to regenerated bone survival. The split crest was one of the most reliable bone augmentation techniques. The main objective of this study is to describe a new flapless-modified split-crest technique. This procedure is aimed to optimize bone regeneration performing bone augmentation and implant insertion in a single step. The association of the PRF with this technique is of great help in implant rehabilitation, especially in elderly patients, when bone regeneration is required.

Methods: The aim of this technique is to obtain an adequate expansion of the buccal cortex while preserving the vascular supply avoiding periosteal elevation to improve cortical bone preservation. The main advantages of this technique consist in a single surgical phase without donor sites, periosteal vascular preservation of the cortical buccal walls, preservation of the alveolar bone height avoiding bone loss after bone drilling by implant kit. This allows to maintain an adequate cortical thickness on both sides thus preserving periosteal nourishment on the buccal wall. The advantages relating to the use of PRF are also reported. The rationale for using PRF is to promote healing of surgical site by platelet growth factors, which can improve the vascularization of the surgical site, promoting neoangiogenesis.

Results: All the six cases treated showed excellent results with complete osteointegration. Also bone preservation was achieved with good aesthetic result and full patient satisfaction.

Conclusion: This technique could be extended to almost all implant insertions for preserving alveolar height at the time of drilling for implant insertion, due to the shape of the alveolar ridge. It is currently a minimally invasive technique with low risks and satisfactory clinical results that prevent implant complications or failure, particularly in elderly patients due to age-related conditions.

Tarsal-conjunctival flap for the reconstruction of the lower eyelid: our experience

Pierantonio Bellini[1], Attilio Carlo Salgarelli[2], Cristina Magnoni[3], Camilla Reggiani[3-4], Giacomo Setti[1-5], Ugo Consolo[1]

[1] UOC Odontoiatria e Chirurgia Oro-Maxillo-Facciale
[2] UOC Chirurgia Maxillo-Facciale, Azienda Ospedaliera Carlo Poma, Mantova, Italy
[3] UOC Dermatologia
[4] Clinical and Experimental Medicine Program, PhD Department of Surgery, Medicine, Dentistry and Morphological Sciences with Transplant Surgery, Oncology and Regenerative Medicine Relevance, University of Modena and Reggio Emilia, Modena, Italy
[4] Molecular Medicine, PhD, University of Parma, Italy

Introduction: Tarso-conjunctival flap advancement, first described by Hughes in 1937, is among the techniques of choice for reconstructing full-thickness lower eyelid defects so as to restore normal anatomy and function with the best possible cosmetic outcome. The procedure itself is a two-stage, eyelid-sharing technique for the reconstruction of full-thickness defects, which comprises at least 50 % (and up to 100 %) of the horizontal lower eyelid margin. The purpose of this study is to report our experience of a series of patients treated with Hughes procedure following malignant tumor removal.

Materials and Methods: We expose a clinical case of a patient with squamous cell carcinoma of the inferior eyelid; after tumor resection a Hughes flap was performed. The upper eyelid was everted and markings were done on the everted conjunctiva in such a manner that the distal incision on the conjunctival side of the upper lid was 4-5 mm away from the lid margin. Incision through the full-thickness of the tarsus was made in an inverted U shaped manner over the upper lid conjunctiva. The flap was raised by dissecting all levator aponeurosis attachments in the avascular pretarsal plane until the upper tarsal border was reached leaving only attached the majority of inserting Müller's muscle fibers and the conjunctiva. Dissection in this plane between Müller's and levator muscle was continued posteriorly until the flap could comfortably be advanced into the lower lid defect without any significant tension. The flap was sutured tarsus to tarsus into the defect, thereby recreating the posterior lamella of the lower lid. For recreation of the anterior lamella, a free skin graft was inset or an inferiorly based skin-muscle flap was advanced upwards. The Hughes flap causes temporary blindness due to obstruction until it is cut during second procedure after 3-4 weeks. The flap is divided into the planned new position of the lower eyelid.

Conclusion: Taking the clinical case presented as an example, we expose our clinical and operative experience. The Hughes procedure is a well-suited technique for reconstructing lower eyelid defects. Leaving Müller's muscle attached to the Hughes flap might prevent premature flap dehiscence. We prefer the use of a free skin graft for anterior lamella reconstruction.

The use of dermal substitute (Integra®) for extensive post-oncological resection of the scalp: our experience

Pierantonio Bellini[1], Cristina Magnoni[2], Camilla Reggiani[2-3],

Attilio Carlo Salgarelli[4], Giacomo Setti[1-5], Ugo Consolo[1]

[1] UOC Odontoiatria e Chirurgia Oro-Maxillo-Facciale
[2] UOC Dermatologia
[3] Clinical and Experimental Medicine Program, PhD Department of Surgery, Medicine, Dentistry and Morphological Sciences with Transplant Surgery, Oncology and Regenerative Medicine Relevance, University of Modena and Reggio Emilia, Modena, Italy
[4] UOC Chirurgia Maxillo-Facciale, Azienda Ospedaliera Carlo Poma, Mantova, Italy
[4] Molecular Medicine, PhD, Università degli Studi di Parma, Italy

Introduction: The reconstruction of vertex defects following large resections for skin tumors, in some cases involving the cranial bones, is still problematic. Various methods of reconstruction have been described in the past. Dermal substitutes are becoming increasingly popular in the management of these large defects, for example in cases of post-resection oncological defects, acute wounds with loss of substance, burns outcomes, etc.
Materials and Methods: A clinical case of a patient with squamous cell carcinoma of the vertex is presented, which makes it necessary, under general anesthesia, to remove at full thickness a large area of skin of the vertex, including the periosteum.
The reconstructive technique involves the use of an Integra® (Integra Life Sciences Corp., Plainsboro, NJ) dermal substitute positioned to cover the surgical breach. Integra® is a dermal regeneration template composed of a layer of bovine collagen crosslinked with glycosaminoglycan covered by a silastic membrane. The dermal substitute presents a particular management, therefore it will be described in addition to the methods of positioning in the sterile operating field, also the recommendations and the timing of medication, both outpatient and at home.
After 20-30 days from the first operation, the patient undergoes an operation under local anesthesia to cover the neo-dermis with a dermo-epidermic graft taken from the right thigh.
Results: Taking the clinical case presented as an example, we expose our clinical and operative experience. Wide excision and grafting of Integra®, a bilayer dermal regenerative matrix, were performed in all patients.
Conclusion: Integra is a safe and effective option in the reconstruction of scalp defects after the excision of multiple types of tumor, including SCC, BCC, MM. The use of Integra is recommended in elderly patients with multiple comorbidities who have a higher risk for potential complications in traditional surgery; these patients may in fact benefit from a lower anesthetic risk, a less complicated post-surgical care and limited morbidity at the donor site. Integra should also be used in the reconstruction of large and complex wounds and in case of bone exposure, as it helps to overcome the challenges related to wound healing in difficult areas.

CAD/CAM manufacturing cutting guides and customized titanium plates in surgery first upper maxilla repositioning

Antonio Troiano, Mario Rusciano, Brigida Iorio, Ciro Emiliano Boschetti, Giovanna Norino, Luigi Rugge, Fabrizio Chirico, Chiara Spuntarelli, Giada Albani, Elvis Kallaverja, Giovanni Corvo, Mario Santagata, Ivo Ferrieri, Vincenzo Santillo, Raffaele Rauso, Giuseppe Colella, Alfonso Marra, Angelo Itro, Salvatore D'Amato, Gianpaolo Tartaro

Dipartimento Multidisciplinare di Specialità Medico-Chirurgiche e Odontoiatriche
U.O.C Chirurgia Maxillo-Facciale
U.O.S. Chirurgia della Riabilitazione del distretto Oro-Maxillo-Facciale
U.O.C. Chirurgia Stomatologica dell'età evolutiva

Aim: In this case report tridimensional (3D) virtual planning in one patient with malocclusion (II Angle Class) is analyzed, to predict postoperative outcomes on hard tissue and produce CAD/CAM (Computer Aided Design/Computer Aided Manufacturing) cutting guides and titanium fixation plates that would allow the upper maxilla to be repositioned correctly in orthognatic first surgery
Methods: A complete CAD/CAM workflow for orthognathic surgery has 3 steps: 1) virtual planning of the surgical treatment, 2) CAD/CAM and 3-dimensional printing of customized surgical devices (surgical cutting guide and titanium fixation plates), and 3) computer-aided surgery. A virtual surgical plan was achieved by the combination of a 3D skull model acquired from computed tomography (CT) and surface scanning of the upper and lower dental arch respectively and final occlusal position. Osteotomies and movement of maxilla were simulated by Dolphin Imaging 11.8 Premium ® (Dolphin Imaging and Management Solutions, Chatsworth, CA). The surgical plan was transferred to surgical splints fabricated by means of Computer Aided Design/Computer Aided Manufacturing (CAD/CAM). Upper maxilla repositioning was performed using a CAD/CAM device: the surgical cutting guide was used during surgery to pilot the osteotomy line that had been planned preoperatively at the computer and the custom-made fixation titanium plates allowed desired repositioning of the maxilla.
Result: The patient had stable cosmetic results with a

high rate of patient satisfaction at the 1-year follow-up examination. No intra – and / or postoperative complications were encountered during any of the different steps of the procedure
Conclusion: The reported case confirms the clinical feasibility of the described computer-assisted orthognathic surgical protocol in II Angle class, surgically first treated. Further progress in the development of technologies for 3D image acquisition and improvements on software programs to simulate postoperative changes on soft tissue are required.

Digital planning and CAD/CAM (computer aided design/computer aided manufacturing) in orthognathic surgery with fibula flap and osteointegrated dental implants

Fabrizio Chirico, Chiara Spuntarelli, Luigi Rugge, Giada Albani, Elvis Kallaverja, Mario Rusciano, Brigida Iorio, Ciro Emiliano Boschetti, Antonio Troiano, Giovanna Norino, Giovanni Corvo, Mario Santagata, Ivo Ferrieri, Vincenzo Santillo, Raffaele Rauso, Giuseppe Colella, Alfonso Marra, Angelo Itro, Salvatore D'Amato, Gianpaolo Tartaro.

Dipartimento Multidisciplinare di Specialità Medico - Chirurgiche e Odontoiatriche
U.O.C. Chirurgia Maxillo - Facciale
U.O.S. Chirurgia della Riabilitazione del distretto Oro –Maxillo – Facciale
U.O.C. Chirurgia Stomatologica dell'età evolutiva

Aim: To face post traumatic or post oncological facial deformities is challenging: this is related to the multifunction activities of the face, such as chewing, speaking, breathing and also due to complex aesthetic of the face itself. In last years, facial reconstruction and rehabilitation for facial sequelae with computer customized fibula free flap has been largely performed to reduce the time of flap reshaping before to perform microsurgical anastomosis and to let an optimal flap insetting with plates already customized for the defect to reconstruct. However not only post oncologic defects can benefit from customized planning, also in orthognathic surgery is it possible a virtual planning for bones rearrangements. We present our experience in virtual planning with Customized Surgical Solution, intraoperative surgical approach and post-operative outcome in a post-traumatic patient with malocclusion, complex facial asymmetry and functional impairment, where we performed bimaxillary orthognatic surgery, genioplasty and fibula free flap transfer in which dental implants were already been placed. Furthemore, we underline how the use of virtual surgical planning and Computer Aided Design and Modelling can improve occlusal and aesthetic outcomes compared to traditional reconstructive treatment. A one stage reconstruction combining orthognatic surgery and fibula free flap with osseointegrated implants as one of the most interesting and current tool in facial reconstruction, especially in young patients, is emphasized
Methods: CAD/CAM patient specific surgical splints, cutting guides and plates were planned via the web-based Synthes PROPLAN CMF. The CBCT scan images in DICOM format were processed using ProPlan CMF 2.0software. Osteotomies and maxillary movement were simulated by Dolphin Imaging 11.8 premium. A surgical computer-assisted planning was achieved and customized surgical devices planned preoperatively as implant surgical guide, surgical cutting guide and titanium fixation plates were made. The patient in this study underwent bimaxillary orthognatic surgery and genioplasty combined to free fibula flap with osseointegrated dental implant for facial microsurgical reconstruction.
Results: Compared to traditional surgery without CAD/CAM (Computer Aided Design/Computer Aided Manufacturing), the use of customized solutions allows predictable outcomes, better aesthetical-functional outcome, reduction of withdrawal and insetting time, more accuracy in prosthetic rehabilitation, reduction of hospitalization costs, reduction of donor site morbidity, rapid resumption of walking. The functional and esthetic facial score based on patient satisfaction was significantly high.
Conclusions: Digital planning and CAD/CAM increase the accuracy of reconstruction, shorten free flap ischemia time, offer precise matching with a perfect bone fixation and fast bone healing with the achievement of great aesthetical outcomes, functional enhancement and quality of life improvement. Although the limits of acquisition costs, organization challenges complexity and low flexibility of intraoperative changes, we consider outstanding the superiority of the results achieved with the presented technique, allowing successful outcome in complex facial deformities that oblige an extremely precise reconstruction in respect of the imperative functional and aesthetic requirements of the cranio-maxillo-facial surgery.

Oral surgery

Case report: sinus lift vs tilted implants in HIV-infected patients under HAART

L. Abbruzzese, O. La Spesa Martinengo, G. Turbiglio, M. Parravicini, F. Pirani, R. Vinci

Department of Dentistry, IRCCS San Raffaele Hospital and Dental School, Vita Salute University, Milan, Italy

Aim: Evidence suggest that well-controlled HIV-infected patients are possible candidates to receive dental implants. However, literature regarding dental implant therapy in HIV-infected patients is still scarce and mostly based on case reports and pilot studies. Even more limited is literature regarding patients complex surgical procedures, like GBR or sinus lift, in HIV-infected. We present two clinical cases of different rehabilitation of two important posterior maxilla atrophy in HIV-infected immunologically stable.
Methods: The first case shows a middle-aged patient, under HAART, presented to the Department of Dentistry and Dental Prosthetics of the University Vita-Salute San Raffaele with a large defect in the posterior maxilla, as a consequence of pneumatized sinus as shown by CBCT. The only way to allow implant placement was sinus lift. A simultaneous approach was planned and implants were placed at the same time of sinus floor elevation. Deproteinized bovine bone matrix (Bio-Oss®, Geistlich) was used to augment the sinus and a collagen membrane (Bio-Gide®, Geistlich) placed over the lateral window used to access the sinus membrane. Two implants in site 14 and 16 were placed and stabilized in the residual alveolar crest achieving low primary stability. Therefore, a longer healing period was necessary and patient waited 9 months to re-entry. The second case reported is a male patient, 55 years old, under HAART, presented to the Department of Dentistry and Dental Prosthetics of the University Vita-Salute San Raffaele willing to replace teeth 24, 25, 26, which have been extracted more than 2 years ago. Because of the poor bone volume as shown bypanoramic x-ray, applying tilted implant in position 24 allowed implant placements without sinus lifting. This also reduced the treatment time, surgical procedures, and biological cost. Antibiotic coverage was used in both cases.
Results: Various studies are available regarding success rate of angulated implant placement at various time intervals. There are no differences in clinical performance between implants that are placed in an axial position when compared with implants that are intentionally tilted toward the distal aspect of edentulous jaws. The use of tilted implants promotes greater comfort for the patient rather than sinus lift. Moreover the insertion of fixture in the basal bone gives better outcomes and it provides better results than the insertion of bone grafts, as confirmed by the literature. Several types of complications may occur during and after the sinus elevation procedure. Although most short-term studies report similar results for HIV-infected and healthy patients when it comes to implant survival rates, evidence suggest that HIV-infected patients present higher risk of post surgical complications.
Conclusion: Considering all these things, when it is possible, placement of an angulated implant avoiding both invasive procedures like sinus lift and bone augmentation procedure should be the first choice of treatment, in particular for special needs patients.

Use of PRF to promote the healing of post-extraction sites in a patient undergoing bisphosphonate: a case report

A. Accarino[1], D. Izzo[1], G. de Paolis[2], L. Ramaglia[3], P. Bucci[4]

[1]DDS, postgraduate student of Oral Surgery School, Department of

Neurosciences, Reproductive and Odontostomatological Sciences, University of Naples Federico II, Naples, Italy
[2] Undergraduate student, Department of Medicine and Pharmacy, Dentistry School, University of "Grigore T. Popa", Iasi, Romania
[3] MD, DDS, Professor of Oral Surgery, Head of Oral Surgery School, , Department of Neurosciences, Reproductive and Odontostomatological Sciences, University of Naples Federico II, Naples, Italy
[4] MD, DDS, Professor of Oral Medicine, Department of Neurosciences, Reproductive and Odontostomatological Sciences, University of Naples Federico II, Naples, Italy

Aim: Bisphosphonates (BPs) are the most famous class of antiremodelling agents, widely used for the treatment of metabolic bone diseases that cause loss of bone mass, ranging from osteoporosis to cancer-related bone metastasis and also skeletal conditions in the oral cavity. BPs related osteonecrosis of the jaw (BRONJ) is an important complication associated with bisphosphonate therapy. It is characterised by an avascular area of necrotic bone in the maxillofacial area, with or without exposed bone, that does not heal within 8 weeks, in a patient who has no oral cancer or history of prior radiation therapy to the craniofacial region. BRONJ is a serious side-effect in patients affected by bone-involving malignant diseases, breast cancer, multiple myeloma, less frequently BRONJ has been reported in osteoporotic patients receiving oral or intravenous administration of bisphosphonates. Autologous platelet rich fibrin (PRF) demonstrated to enhance bone and soft tissue healing in oral surgery procedures and decreases the probability to develop BRONJ.
Methods: A sixtyseven years old patient with history of hypertension and severe osteoporosis was referred to Department of Oral and clinical Medicine of the "A.O.U Federico II di Napoli" to undego multiple dental extractions. In her medical history stands out a three year long oral treatment with Alendronic acid tablets for her osteoporosis. The patient stopped assuming bisphosphonate one week before surgery and restarted taking the drug four weeks after the extractions as suggested by the latest guide lines. Since two days before the surgery, the patient was given antibiotic prophylaxis with amoxicillin and clavulanic acid every twelve hours until re-epithelization of the sockets and 0.2% chlorhexidine dicluconate mouthwash for fifteen days three times a day. Later we performed anesthesia, luxation and avulsion of the teeth and a careful socket revision. At this point we prepared the PRF pads by centrifuging at 2700 rpm for 12 minutes twenty ml of patient's blood, than we made sure to had removed all the corpuscular component and applied the PRF blocks in the post extractive sites. At the end we applied vicryl sutures and made bleeding check.
Result: 7 days after surgery the sockets were in the process of re-epithelization, there was no swelling, bleedings, local or irradiate pain, functional disturbs, infections, rupture of sutures, alteration in healing processes. At the 30th day the wounds were re-epithelized and there was no Rx sign of BRONJ.
Conclusions: Through this case report we showed that the use of PRF helped to reach a favorable healing process of post extractive sockets in a potential BRONJ candidate.

Surgical marsupialization of oral ranula due to surgical sequelae: a case report

Giovanni Agrò[1], Matteo Miegge[1], Rossella Presta[1], Sogol Ghassemzadeh[1], Matteo Vala[2], Monica Penteneroa[2]

[1]Oral Surgery Specialty School, Department of Oncology, San Luigi Gonzaga University Hospital - Orbassano, University of Turin, Italy
[2]Oral Medicine and Oral Oncology Unit, Department of Oncology, San Luigi Gonzaga University Hospital - Orbassano, University of Turin, Italy

Background: Ranula took this name because of the particular clinical appearance that resembles the abdomen of a frog. It is due to submucosal saliva harvest within the floor of the mouth and depending on its dimension, it can impair eating and swallowing. Depending on its pathogenesis it can be more properly defined as a mucocele or a retention cyst from the sublingual gland or seldom from the minor salivary glands of the floor of the mouth. Rarely, its onset may represent a sequela of surgical intervention involving the floor of the mouth or the ventral tongue. The first-line treatment for this pathology is a controversial issue in the literature. Reported surgical interventions include: saliva aspiration, complete excision of the ranula and/or sublingual gland, marsupialisation, dissection, cryotherapy, sclerotherapy, hydro-dissection and LASER ablation.
Case report: A 60-year-old male underwent surgical excision of a squamous cell carcinoma of the left ventral tongue (pT1pN0). Nine months after surgery he came to our observation for the sudden and fast onset of a swelling lasting from about 7 days, located on the left side of the floor of the mouth. On clinical examination, the observed superficial submucosal swelling had a maximum diameter of about 18 mm and was located along the scarring area of the previous intervention. It showed a yellowish colour and revealed on palpation the presence of liquid content. Aspiration was performed with a diagnostic rather than therapeutic intent, of a mucous fluid resulting in a complete and immediate solution of the swelling. Therefore, a clinical diagnosis of ranula was performed, in the suspect of an iatrogenic pathogenesis due to scarring sequelae of the previous surgical excision.

The swelling relapsed in about 7 days, Ultrasound scan was able to exclude a plunging ranula beyond the mylohyoid muscle and surgical marsupialization was scheduled. Healing was uneventful and the patient is free of disease (last follow-up visit performed 1 year after marsupialization).
Discussion: The present case show effectiveness and safety of marsupialization in an iatrogenic ranula. According to the literature, large ranulas are usually associated with damaged sublingual gland with a recurrence rate exceeding 50% for treatments not including the sublingual gland removal. Nevertheless, the not negligible risk of damage to adjacent structures justify at first the choose of less invasive therapeutic options. Marsupialization and micro-marsupialization represent a first-line option frequently chosen aiming to avoid invasive surgery. Such techniques imply interventions characterized by reduced surgical time and fast healing.
Conclusion: Even facing potential failure rates reported in the literature, in the presence of large ranulas marsupialization represents a reasonable first-line approach when considering a cost benefit ratio.

Analysis of systemic and oral complications in patients underwent kidney transplantation

Alessandra Arduino, Ruggiero Tiziana, Pol Renato, Camisassa Davide, Stan Mirela, Carossa Stefano

Department of Surgical Sciences, Oral Surgery Section, CIR Dental School, University of Turin, Turin, Italy

Aim: Evaluate the relation between the possible presence of oral infectious foci at the moment of the transplantation and the systemic complications in the post-transplantation period. It is also given an analysis about the logistic aspects of the management of these patients in the period before and after the transplanta
Methods: It was analyzed a sample of 70 patients underwent kidney transplantation, divided into two groups:

- Group A: 50 (71%) patients underwent kidney transplantation without oral infectious foci
- Group B: 20 (29%) patients underwent kidney transplantation despite the presence of at least one oral infectious focus.

The patients belonging to these groups, during the pre-transplantation period, followed at Dental School, were treated following the most conservative protocol; for some patients elective treatments, like endodontic retreatment, have been used when necessary following a careful planning on the base of the clinical and radiological analysis. To evaluate the timing for dental treatment it was analyzed the time between the diagnosis of kidney pathology, the transplantation, the first and the last dental visit. At last fever, number of fever episodes, pneumonia, mucositis, urological complications, other complications, acute rejection and death were analyzed as possible complications in the post transplantation period and a correlation of these events and the presence of infectious oral foci was done.
Results: from data's analysis have been highlighted no significant differences between the two groups about the complications; the only exception was for the patients with urological complications, where an improvement of this condition was seen after 6 months from transplantation in the group treated for the infectious foci. Moreover, in the same group, the decrease of the fever in the first 6 months after transplantation was almost significant. In the first 6 months after transplantation it has been seen that the complications were less in the group treated for the infectious foci, except the urological ones, which have no significant relation with the oral infectious foci. The time for dental treatment was of about 20 months, while the time between the diagnosis and the transplantation was about 100 months.
Conclusions: in the patients underwent kidney transplantation there is no significant difference about the post-transplantation complications comparing the group in which the oral infectious foci were treated and the other one in which remains at least one oral infectious focus. Considering the dentist as a dental-care provider, in order to avoid possible complications and to improve the psychological impact of the oral component on these subjects, it is suggested to treat all the infectious foci in the most conservative way in the pre-transplantation period.

Histological evaluation of bone regeneration with concentrated growth factors

F. Bertoni, E. Audino, R. Zotti, C. Trentini, L. Rodella, S. Salgarello

University of Brescia, Italy, Dept. of Medical and Surgery Specialties, Radiological Sciences and Public Health

Aim: Tissue regeneration is one of the most studied aspects of modern medicine and the development of platelet concentrates is included in this context. This paper aims to evaluate the possible benefits deriving from the use of Concentrated Growth Factors in regenerative bone surgery or alveolar ridge preservation. The effects on soft tissues and hard tissues are analyzed, from the clinical point of view and from the histological point of view through the analysis of bone coring.
Methods: Adopting certain exclusion criteria, two healthy and adult patients were selected. The CGF

protocol for membrane formation and for the achievement of Sticky Bone was applied. Raised a full-thickness flap, it is placed on the recipient sites the Sticky Bone which is covered by the membranes of CGF; the flaps are then closed by first intention. Six months after the intervention and after CT evaluation of the regenerated sites the surgical re-entry is programmed during which, at the same time of the implant insertion, a bone carrot is taken for the histological analyzes. A total of 4 bone coring were taken. Two colors are made in the laboratory: hematoxylin-eosin for the general evaluation of the morphology of the samples and Masson-Goldner's trichrome for quantitative analyzes. In particular, the percentages of vital bone, non-mineralized tissue and medullary spaces containing or without the biomaterial have been calculated.

Results: Clinically, it has been observed that the application of CGF positively influences the healing of soft tissues, at 4 days it showed no signs of inflammation and appeared pink at 7 days. Healing appeared complete at 15 days without signs of wound dehiscence. Patients reported no pain or swelling exceeding normal parameters and there were no post-operative complications. From the histomorphometric analysis it was found that the vital bone constituted 51 ± 13%, the 12 ± 2% was represented by non-mineralized tissue, while the medullary spaces with the presence or absence of the biomaterial employed 37 ± 5%.During coring the perception of consistency was comparable to a grade IV of the Misch scale; the four coring picked up presented some critical points during the various processing steps due to a different consistency in the different parts of the sample. This fragmentation has made the evaluation and orientation of the samples more difficult. The vases are recognizable and well represented, especially in non-mineralized tissue. The presence of inflammatory elements was not observed.

Conclusion: From the clinical point of view it was observed how the CGF intervened significantly in soft tissue healing. From the histomorphometric analyzes, different signs of bone regeneration emerged: the presence of neovascularization and the percentage of neoformed vital bone, some of which showed a non-homogeneity that could be interpreted as a sign of active bone renewal; furthermore, the still present biomaterial was surrounded by tissue being formed. However, these aspects do not allow, at the moment, to sustain that the process has been accelerated and improved by the addition of CGF. In fact, the study has several limitations: the small number of the sample and the difficulties encountered during the processing of the bone coring do not allow to conduct a statistical analysis. Therefore, studies are still needed to develop precise clinical protocols that make it possible to exploit the CGF's potential.

Biological evalutation of autologous bone samples taken with various methods

E. Audino, R. Zotti, R. Belotti, M. Rampinelli, D. Dalessandri, S. Salgarello

University of Brescia, Italy, Dept. of Medical and Surgery Specialties, Radiological Sciences and Public Health

Aim: Autologous bone sampling is a well documented procedure in oral and maxillofacial surgery, therefore there are various methods of sampling bone and particulate blocks. It is suggest that small bone particles exhibit a larger total area, but that mechanical manipulation reduces the number of viable cells taken with greater damage to small particles. The aim of the present work is to determine the number of viable cells in mandibular and maxilla bone chips, evaluating whether there is a significant difference between different methods of sampling and collection.

Methods: The bone-chips were taken using the following methods: scraper (Savescraper®), microscraper (Micross®), implant, piezoelectric scalpel OP3 (Piezosurgery®) and round burs surgical drill 3.5mm. For the surgical drill and piezo scalpel method, the bone chips were conveyed by the surgical suction device connected with collecting systems with a basket or piston filter. The samples were seeded in Dulbecco's Modified Eagle's Medium (DMEM) of 5 cm diameter and incubated at 37 ° C in 95% air and 5% carbon dioxide. The osteoblast survival curves were evaluated in the 30-day time unit, highlighted in microscopy by Burker's chamber. The results were compared with the survival curves of block-section samples of mandible, maxilla and cranial theca.

Results: The study investigated 18 methods of sampling, for each method 3 samples were taken for a total of 54 samples. Among these, 5 samples taken by surgical suction were excluded for bacterial superinfection. The osteoblastic survival curve was higher with bone-chips taken with implantation method (over the 95% at the 30th day) followed by the scaper technique (about 90% at the 30th day) and by the piezoelectric scalpel method and with round burs surgical drill with (close to the 50%). The block-section samples have already produced stratification over the 95% at the 25th. The diversification of the maxillar versus mandibular site did not provide significant results.

Conclusion: The use of one sampling method depends essentially on the surgical occasions. Bone chips produced by drilling the implant site preparation protocol are the most performing, above all because the bone marrow and cortical components are removed. Otherwise the use of the scraper should be preferred. In fact, the scraper is a method of picking

little traumatic and with lower risk of contamination, which produces a coarse-grained bone chips with high osteoinductive capacities.

Socket-shield technique: a case report

Alberto Pispero, Ivan Bancora, Elena Maddalone, Giulia Pradal, Daniela Sorrentino, Camilla Zenoni, Francesca Iellimo

Università degli studi di Milano, Dipartimento di Scienze biomediche, chirurgiche e odontoiatriche - ASST santi Paolo e Carlo, Ospedale San Paolo, UO Odontostomatologia II, Milano

Aim: Healing of extraction sockets leads to dimensional changes that affect the implant placement and its emergency profile. Clinical studies by Hürzeler et al. suggest that retaining buccal root fragment of hopeless teeth may avoid tissue alterations after tooth extraction. The aim of this report is to present the surgery procedure known as the socket-shield technique (SST) as an alternative approach to prevent hard and soft tissue resorption processes with an immediate implant placement.
Methods: 75 year-old female patient came to our clinical observation presenting rooth decay on element 13. Based on clinical and radiografic exams, no restaurative alternatives were possible. Considering the absence of pathological periodontal probing it was possible to plan an immediate implant placement. Local infiltration anesthesia (mepivacaine 2% + adrenaline 1:100000) was administered at the surgical site. Sectioning of the root was done in two steps. In the first step, sectioning was done mesiodistally till apical two-third with the help of surgical bur parallel to the long axis of the tooth. In the second step, the direction of the bur was changed to an oblique direction toward the buccal surface in order to detach the palatal fragment. The palatal aspect was atraumatically extracted with the help of a Coupland elevator, leaving the buccal aspect untouched into the alveolus and remaining buccal fragment was trimmed by leaving only 2 mm in a C-shape as a shield. After that the implant was placed (BLT™ Straumann 4.1 x 12 mm), paying attention to not getting in contact with the root fragment, that must be left untouched during all the procedure, in order to preserve its stability and its periodontal ligament. The primary stability was successfully achieved and a provisional prosthetic manufact was placed immediately after implant insertion.
Results: No postoperative complication was noticed and healing was uneventful. Primary stability was achieved and clinical and radiografic exams immediately after surgery show proper implant placement . Six months follow-up shows proper healing, and healthy peri-implant tissues. Neither recession or bone resorption were recorded. This case report shows satisfying preservation of postextraction tissue and buccal bone with successful healing of the implant.
Conclusions: Numerous studies have shown that the alveolar ridge undergoes bone remodeling after tooth extraction, in terms of both shape and width of the buccal plate. The bone loss seems to be a result of destruction of the periodontal ligament consequent to tooth extraction. This resorption may leeds to recession, undesiderable especially in the aesthetic zone. Severals authors found that bone resorption could be prevented by the retention of the buccal aspect of the root with its periodontal ligament and immediate implant placement. The immediate implant placement supports the buccal root fragment and thereby prevent resorption and collapse of the buccal soft tissue. In addiction, the root fragment will increase the width of the buccal bone plate to more than 2 mm, reduceing the amount and incidence of buccal bone loss. Histological studies by Hürzeler et al. showed cementogenesis between the implant surface and the retained root surface and clinically successful osseointegrated implant, demostrateing the validity of the SST in preserving buccal cortical plate and peri-implant tissues.

Severe oro-facio-cervical odontogenic abscess and phlegmons: complications, diagnostic and therapeutical management of 61 hospitalized patients

G. Barile, F. Dell'Olio,D. De Falco, L. Barulli, V. Acella, P. Sportelli, A. Tempesta, G. Favia

Complex Unit of Odontostomatology, DIM, Interdisciplinary Department of Medicine, Aldo Moro University of Bari, Italy

Aim: The loco-regional and systemic spreading of odontogenic abscess is a life-threatening complication of wrong or delayed treatment. Every year, lots of patients with severe facial and cervical swelling, erythema and pain caused by odontogenic infections reach emergency room. They may arise from periapical abscesses to superficial and deep infections in the neck. If untreated, they lead to complications that often require hospitalization, surgical drain, extraction of involved teeth and intravenous antibiotic therapy effective to multiple-resistant bacteria. About causative bacteria, 73% were Streptococcus, 48% were Prevotella, and 47% were Peptostreptococcus. This study describes cases of severe odontogenic abscess and phlegmons referred to Complex Operating Unit of Odontostomatology of the "Aldo Moro" University of Bari between 2017 and 2018.
Methods: At emergency room, all patients underwent

standard blood complete tests, electrocardiogram and orthopantomography; nuclear magnetic resonance was used to assess the structures invaded by suppuration in case of phlegmon. Intraoral incision, performed to drain pus (used for antibiogram) and to reduce trisma (mandatory for a wide mouth opening during extraction), could be associated to an extraoral one, and was followed by the application of a drainage consisting in iodate gauze. During recovery, hearth rate, body temperature, ventilation rate, oxygen saturation, blood pressure were monitored for all patients. All patients received intravenous analgesics, gastro-protectants, and multiple-antibiotic therapy based firstly on intravenous cefazoline, then on susceptibility test's results. After causal tooth's extraction, an alveolar curettage was carried out and then a trans-alveolar drainage by iodate gauze was placed. All drainages were daily substituted and washing of abscess cavity with physiological solution was performed until the patients' discharge, that occurred after their complete remission. Medical records were collected for all patients in a database and analyzed using descriptive statistical analysis.

Results: 61 patients were selected for this study, 37 of them were male and 24 females. 36 cases occurred in 2017 and 25 in 2018. Odontogenic infection occurred mostly in posteriors sectors; mandibular molars form the 50% of the entire sample. In particular 9 cases from anterior sextants, respectively 6 from superior arch and 3 from inferior arch, while 52 infections generate from posterior sectors: 19 from superior arch and 33 from inferior one. Mean time of hospitalization was 3.4 days to complete remission and then to discharge.

Conclusions: Fundamental is the role of dentists operating on the territory for prevention, early diagnosis and effective treatment of this disease. In any case, it's necessary to avoid the hospitalization of such patients because of social benefits-costs balance and for the few structures able to cope with this problem. Moreover, the evidence of a great incidence of odontogenic infections in the posterior sector allows a reflection on the possible correlation between anatomical peculiarities of the supposed dental elements and bacterial infiltration. In fact, literature confirms the greater incidence of cario-periodontal lesions, and consequent odontogenic infections, that can be found in molars. Impacted or semi-impacted wisdom teeth presence is a further risk factor for pericoronitis and both occlusal and interproximal caries.

Human dental auto-transplantation for the replacement of lost teeth: retrospective 10 yrs follow up study

Rossella Battaglia[1], Michele Melillo[1], Luca Boschini[2], Domenico Bulzacchelli, R. Vinci[3], G. Sammartino[4], Filiberto Mastrangelo[1]

[1]Department of Clinical and Experimental Medicine, University of Foggia, Italy
[2]Private practice, Rimini, Italy
[3]San Raffaele Ateneo Vita-Salute Milano, Italy
[4]University Federico II Napoli

Aim: A traditional fixed partial denture or an osteointegrated implant are used to restore an irremediably compromised tooth. Actually tooth autotransplantation represented a crucial challenge to a successfull rehabilitation. Even if dental transplants were less practiced and understood, the International literature considers it the first choice on condition that donor tooth expendable is compatible and available for the receiving site (Chung 2014). For expendable tooth we imply an element whose extraction does not figure out a considerable biological cost. The advantages in carrying out this technique are numerous: use of an autologous element, the keeping of tissue tropism, aesthetic and functional restoration and then, the reduction of the economic cost. The purpose of this retrospective study was to evaluate in human the survival and success rate of auto-transplanted teeth to rehabilitate jaws after tooth loss.

Materials and methods: Twenty teeth were auto-transplanted in 19 patients between 25 and 47 years (average age of 37 years), from 2003 to 2008 and followed for 10 years. All patients received the third molar as a donor tooth to replace first or second compromised molar. The procedure was extensively documented in literature and provide gently avulsion of the donor tooth after compromised tooth extraction, the adaptation of the receiving alveolus and then the teeth splinting for 2 weeks. The endodontic treatment and the restoration of the transplanted tooth were performed after 15 days. No prosthesis was placed. The survival and success rate were detected. After 10 yrs the dental element were considered as Survivor when were not extracted, and as failure when the element has developed any root problem during the same time and needed to be extracted. The success rate was assessed when survived elements did not develop root pathology.

Results: The average follow up was 10.4 years (from 8 years up to 13 years), during this period only one tooth was lost, determining a 95% survival rate. The cause of the failure transplant was due to the alveolitis of the receiving site. One element developed an inflammatory root resorption that was resolved after an endodontic treatment, the tooth is nowadays functional. The success rate is 90%.

Conclusions: The results of survival and success rate are in complete agreement with the most

modern literature and confirm that the technique of autotransplantation is a reliable procedure, when the protocols and indications are strictly followed. The values obtained can be compared to those of other therapeutic alternatives at 10 years. dental transplantation, in selected cases, can be considered a valid therapeutic option to the compromised teeth replacement, and an effective alternative to implant rehabilitation.

Bone graft in upper jaw cyst cavity: a case report enucleation of bilateral maxillary cysts and use of xenograft to repair bone defect: A case report

E. Battista, M. Cacciola, M. Menditti, F. Scotto, L . Ramaglia, A. E. di Lauro

Department of Neuroscience, Reproductive Science and Odontostomatology Program of Oral and Reconstructive Surgery Head Professor Gilberto Sammartino University of Naples Federico II

Aim: The inflammatory cysts are the most common benign lesions observed in dentistry. The purpose of this study was to investigate the use of Xenograft in clinical treatment and enucleation of maxillary residual cysts. Furthermore, we assessed the potential use of bone graft to repair the bone defect caused by chronic infection.
Methods: We report a case of a 29 years old woman has presented at our department with a bilateral inflammatory maxillary cysts. The patient had a chief complaint of recurrent swelling and pain associated to the upper jaw. The patient medically was fit and well, smoking 10+ cigarette a day. A radiological assessment was performed. The xray showed radiolucency of the area around 1.2 and 2.2. CBCT scan was taken in order to assess the structure and its anatomical connections of the cysts. The patient was admitted has inpatient and elective surgery was planned under general anaesthesia. Paramarginal incision and full thickness flap from distal 13 to distal 23 was raised. The cyst was visualised and enucleation of the both cysts were carried out. The Cyst cavity was carefully debrided and rinsed with sterile N Saline. The right cyst cavity was grafted with Xenograft® and resorbable membrane was applied. Left Cystic cavity was left to heal on its own. Patient was then sutured tension free with 4/0 Vicryl® rapide with continue lock suture. The patient was discharged at home after 1 day, with full course of Amoxicillin/clavulanic acid at 1gr two time daily per 7 die, painkillers was advised to taken as required from the patient, Chlorhexidine 0.2% three times daily per 14 days. Further postoperative follow up was carry out at week one and two. Sutures were removed and wound was checked after one week.
Results: Patient was left to heal for 7 days and review was carried out. The patient did not have any complain. No signs of swelling, infection, numbness, bruising was detected upon follow up at week one and two. New CBCT was requested at month 6. We have found that cyst cavity was filled and improvement of the buccal bone on right site. Conversely left side the site was still healing and new bone forming and defect of the buccal bone was still present. Hounsfield unit scale value on the grafted site showed a range from 600 to 1000 HU, whereas on the left side the range was from 80 to 300 HU.
Conclusions: Treatment of cystic lesion of the upper jaw using xenograft and resorbable membrane was showed to be superior to no treatment with biomaterials in terms of healing of the cystic cavity. This procedure is safe and effective and good alternative to no other treatment methods. Long-term and comparative studies are required to evaluate its advantage over no other methods of treatment.

A lateral approach for sinus lift surgical guided: a case report

E. Battista, M. Cacciola, A. Dell Aquila, G. Vitiello, G. Sammartino

Department of Neuroscience, Reproductive Science and Odontostomatology Program of Oral and Reconstructive Surgery Head Professor Gilberto Sammartino University of Naples Federico II

Aim: Nowadays has been become crucially important be accurate and predictable in implant dentistry. The introduction of digital technology has marked a step forward in Dentistry. The aim of this study is to describe the digital workflow in lateral sinus lift approach computer guided.
Methods: We report a case of 65 years old lady partially edentulous on the upper right quadrant. The patient was fit and well, no allergies and no medication has been reported. The main concern of the patient was to rehabilitate the upper right quadrant after surgical extractions were carried out. the patient did not have enough bone in order to place the implants on the above area and sinus lift approach was the most valid alternative. At the time of the first consultation digital impressions were taken and CBCT scan was requested. We used Blue Sky Bio® (implant planning software) in order to plan our fully guided surgery. We planned to place three implants (Snucone®) at region 1.4, 1.5 and 1.6. The implant planning was fully exported from DICOM to STL file. We Used MeshMixer® (Cad-CAM software) to design our "guide" for the lateral sinus lift approach procedure. The guide was 3d Printed with Cel Robox®

3D. The patient surgery was carried out under local anaesthesia. Full thickness flap was raised and the 3d printed guide template was applied. We started to do the osteotomy of the buccal bone using the guide and piezosurgery®. The Schneiderian membrane was carefully raised and bone graft was applied into the maxillary antrum. Using the same surgical guided stent we placed three dental implants, achieving a good torque and primary stabilization. The flap was closed tension free with 4/0 Poliestere. The patient was discharged at home after 1 day, with full course of Amoxicillin/clavulanic acid at 1gr two time daily per 7 die, painkillers was advised to be taken as required from the patient, Chlorhexidine 0.2% three times daily per 14 days. Further postoperative follow up was carried out at week one and two. Sutures were removed and wound was checked after one week.

Results: The patient did not have any complaint. No signs of swelling, infection, numbness, bruising was detected upon follow up at week one and two.
We performed a new radiograph at 3 months that shows a good healing of the bone and good positions of the dental implants.

Conclusions: This method has several advantages as the lateral window was easily accessible and the osteotomy more accurate. In fact, this technique avoids further errors that might be performed by the surgeon doing a not correct design of the lateral window for sinus lift procedures. Furthermore, the surgical guided technique for sinus lift procedure can help to detect and avoid some complications connected with the presence of the oro-antral artery and osteo septum. This procedure is safer and effective and a good alternative to the classical lateral approach procedure. Long-term and comparative studies are required to evaluate its advantage over the classical technique lateral approach.

Effects of severe hypoxia on periodontal ligament stem cells: preliminary results of an in vitro study

F. Bennardo[1], A. Di Vito[2], E. Chiarella[2], F. Baudi[2], T. Barni[2], A. Giudice[1]

[1]School of Dentistry, Division of Oral Surgery and Pathology, Department of Health Sciences, Magna Graecia University of Catanzaro, Italy
[2]Department of Experimental and Clinical Medicine, Magna Graecia University of Catanzaro, Italy

Aim: Periodontal ligament (PDL) has been reported to be a convenient source of mesenchymal stem cells. The availability of periodontal ligament stem cells (PDLSCs) for tissue engineering is strongly limited due to the low number of cells that can be obtained from a single sample, therefore an expansion process is required in vitro. In the last years, great attention has been directed to the role of low oxygen tension (hypoxia) in culture medium on the phenotype, differentiation potential, migration and proliferation, and gene expression of mesenchymal cells derived from different sources. Actually, the available data on the behavior of PDLSCs when exposed to low oxygen concentrations are conflicting, due to the different culture conditions such as O2 concentrations (1%, 5%, 10%, etc.), exposure duration, and method of induction of hypoxia. Moreover, most of the researches in this field focused on different source of mesenchymal stem cells, such as bone marrow, adipose tissue, umbilical cord and Wharton's jelly. The aim of this study was to evaluate the effect of a severe ([O2] <1%)and chronic (> 1 week) hypoxic exposure on phenotype, proliferation, migration and differentiation potential of PDLSCs.

Methods: PDLSCs were harvested from healthy third molars (single patient) after tooth extraction. PDL tissue was mechanically removed by a Gracey curette, and a single-cells suspension was obtained enzymatically by digesting with 2mg/ml collagenase. Isolated cells were seeded in a 6-well culture dish. When cells became 80-90% confluent, they were subcultured (4 x 103/cm2 in a 6-well dish) until passage 6. Cell cultures were maintained at 37°C in 5% CO2 humidified air, indicated as normoxic conditions (ambient O2 concentration). For hypoxic cultures, cells were maintained in hypoxic incubator (1% O2). Cells at passage 3 or 4 were used for the subsequent experiments. Flow cytometry analysis and cell proliferation assay were carried out in both normoxic and hypoxic conditions. The osteogenic differentiation of PDLSCs in normoxic and hypoxic conditions was induced by culturing cells in the presence of β-glycerophosphate, dexamethasone, and L-ascorbic acid for 3 weeks. The osteogenic differentiation was assessed by alkaline phosphatase (ALP) activity, mineralization (alizarin red staining) and gene expression of osteogenic markers. For each experiment, cells derived from at least three different individuals were used.

Results: Our findings indicated that severe hypoxia did not alter the expression and the percentages of MSCs markers (CD73, CD90, CD105) after 1 week of exposure. Cell growth of hypoxic PDLSCs was not altered during the first week of exposure, while resulted impaired after 14 days of exposure. Interestingly, under hypoxic conditions, expression of osteoprogenitor markers ALP, collagen I, Runx2, Msx2 was down-regulated markedly. When hypoxic PDLSCs were subcultured into osteogenic medium, both production of mineralized tissue and ALP activity were observed, however the expression of osteoprogenitor and osteoblast markers appeared altered.

Conclusion: There is a mounting evidence that "hypoxia can affect the biology of mesenchymal stem cells". In this view, the behavior of hypoxic PDLSCs strongly depends on oxygen concentration and exposure duration. Our preliminary results may provide useful insight regarding the behavior of PDLSCs in their hypoxic physiological niche.

Titanium Intolerance: Fact or Fiction

M. Bergamini, T.G. Wiedemann

Department of Oral and Maxillofacial Surgery at New York University College of Dentistry

Aim: The aim of the ongoing study is to evaluate a possible correlation between biological implant complications and a metal adverse response to titanium dental implants.
Methods: The authors performed an electronic search in several databases such as Pubmed, relating to key words such as: "titanium intolerance", "titanium hypersensitivity", "titanium allergy" and "dental implants intolerance". A total of 31 articles qualified for the review.
Results: Recent studies reported sporadic presence of a hypersensitive reaction to titanium alloys. An accelerated corrosion of titanium in a specific environment such as the oral cavity could lead to elicit an immune response. Titanium may generate a hypersensitivity reaction type IV with a sensitization phase followed by an elicitation of an immune response on a subsequent exposure of sufficient concentration. Studies revealed that an idiopathic and rapid marginal bone loss around the implant surface might be related with titanium hypersensitivity in a subgroup of patients chronically exposed through dental implants. Melisa Test is considered to be the most appropriate diagnostic tool to determine titanium intolerance and measure its severity.
Conclusion: Concerns have been raised regarding titanium's potential to induce hypersensitivity or inflammatory reactions in the host tissues which could lead to biological complications and even loss of dental implants in certain cases. There is an association between biocorrosion, presence of titanium particles, and biological implant complications, but there is insufficient evidence to prove an unidirectional causal relationship. Nevertheless, this issue largely contributes to the debate surrounding the value of alternative implant materials, mainly zirconia nowadays.

Pregnancy and dentistry: a literature review

C. Bacci[1], A. Berto[1], S. Piovan[2], E. Bressan[1], S. Sivolella[1], G. Zanette[1]

[1]Department of Neurosciences (DNS), Dentistry Section, Chair of Dental Anesthesia, University of Padua, Via Giustiniani 2, 35128 Padova, Italy
Director: Prof. Edoardo Stellini
[2]Ulss 2, Marca Trevigiana, Regione Veneto.

Aim: Pregnancy is a unique moment in a woman's life, followed by the relevant physiologic changes, both physical and emotional, which may adversely affect oral health. Pregnancy represent also an embarrassing situation for the unskilled and not updated dentist, due to the unique physiological changes of the mother/fetus unit and the frequent use of many different drugs in the modern dental practice. The purpose of this study is to critically review the international medical literature on the complex relationship between pregnancy and dentistry, to evaluate the most frequent conditions that occurs in this period, their causes and risk factors, their implications on the safety of dental treatments and possible adverse birth outcomes.
Methods: To review the international literature on this topic, a Medline/COCHRANE search was carried out by the use of specific keywords and MeSH terms, properly combined with the boolean operators "OR" and "AND".
Results: According to the topic and the aim of the study, the research led to 373 publications among guidelines, meta-analysis, systematic and non systematic reviews, collected from 2000 to 2018. At the end of the review process 146 publications were selected for inclusion in the present study.
Conclusion: One of the most frequent conditions noticed in the mouth of the pregnant patient is periodontal disease, as gengivitis or periodontitis, which worsening is caused by an increased inflammatory and immune response in the host; its association with adverse pregnancy outcomes is supported by conflicted results; periodontal treatment did not show a significant reduction on the adverse outcomes or, on the other hand, any risk for the mother or the fetus. Many dentists, due to fear or lack of preparations, do not provide oral health care to pregnant women, nevertheless preventive, diagnostic and restorative dental treatment is safe also throughout pregnancy and effective in improving and preserving oral health. There is a safe alternative for any category of the most common medications employed in dental settings, as antibiotics, analgesics, antiseptics and local anesthetics; likewise, diagnostic radiographs are not absolutely contraindicated. The best time to perform routine dental treatment is the second trimester (pregnancy weeks 14 to 27), but it can be done at any time in case of dental urgency, regardless of the gestational age.

Is it necessary to treat patients undergoing anticoagulant therapy at the hospital?

Carlotta Bonifaci, Francesca Zotti, Massimo Albanese

Section of Dentistry and Maxillofacial Surgery, Department of Surgical Sciences, Paediatrics and Gynecology, University of Verona, Italy

Aim: The management of patients taking oral anticoagulant is still a problem that general dentists have to face in their daily clinical practice. A retrospective study, with a literature and guidelines review, aimed to evaluate the real faesability to treat this kind of patients in private practice.
Methods: The present retrospective study conducted at the AOUI(Azienda Ospedaliera Universitaria Integrata) of Verona, analysed 35 patients undergoing oral anticoagulant and antiaggregant therapy who underwent minor oral surgery. Patients were divided into three groups: no drugs group, oral anticoagulant group, antiaggregant group. The procedures were classified into low, moderate and high bleeding risk.
Low bleeding-risk procedures are local anaesthetic infiltration, single dental extraction, soft tissue biopsy less than 1 cm in size, supragingival prophylaxis, placement of rubber dam, restorative procedures, crown preparation, root canal therapy, prosthetic rehabilitation of implants, and removal of orthodontic brackets and bands. Moderate bleeding-risk procedures are local anaesthesia nerve block, multiple simple extractions (less than 5 teeth), soft tissue biopsies ranging from 1 to 2.5 cm in size, placement of single implants, infragingival prophylaxis (6-12 teeth), and localized gingival surgery (less than 5 teeth). High bleeding-risk procedures are multiple extractions of more than 5 teeth, surgical extractions requiring raising of mucoperiosteal flap and bone removal, soft tissue biopsies larger than 2.5cm in size, osseous biopsies, removal of torus, placement of multiple implants, complete periodontal treatment of all the oral cavity, gingival surgery of more than 5 teeth, endodontic surgery. Among the patients, two were taking the drugs for Pulmonary Embolism, eight were taking caradioaspirin, while the remaining 33 had heart diseases (AF, myocardial infarction, prosthetic heart valve, arrhytmia). All patients taking VKAs or DOACs were asked to bring a cardiologist permission and only four of them had to switch their usual therapy with low molecular weight heparin (LMWH). INR was requested if the patient was taking VKAs, to monitor the anticoagulation status. Patients were seen at the time of the procedure and after 15 days to evaluate:
1) if there was intraoperative and post operative bleeding: persistent oozing or marked hemorrhage despite mechanical compression with gauze pads for 20 minutes(Mauprivez) between patients taking VKAs, DOACs or antiaggregant and the control group 2)wound and soft tissues healing.
Results: None of the patients among the two groups had intraoperative bleeding that could not be controlled by local hemostatic measures (compression with gauze pads, sutures, wound filling with oxidised cellulose). Only two patients had persistent bleeding requiring further intervention and all patients presented good healing 15 days after extraction was performed.
Conclusion: The clinical findings confirmed results in recent literature and guidelines. Patients undergoing anticoagulant therapy can be managed in private practice if adequate preventive measures are followed:
- A complete medical and pharmacological history should be taken before the procedure;
-the procedure should be performed in the morning;
- A communication between surgeon/dentist and patient's physician is necessary, to decide the risk of bleeding of the procedure and the patient's thromboembolic risk. A decision whether a bridge therapy with LMWH should be given to the patient before oral surgery procedure will be taken.
-DOAC therapy can be continued in patients undergoing oral surgery.
- For patients undergoing VKAs therapy, INR should be checked the morning of the procedure: if INR is <2.5 the procedure can be safely performed;
- Local hemostatic measures, like compression with gauze pads, sutures, wound filling with oxidised cellulose, can help control bleeding.

Evaluation of bone stability in 33 patients treated with 'all on four flat technique'

C. Borgioli, R. Conti, A. Gonnelli, I. Di Maggio, G. Pagavino, P. Tonelli

Università degli studi di Firenze, Department of Oral Surgery, Florence, Italy

Aim: Rehabilitation of atrophic mandible with 'all on four' is a well documented technique and is described in literature like a good cost effective therapeutic options that allows decrease morbidity and time of treatment with stable clinical results. This type of rehabilitation enables overload the anatomical limits of inferior alveolar nerve with the placement of 4 intraforaminal implants (two axial and two tilted). The rehabilitation of posterior sectors could be realized with the tilted implants that decrease the cantilever lenght. However the tilted implants has a greater bone resorption in comparison with axial ones because of their position that doesn't allow the reception of forces parallel to the implant. The aim of our study is to evaluate the bone resorption around 132 implants

placed with 'all on four technique' during an average follow up of 75, 60 month. The connection between implant and prostheses is characterized by a particular abutment: a flat. This could be overload the problem of forces reception and minimizing the bone resorption.
Methods: 33 patient were studied during 132 month with an average follow up of 75,57 month (since 2007 to 2018). They are be selected with the same inclusion criteria: total or posterior bilateral mandibular edentulism, rehabilitated with full fixed prosthesis. A TC has been done before surgery. Same surgical protocol has been applied to all patient: open flap, octeoplastic to regularize crest, osteotomy preparation with drill sequence, placement of 4 intraforaminal implants Intralock DT sti 40x10 and 40x13. All patients received a provisional prostheses without any cantilever length during the time of osteointegration. To analyzing the bone resorption has been done a series of periapical radiographs for all implants. The reference point for all measurement has been calculated with the distance between bone level and implant platform. For each implants has been chosen a single measurement of the side were the resorption was greater. A statistic average has been calculated for all measurement that was found.
Results: The successful percentages was 96,97% because 128 implants shows a marginal bone loss of 1,7 mm (SD of 26,95) during an average follow up of 75,57 month. Only 6% of implants shows a marginal bone loss of 3-3,2 mm. The cumulative implants survival was 100% because even thought the resorption for 3,03% implants was greater this can't compromise the stability of them.
Conclusion: Tilted implants doesn't received a correct dissipation of the forces and that could lead to a greater marginal bone loss around them in comparison to axial ones. The placement of a flat abutment instead of angle connection allows obtain a passive prosthetic structure that receives parallel forces in the same direction of tilted implants and it could be lead to a lower bone resorption around this implants during the time.

Evaluation of soft tissues in patients affected by MRONJ after application of Low Level Laser Therapy or photodynamic therapy: a pilot study

F. Erovigni, S. Sammartino[1], G. Peiretti[1], I. Bosso[1], A. Dell'Acqua[1], S. Carossa[1]

[1]Department of Surgical Sciences, Oral Surgery Section, CIR Dental School, University of Turin

Aim: The aim of the study was to evaluate if the use of low level laser therapy (LLLT) used alone or in combination with a photoactivator (Photolase) through the photodynamic therapy (PDT) could induce improvement in the inflammation of the mucosa circumscribing a medication related osteonecrosis of the jaws(MRONJ).
Methods: 8 patient affected by MRONJ were selected for the study. 5 underwent to LLLT with 810 nm diode laser (Ora-laser d-lux Oralia – Oralia medical Gmbh- Detushland), 3 to PDT (Photolase Europe Ltd – Detushland). Once MRONJ was diagnosed, mucosal morphology was evaluated in every petients with an healing scale (4 = no signs of inflammation; 12= infection plus inflammation) and pain with a visual analogic scale (VAS). The size of the bone exposition was measured with a millimetrated probe in the longest and the largest point, and the area of the bone exposition was approximately calculated. The depth of probing between mucosa and bone on 6 points (MV=mesio-vestibular, V=vestibular, DV=disto-vestibular, ML=mesio-lingual, L=lingual, DL=disto-lingual) was even recorded in every session.
The treatment was divided in three weekly sessions (T0-T1-T2) using a biostimulation program for the LLLT and a dedicated program for the PDT.
T-test was used to calculate differences between the measures at T0 and at T2.
A $p < 0,05$ was considered statistically significant.
Results: Considering the whole population (without distinguishing between LLLT and PDT) a statistical difference was found in all the probing measures except for the vestibular one. There were no statistical differences in the variation of the area of bone exposition and of the VAS. A statistical differecence was found in the healing scale ($p= 0,00009$). Considering splitted populations (LLLT vs PDT), regarding the probing measures, statistical differences were found only in few parameters (MV and V for the LLLT population; MV and DV for the PDT population). In both populations a statistical difference was found in the variation of the mucosal morphology though the healing scale ($p=0,02$ and $p=0,05$ respectively).
Conclusion: in this pilot study, LLLT and PDT applied on patients suffered from MRONJ induce an improvement of the mucosal morphology and, in some cases, a reduction of the probing measures inside lesions. No differences were found in the size of the area of bone exposition.

Efficacy of different haemostatic agents in extractive surgery in patients with multimorbidity taking antiplatelet therapy: a randomized clinical study

Y. Brancaccio[1], A. Antonelli[2], F.diodati[1], A. Giudice[3]

[1]DDS Candidate, School of Dentistry, Magna Graecia University of Catanzaro, Catanzaro, Italy

[2] Research Collaborator, Department of Health Sciences, Magna Graecia University of Catanzaro, Catanzaro, Italy
[3] MD, Professor, School of Dentistry, Magna Graecia University of Catanzaro, Catanzaro, Italy

Aim: Managing bleeding risk after dental extractions in patients on antiplatelet therapy is controversial, due to increased haemorrhage or atherothrombotic risk if taken or discontinued respectively. Several studies have suggested to continue antithrombotic therapy as long as local haemostatic agents were used, but it is not well-elucidated which one is more effective. The purpose of this research was to test and compare clinical efficacy of four different hemostatic agents in patients, taking oral antiplatelet therapy, undergoing multiple dental extractions without reducing or discontinuing drugs.
Materials and methods: A group of 102 patients (74M-28F, aged 64.1±17.4yrs) treated with an oral antiplatelet agent with indication to extractions of almost four teeth non-adjacent was enrolled in the study. Investigated items included dermographic and clinical variables (gender, age, alcohol abuse and smoking, comorbidities), antithrombotic therapy (drug and dose), type of tooth extraction (simple extraction or surgical extraction). All patients underwent multiple extractions at the same time and – according to a split-mouth design – the sockets were randomly allocated to suturing alone (control group), suturing plus haemostatic plug (HAEM), suturing plus advanced-platelet rich fibrin (A-PRF+), suturing plus leukocyte-platelet rich fibrin (L-PRF). None of the patients modified or suspended antithrombotic therapy. Main outcomes measures were bleeding (assessed thirty minutes after the end of the procedures), wound healing index (evaluated at 1 and 2 weeks after surgery).
Results: Characterization of study population showed 51% hypertensive, 49% diabetic, 63% dyslipidemic, 26% obese patients. Smoking and alcohol abuse were present in 33% and 35% of cases, respectively. Post-operative bleeding was present at 20, 12, 2 and 5 sites for control, HAEM, A-PRF+ and L-PRF sites (P<0.0001), respectively. Incomplete wound healing at 2 weeks after extraction was present at 31, 39, 22 and 15 sites for control, HAEM, A-PRF+ and L-PRF sites (P<0.0001), respectively. At logistic regression analysis, both A-PRF+ and L-PRF – but not HAEM – showed reduced bleeding risk when compared to suturing alone (OR=0.09 with CI95% 0.02-0.40; P=0.001 for A-PRF+; OR=0.09 with CI95% 0.08-0.64; P=0.005 for L-PRF). Conversely, only L-PRF showed reduced risk for incomplete wound healing when compared to control site (OR=0.43 with CI95% 0.22-0.87; P=0.019). Of interest, patients affected by hypertension (OR 3.91 with CI95% 1.30-11.74; P=0.015) and diabetes (OR 3.24 with CI95% 1.15-9.15; P=0.026) had the highest bleeding risk. Conversely, smoking (OR 4.30 with CI95% 1.32-14.01; P=0.016) and diabetes (OR 3.79 with CI95% 1.45-9.94; P=0.007) led to greater risk for delayed wound healing.
Conclusions: Among haemostatic agents, L-PRF and A-PRF+ reduced bleeding risk and L-PRF led to faster healing, in dental extractions for patients taking oral antiplatelets. Regardless of haemostatic choice, it should be evaluated comorbidities that may increase bleeding risk and influence wound healing in this setting of patients.

Precision and trueness compared between dicom and stl files for human dental auto-transplantation

Domenico Bulzacchelli, Michele Melillo, L. Boschini, Rossella Battaglia, Raffaele Vinci, A.Scarano, Filiberto Mastrangelo

Aim: DICOM files (Digital Imaging and Comunications in Medicine) represent the standard for defining the criteria for communication, visualization, archiving and printing of biomedical information such as radiological images. STL (Stereo lithograpy interface) is a file format, binary or ASCII, born for CAD stereolithography software. Is one of the main formats used in 3D printing. Dental Transplantation today represents a challenge for the clinician, who wants to replace a lost tooth with an auto-transplanted tooth. For a good result, is necessary that the receiving site has a perfectly prepared size. This is possible in faster and safer way if, before the transplant, a stereolithographic model of the tooth is used for the creation of the receiving site. It follows that, more the DICOM file and the STL have no dimensional difference, more the result will be predictable. The purpose of this study was to compare the dimensional difference between DICOM files and the final STL printing of stereolithographic teeth models.
Methods: 4 patients needed the restoration of an irremediably compromised tooth using the dental transplanttechnique, we requested a 3D X-ray investigation with CBCT for the study of the case. The dicom files obtained from the acquisition were processed to extrapolate the volume only of the dental element intended for transplantation. Thanks to a dedicated software, the DICOM file was converted into STL files and after STL was cleaned, it was prototyped using a 3D printer. The sample obtained was measured with a digital caliber in length (apex-cuspidal peak) and in width (M-D and V-L in correspondence of the CEJ line and of the tooth equator) repeating the measurements many times and obtaining a media of

the dimensions. The same measurements were detected on the element for the transplant after its avulsion and before proceeding with the transplant.
Results: From the analysis of the literature the variables that can influence the reliability of a prototypation were:
- the printing technique of the stereolithographic model (The PolyJet and DLP techniques were more precise than the FFF and SLA techniques, with the PolyJet technique having the highest accuracy (Kim et al. 2018)
- the dose of CT radiation used for the acquisition of the DICOM file. (a reduction of CT dose by up to 80% of the clinical acquisition in conjunction with iterative reconstruction yields maxillofacial bone models accurate for 3D printing.(Cai et al. 2015)
From our measurements on the samples, it was detected a discrepancy media of 0.74mm (min 0.19 and max 1.42mm). Resulted also a bigger incongruity in length measurement (mean 1.17mm) compared to width measurements at the CEJ level (mean 0.32 mm) This means that it is not possible to rely blindly on the dimensional overlap between DICOM and STL models for dental transplantation, but with the necessary knowledge on the subject it is possible to reduce this dimensional error to the minimum.
Conclusions: The literature data shows variables that can influence the dimensional reliability of a prototype printed by STL obtained from the conversion of a DICOM file. Our comparative measurements have demonstrated a discrepancy that may lead to non-reliability in the use of the prototype itself. New strategies for converting files and changes in software design will be necessary to improve dimensional alignment between prototype and real sample.

Use of I-PRF (platelet rich fibrin) in the treatment of chronic non-specific inflammatory ulcers of the oral cavity

Maria Cacciola

Department of Neuroscience, Reproductive Science and Odontostomatology Program of Oral and Reconstructive Surgery, Head Professor Gilberto Sammartino University of Naples Federico II, Italy

Aim: Platelet concentrates for surgical use are innovative tools of regenerative medicine, which are widely used for clinical and surgical applications, that requires tissue regeneration. Their potential beneficial outcomes, including soft tissue regeneration, local hemostasis and acceleration of wound healing, make them suitable, in different medical fields, as therapeutic options. The driving concept is to collect and gather the most active components from the blood sample, like platelets, fibrin and eventually leukocytes and to prepare them in a clinically usable form. The aim of this study was to evaluate the therapeutic efficacy in the short / medium term (within 1 year) of an autologous hemoconcentrate (i -PRF - injectable platelet rich fibrin) by topical submucosal infiltration in patients with non-specific chronic inflammatory ulcers of the oral cavity not responsive to the common treatments.
Method: The study includes two patients: a 78 year-old (Patient A) woman with a clinical and histological diagnosis of plasmacells mucositis and a 62 year-old woman (Patient B) with clinical and histological diagnosis of pemphigus vulgaris; both women do not suffer of systemic diseases. For the i-PRF preparation, 2 blood tubes were collected and centrifuged at 800 rpm for 3 minutes by centrifuge. At the end of the process the i-PRF is readily detectable on the top of the tube and collected with an insulin syringe. The infiltration was performed without anesthesia with the same syringe in four points of the periphery of the lesion. It was performed one infiltration per week for the first four weeks, followed by one infiltration every 3 weeks for twelve months since the first infiltration. Clinical assessment was done of tissue healing at week one post operation. Furthermore it was given to the patients the VAS scale in order to report pain symptoms. The patients were instructed to report the pain associated with them procedures at two, three and seven days post operation.
Results: Patient A and B did not suffer of any side effects caused by the injections. We reported an improvement of pain and perilesional inflammation on both patients. Patient A reported an improvement on VAS scale from 9.5 to 0 at week four post operation, the lesion was still present and not solved. Patient B had improvement on VAS scale from 8 to 0 at week one post operation and better appearance from the clinical aspect.
Conclusions: Based on the results obtained, we can conclude that i-PRF has been effective in the management of pain in both patients. Therefore the blood components can not be used as alterative to standard therapies, but they can be useful in those cases refractory to conventional treatments especially in pain management, with the advantage of reducing the side effects of standard therapies.

Le Fort I as an instrument for optimizing t he implant treatment

C. Capone, P. Natale, M. Masucci, A. Caserta, A. Capuano

Department of Neuroscience Reproductive Science and Odontostomatology, Program of Oral and Reconstructive Surgery,

Head Profesor Gilberto Sammartino, University of Naples Federico II

Aim: Class III of malocclusion represents a growth-related dentofacial deformity with mandibular prognathism in relation to the maxilla and/or cranial base. Class III malocclusion has a multifactorial etiology, which is the expression of a moderate distortion of normal development as a result of interaction between innate factors or genetic hereditary with environmental factors. Prosthodontic treatments for this group of patients are challenged by the skeletal discrepancies of the maxilla and the mandible. A comprehensive multidisciplinary approach to treatment planning that involved prosthodontists, periodontists, and oral and maxillofacial surgeons is often necessary to ensure accurate diagnoses and appropriate treatments. The Prostetis camouflage is a treatment option: procline the upper incisors and incline the lower incisors, but is excluded due to the huge incisors cantilever discepancy. This case showed pacient with class III of malocclusion and a trophic maxilla and mandible restored with dental implants. Patient underwent simultaneous orthognathic surgery and implant placement to correct the oral and facial disease. The aim of this case is to demonstrate how combinated orthognatic, surgical and prosthetic rehabilitashion can restablish aesthetic and function in adult pacient with teeth compromised periodontal, associate with class III malocclusion through the progressive loading of implants and mini-implants.
Methods: A 37-year-old female pacient came to our Department complaining her dental and facial desease. Clinical examination revealed the mobility of all the teeth included the metal ceramic fixed prosthesis. Orthopantomografy and CT scan examination revealed generalized severe bone loss and periapical radiolucencies of several teeth. The patient's medical and dental histories were reviewed. No contraindication for dental treatment was identified. Treatment plan options were discussed with the patient, and the option of surgical repositioning of the maxilla in conjunction with implant therapy to replace teeth and temporary prosthodontic supported by mini-implant maxillary, was chosen. The implant sites and the diameter and length of the implant fixture were selected on the basis of available alveolar bone on cone-beam computerized tomography scans. All mandibular and maxillary teeth were extracted. Le Fort I osteotomy was performed under general anesthesia, simultaneous the positioning of eight implants and four mini-implants inserted in the upper jaw. During the implant healing period was immediately placed provisional prostheses used to assist in fabrication of the definitive restorations loaded on mini-implants. After few mounth was operated the lower jaw in local anestesia and six implants were placeda and immediatly loaded. After 3 mounth the definitive restorations were fabricated in a canine-guided occlusion.
Results: Post-operative clinical evaluation , the patient's facial profile was significantly improved. The implants were osseointegrated, and no sign of excessive periimplant bone loss was noted.Oral hygiene instructions were provided to the patient.
Conclusion: This case report presents a comprehensive treatment for a patient with severe skeletal class III malocclusion, treated without prosthesis comouflage with cantilever. Functional occlusion and esthetics were restored with orthognathic surgery, implants, and complex fixed prosthodontic therapy. done successfully with careful planning and a multidisciplinary approach.

Ameloblastoma: a permanent pitfall? An extremely rare case of recurrence after twenty years

A. Capuano, A. Cascella, G. Leonetti, P. A. Ibello, P. Natale, P .Radano

Department of Neuroscience, Reprodutive Science and Odontostomatology Program of Oral and Reconstructive Surgery Head Professor Gilberto Sammartino University of Naples Federico II

Aim: Ameloblastoma is a benign neoplasm of the maxillary bones with epithelial or fibro epithelial structure that originates from a degeneration of the embryonic dentoformative elements, in particular those of the enamel-dentinal tissue, in the different phases of their development. There are different macroscopic and microscopic variants of ameloblastoma and the lesion has a high percentage of recurrence due to the permanence of epithelial proliferative cells inside the bone marrow. There are actually different therapies of ameloblastoma: demolitive surgical therapy, conservative surgical therapy, and radio/chemio adjuvant therapy in the case of neoplastic transformation. Less recurrence occurs after radical treatment (4-12%) compared to a conservative one (17-40%) with an average follow-up of 5 years. Over 50% of all recurrences occur within 5 years after surgery. Although there is a relapse risk over time, the conservative approach is preferred, especially in young patients, in order not to affect the aesthetic and anatomical function aspect. If the lesion expands to soft tissue, radical treatment is needed. Our goal is to show a very rare case of ameloblstoma's recurrence after more than twenty years from the first conservative intervention.
Methods: This case deals with a young woman of twenty-six years operated in 1997 because of an ameloblastoma extended along the body and the branch of the right side of mandible. The first orthopantomography (OPT) in 1997 showed a large

radiolucency that extended from the second premolar to the right mandible condyle. Rizalisis of 45, 46, 47 was present. TC (computed tomography) images showed that the radiolucency extended to the higher edge of the right mandible without the interest of lower, vestibular and lingual corticals. The first surgery was performed in general anesthesia with a conservative approach to preserve the function and the related aesthetic of the young patient. Histological examination confirmed the diagnosis of ameloblastoma in mixed and plexiform microscopic variant. After the surgery the patient was subject to a radiographic follow up every 6 months for 5 years. In 2001 two small recurrences were found in the right mandibular body and were promptly excised with a radical approach in the areas of the lesions.

Socket preservation with L-PRF: literature review and case-series

M. Cerri, F. Tomasoni, G. Garbelli, S. Bertoli, S.M. Lupi

[1]Department of Clinical-Surgical, Diagnostic and Pediatric Sciences, Section of Dentistry, University of Pavia, Italy

Aim: Leukocyte-and Platelet-Rich Fibrin (L-PRF) is a second-generation platelet concentrate, developed in France by Joseph Choukroun in 2001. L-PRF is an autologous product, consisting of a high-density fibrin matrix rich in platelets and leukocytes. This innovative material is able to release a large quantity of three main growth factors: platelet-derived growth factor-AB (PDGF-AB), transforming growth factor-b1 (TGF-b1), vascular endothelial growth factor (VEGF) and high quantities of active molecules, such as cytokines, chemokines and important coagulation matricellular glycoproteins (fibronectin, vitronectin and thrombospondin 1 (TSP1)). The presence of leukocytes has a great impact on the biology of these products, not only because they actively participate in the wound healing process, but also because of their immune and antibacterial properties. L-PRF is a very versatile and powerful material that can contribute to wound healing and both soft and hard tissue regeneration. The aim of this work is to evaluate the effectiveness of L-PRF as surgical adjuvant in socket preservation.
Methods: A complete literature review was carried out using Medline (PubMed), EBSCO and the Cochrane Library. Patients presented in this case series were evaluated after tooth extraction followed by the insertion in the socket of L-PRF without using any other biomaterial. L-PRF was obtained using IntraSpin Protocol (Intra-Lock®). This protocol dictates the collection of blood samples in glass tubes without adding any anticoagulant or activator; then blood is processed using IntraSpin Centrifuge® (2700 rpm for 12 minutes) to obtain a three-layered product: the upper layer is PPP (Poor-Platelet Plasma), the lower contains Red Blood Cells and in the central part there is the fibrin clot (L-PRF), which is separated from the other parts by using specific scissors. Xpression Box (Intra-Lock®) was used to obtain membranes of L-PRF. Tooth extraction was performed carefully to preserve to the fullest the alveolar bone. The L-PRF clot was positioned into the socket and L-PRF membrane was positioned onto the socket and the wound was sutured. Clinical and radiographic (CBCT) evaluation was performed.
Results: A lot of studies reported the clinical effectiveness of L-PRF use in the preservation of alveolar ridge. Clinical results reported that socket preservation with L-PRF showed optimal soft tissue healing and bone regeneration. Furthermore, patients reported minimum pain, swelling and function alteration. Radiographic controls (CBCT) revealed filling of post-extraction sockets with regenerated bone.
Conclusion: The use of L-PRF seems to be a new potential engineered tissue used as adjuvant in oral surgery. This product can contribute to stimulate the healing process both of soft and hard tissue and to enhance bone regeneration. The L-PRF technique turned out advantageous in the surgical practice since, being completely autologous, can imply a strong psychological advantage from the patient prospective, it has no risk of rejection and could decrease the incidence of certain types of complications, such as socket infection. It also requires minimal cost of production and could reduce the post-operative pain and inflammation. Moreover, the production technique is simple, quick and does not requires sample handling or anticoagulant/activator adding. The absence of any kind of scaffold allows for a more accurate evaluation of quantity and quality of the newly formed bone. L-PRF appears to be a source of autologous cells and growth factors, thus creating a synergistic relationship oriented to tissue regeneration.

Antibiotic therapy in tooth extractions: a controlled, single-blind, randomized clinical trial

Cinquini Chiara, Barone Antonio, Marchionni Saverio, Nisi Marco, Gabriele Mario

Unit of Dentistry and Oral Surgery, University of Pisa, Director: Prof. Mario Gabriele. Department of Surgical, Medical and Molecular Pathology and Critical Care Medicine, University of Pisa, Italy

Aim: Tooth extraction is a common surgical procedure frequently performed by general dentists. Antibiotics

are generally administered to prevent the risk of infection or alveolitis. According to literature, in case of third molar extractions, antibiotics are proven to reduce the risk of post-operative complications. The primary aim of our study was to assess the efficacy of antibiotic therapy in reducing post-operative complications after tooth extractions (third molars excluded) and to evaluate the use of a probiotic (Lactoferrin and Bifidobacterium longum) in preventing gastro-intestinal side effects associated to the use of antibiotics.

Methods: A randomized, parallel, single-blind, controlled trial was performed on adult patients needing tooth extractions at our clinic between 2016-2018. Exclusion criteria were third molar extractions, general contraindications to oral surgery and patients with systemic conditions needing antibiotic prophylaxis. The extractions were conducted at T0. If a flap elevation, odontotomy, or ostectomy was performed, the extraction was scheduled as complex. Subsequently, with a computer-generated randomization list, the patients were allocated to one of the three study groups. Patients allocated to Group 1 received only antibiotic (amoxicillin + clavulanic acid 825/125 mg, twice a day for six days) after surgery; patients allocated to Group 2 received antibiotic and probiotic while patients belonging to Group 3 received no pharmacological treatment. Follow-up visits were performed at 7,14 and 21 days after the extraction. The clinical parameters assessed were pain (0-10 NRS), presence of abscess, fever, dry socket, trismus, general post-surgical complications and gastro-intestinal symptoms.

Results: One hundred sixty-five patients meeting the inclusion criteria were enrolled in this study, fifteen patients were excluded because they were lost to the follow-up. Decay was the main reason for tooth extraction in each group followed by periodontal disease. The proportion of simple/complex extractions was 30/20, 32/18, 35/15 respectively for Group 1, Group 2 and Group 3. No sign of surgical site infection was observed 7 days after the extraction in all three groups while dry socket was present in two patients of Group 3. No patients showed trismus. Pain was the most important symptom: at T1, 28 (56%), 21 (42%) and 34 (68%) patients reported pain respectively for Group 1, Group 2 and Group 3. A statistically significant difference was found between Group 2 and Group 3 (P=0.009). At T2 pain was further reduced in all the groups with a mean NRS close to 0. At T1 gastric symptoms were observed in 12 (24%), 10 (20%) and 1 (2%) patients belonging respectively at Group 1, Group 2 and Group 3. Diarrhea was present in 11 patients only in the Group 1 at T1, while not a single occurrence was observed in the other two groups.

Conclusion: According to our results the number of patients reporting pain was significantly higher in the control group (P= 0.009) and a higher proportion of patients experienced "mild pain" (NRS 1-3) when compared to the other two groups (P=0.025). As far as gastro-intestinal side effects were concerned, our trial showed that those effects were related to the antibiotic exposure and intestinal symptoms seemed to be tackled by the probiotic administration. In our study post-extraction complications seemed mostly mild and self-limiting. In the light of the present data, we cannot encourage the administration of antibiotics for simple tooth extractions.

Marsupialization of keratocystic odontogenic tumor

Aim: The keratocystic odontogenic tumor (KOT) formerly known as odontogenic keratocystr is a benign cystic tumor of dental origin that probably oriiges from primitive dental lamine. It is characterized by a potential for local aggressive behaviur and tendency to recurr. In particular the parakeratinized version presents a recurrence rate varyng from 25% to 60%. Multiple treatment for the KOT have benn proposed: enucleation, decompression and decompression following by enucleation. All these treatments are valid depending on the size of the lesion, its location, the entity of cortical destruction, the histological appearance, the proximity to important anatomical structures. Indication for the enucleation (Partch II) are small orthokeratinized lesions localized in the anterior region of mandible. The decompression (Partch I) might be the first choice of treatment for huge parakeratinized lesions localized inthe posterior regions of mandible. The decompression and second stage-enucleation is the most proper treatment in case of medium size orthokeratinized orparakeratinized lesions and proximity with vital anatomical structures. The present study aim at assessment and histomorphometric analysis of KOT epithelium and fibrous capsule before and after decompression treatment. Histlogic evaluation and immunohistochemical expression of podoplanin, Bcl-2, COX-2, IL1 were analyzed by using conventional microscopy. In addition volume change pattern of decompression was analyzed by using TC dentalscan.

Methods: Six patients who were diagnosed with KOT of the mandible were selected and trated by marsupialitation. They underwent an incisional biopsy of the cyst at the date of decompression. The connection with the oral cavity was maintainded by iodoformic gauze with gentamycin. During the follow up period weekly irrigations through the lesion access were applied. In particular every time the iodoformic gauze was removed, the cystic cavity was irrigated with physiological solution, hydrogen

peroxide,iodopovidone solution, rifamycin and then a new iodoformic gauze with gentamycin was put inside. After some decompression period the patients underwent surgery enucleation. The histomorphometric and immunohitochemical parametries were measured before starting the decompression treatment (T1) and at time of enucleation (T2). The samples were fixed in 10 percent buffered formalin and treated in hematoxylin eosin. The epithelium and fibrous capsule thickness was measured by Olympus dp-soft software.
Results: The samples analysis reveales statistically significant increase in the epitelium thickness after the marsupialitation treatment. Wilcoxon test was used for the statical analiysis. The volumetric analysis was conducted with Inversthilius 3.1 and Meshlab. Comparing TC realized at T1 and T2 a volumetric reduction of cystic cavity and a volumetric increase of bone tissue were registered.
Conclusion: As a treatment of KOT, decompression followed by enucleation was more conservative and effective than other procedures. Decompression preserves the important anatomical structures of the jaw and thus decreases complications such as functional and esthetic damage. Although the rate of recurrence is low using this procedure, periodic check-ups are necessary.

Intraosseous dentinogenic ghost cell tumor. Report of a rare case

R. Cordaro, D. Novembre, E. Giofrè, I. Barca, D. Caruso, M.G. Cristofaro

Department of Experimental and Clinical Medicine, Unit of Oral and Maxillofacial Surgery – University "Magna Graecia" of Catanzaro, Italy

Aim: Dentinogenic ghost cell tumor (DGCT) is a rare tumorous form of calcifying odontogenic cyst and it seems to have a more aggressive behaviour. We present a case of a 60-year-old male patient affected by intraosseous DGCT in the posterior region of the right mandible. The treatment consisted of surgical enucleation with no evidence of recurrence on post-operative clinical and radiographic follow-up at one year later. The purpose of this work is to report a single case of an uncommon form of dentinogenic ghost cell tumor.
Methods: A 60 year-old male patient presented at the Department of Oral and Maxillo Facial Surgery University Magna Graecia of Catanzaro with asymptomatic swelling in the right posterior region of the jaw since two months. Extraoral examination was negative for signs of illness; intraoral examination revealed the presence of alteration of mandibular profile extending from 46 region to the retromolar one with motility of the lower right second molar. Oral mucosa of the lesional area was normal. There was no limitation of mouth opening and no parestesia. Clinically, a provisional diagnosis of odontogenic cyst was made. The patient underwent orthopantomografy and Cone beam computed tomography scan. An incisional biopsy was already carried out in the region of the lesion three weeks ago. The lesion has been removed surgically under local anestesia and the entire sample was finally analysed by pathologist.
Results: Orthopantomografy showed distal jaw osteorarefaction at the second right lower molar and an incidental finding of Stafne bone cavity in the left posterior region of the jaw. Three dimensional Cone Beam computed tomography scan of the jaw showed an interesting destructive osteolytic lesion with irregular margins from the region of 46, the upright branch of the right yaw up to the subcoronoid region. At first incisional biopsy revealed calcified odontogenic cyst. Definitive histopahological examination diagnosed DGCT.
Conclusion: Ghost cell odontogenic tumour (DGTC) is very rare and it represents an aggressive solid variant of Calcifying odontogenic cyst (COC) . Intraosseous form is more locally invasive having an infiltrative growth pattern and high recurrence rate after resection so it should be treated by extensive surgical resection with an adequate safety margin. In this case study the patient was treated with surgical enucleation followed by curettage of the cavity and at one year follow-up there was no evidence of recurrence. Recurrence rate of intraosseous DGCT following resection remains one of the major concern, therefore regular follow-up is mandatory for better prognosis.

Variability of new bone formation in different areas of the maxillary sinus after lateral augmentation: a proof-of-concept study

A. Corradini[1], F. Berton[1], F. Bernardello[2], T. Lombardi[3], V. Nicolin[4], M. De Biasi[1], R. Di Lenarda[1], C. Stacchi[1]

[1]Clinica di Chirurgia Maxillofacciale e Odontostomatologia, Azienda Sanitaria Universitaria Integrata di Trieste, Italy
[2]Libero professionista, Terranegra di Legnago (VR), Italy
[3]Libero professionista, Cassano allo ionio (CS), Italy
[4]Bone Lab, Dipartimento Universitario Clinico di Scienze Mediche, Chirurgiche e della Salute. Università degli Studi di Trieste, Italy

Aim: Bone regeneration after maxillary sinus augmentation has been demonstrated to be more predictable in narrow sinuses compared to wider ones, due to a faster cellular colonization of the graft from the surrounding bony walls, in centripetal direction. The aim of this proof-of-concept study was to evaluate if, in the same sinus cavity, new bone

formation occurs with different rates in different areas, according to the distance between buccal and palatal walls.

Methods: Patients with edentulous posterior maxilla, with residual crestal bone height <5 mm and needing maxillary sinus floor elevation for the placement of at least two implants were enrolled in this study. After elevating the Schneiderian membrane with lateral approach and checking for the absence of perforations, a composite graft (autogenous bone, xenograft and alloplast in equal proportions) was inserted into the sinus cavity. After six months of healing, two biopsies were harvested from each sinus during implants placement (mesial site "A-narrow" – distal site "B-wide"). The two harvesting sites were used as osteotomies for the insertion of the two implants. Histologic and histomorphometric evaluations were performed, excluding from the analysis the residual crestal bone. Data for descriptive statistics were expressed as mean ± standard deviation. The normality of the distribution of the scalar dependent variables was evaluated with a Shapiro-Wilk test. The comparisons of the variables of interest between the two sites were carried out using a Wilcoxon test (α=0.05).

Results: Five patients were enrolled and treated: after uneventful healing, ten implants were inserted. Bucco-palatal sinus width, measured in the sites of implant positioning at 10 mm height comprising the alveolar crest, ranged from 8.5 to 22.7 mm (group A: 11.40 ± 2.03 mm; group B: 17.38 ± 4.76 mm - p=0.043). Newly-formed bone in group A (23.09 ± 7.91%) resulted significantly greater than in group B (14.86 ± 5.81% - p= 0.043). Also the graft remodelling rate was higher in narrow sinuses, but not significantly (residual graft: group A 39.89 ± 12.91%; group B 45.75 ± 8.71% - p= 0.080).

Conclusion: The results of the present proof-of concept study suggested that the bucco-palatal width of the maxillary sinus could significantly affect bone regeneration outcomes in terms of new bone formation and graft remodelling, even if further studies on a wider sample are needed to confirm these preliminary data. Future histomorphometric studies should carefully take into account this aspect, especially in order to obtain reliable data when comparing the performance of different biomaterials in sinus augmentation procedures.

Condylar positioning in bilateral sagittal split osteotomy by surgical guides using a CAD/CAM procedure

Antonio Cortese[1], Matteo Tomeo[1], Antonio Borri[1], Emilio Cataldo[2]

[1]Università di Salerno, Dipartimento di Medicina chirurgia e odontoiatria, Italy
[2]Università di Salerno, Dipartimento di Ingegneria

Aim: Current techinques for maxillary and mandibular positioning in orthognatic surgery usually refer to occlusion by intermediate and final occlusion splints. By these techniques no control on condilar position is possible, which is usually obtained by manual positioning pushing the ramus fragment and condyles upward and backward in glenoid fossa to achieve a centric realation in a centric occlusion obtained by occlusal splints.These procedures are strictly related to the experience of the operator. Because a precise centric relation and centric occlusion achievement is paramount for the succsess of the procedure with optimal occlusion aesthetic and function results, a new technique based on a new CAD-CAM technology was developed and presented to avoid possible lack in precision in operator sensitivity based procedure as current techniques for centric relation condylar positioning.

Methods: A CAD-CAM procedure was developed in cooperation with the Department of Engeneering of the University of Salerno performing a virtual planning on CT- scan high definition achieved on a patient affected by mandibular asimmetry. Examination was performed with the patient in centric occlusion by wearing an occlusal splint during the CT-scan acquisition time. In this way it was possible to achieve the abitual occlusion of the patient with the condyles in centric relation even if the patient was in a supine position. Three-dimensional digital model of the skull was achieved segmenting the acquired DICOM images using a threedimensional slicer software. Laser surface mandibular and maxillary dental arches were scanned and integrated in the CT-scan for a model that intails skeletal and dental threedimensional recontruction using the Rhinoceros software. In this way it was possible to perform a virtual surgical planning to correct the mandibular asimmerty. Also to mandibular digital guides were designed and printed by a 3D printer. The surgical guides were designed with a double U shaped surface proximally fitting wih the anterior edge of the ramus and distally fitting to the retromolar trigonus and the last molar distal crown surface. In this way by surgical guides positioning and screw fixation after BSSO osteotomy cuts and mobilization, a precise mandibular fragments positioning and fixation was achieved combining both centric and occlusion relation at surgery time.

Results: To check final result post-operative CT-scans were obtained and misurements were performed for sagittal, vertical and trasversal condylar positioning to check the effective centric relation of both of the condyles in the glenoid fossae also achieving a precise centric occlulsion. Three planes of the space

were selected to verify condylar positioning:
1. Horizontal plane defined by left and right porion and right orbitale points.
2. Sagittal plane passing trhough sellae and nasal points perpendicular to horizontal plane.
3. Frontal plane passing to the sellae point and perpendicular to sagittal and horizontal planes.
Sagittal condylar position was measured by the distance from posterior condylar point and the most posterior point of the glenoid fossa. Vertical condylar position was detected measuring the distance between the suoperior condylaar point and the superior point of the glenoid fossa. Transverse condylar posiotion was detected measuring the distance between the medial condylar point to the medial wall of the glenoid fossa.
Conclusion: All the measurements were significant for a precise condylar positioning in centric relation in the glenoid fossa after surgery. Also good aesthtic result with final full satisfaction for the patient were achieved.

The lateral periodontal cyst: a case report

L. Laino[1], D. Menditti[1], L. Nastri[1], M. D'Agostino[1], A. Donzelli[1], R. Vallebona[1], S. Melito[1], M.G.P. Di Mare[1], L. Ramaglia[2]

[1]Multidisciplinary Department of Medical-Surgical and Dental Specialities, University of Campania "Luigi Vanvitelli", Naples, Italy
[2]University of Naples "Federico II," Department of Dental and Maxillofacial Sciences, Naples, Italy

Aim: The lateral periodontal cyst (LPC) is a type of odontogenic cyst localized on the side of a vital tooth root that at radiological examination does not present inflammatory origin or keratocyst or unicystic ameloblastoma features. This is a case report of LPC in the premolar site of the jaw. The pathogenesis of this cyst is unclear: the difficulty to find the characteristic of this lesion is due to the frequency of presence in the periodontal site of keratocyst (prevalence 0.2-2%) or inflammatory lesion formed by a lateral canal of a necrotic tooth (prevalence 33%), while the LPC prevalence among the other type of periodontal lesion is about 1,2%. Formerly the LPC and the gingival cyst of the adult were classified in the same category, today their association is only topographic in the periodontal site because there are histological differences between these lesions, like the presence of epithelial plaques by localized proliferation of cells in the LPC but not in the gingival cyst. The aim of this article is to have more information about this topic and to have a deeply and clear vision of it.
Methods: The most important clinical characteristic is the vitality of the contiguous tooth. The therapy of the LPC is the simple enucleation with preservation of the tooth. The surgical therapy is under local anesthesia: in the present case we cut the vestibular mucosa of the premolar region to make a cavity of access to the lesion by osteotomy. After the removal, we cleaned the cavity with a curette to take away any other residue and we made a suture. In most cases the contiguous tooth has only an anatomic involvement and it is safe.
Results: Histologically it shows an epithelial lining of 1-5 layers with small and pyknotic nucleus and intracellular fluid; some cellular agglomerates can be found in the form of plaques, formed by fusiform, large and clear cells parallels to each other that may contain glycogen. They seem formed by a localized proliferation of the basal cells leading to a thickening of the epithelium which extend into the lumen or in the fibrous wall, due to an increase in size both for a hyperplasia and hypertrophy. They may turn grow larger and give rise to further cystic botryoid lesions because, although it has not yet been established if it is considered a variant of the LPC, the common origin of these two types of lesions is not denied.
Conclusion: LPC presents cystic characteristics, and show neither inflammatory signs nor possible keratocyst characteristics and for this we define it as a lateral periodontal cyst. Doubts about its classification are due to the absence of epithelial cells in the periodontium, so its origin can be searched among the epithelial rests of Malassez or dental follicle cells that remain during the eruption with a portion of it linked to the Hertwig sheath. Given its infrequency it's important to know its aspect in order to distinguish it from any more aggressive and recurrent forms, aiming at the right therapeutic choice.

Hairy leukoplakia: an oral sentinel of systemic immunosuppression

Alessandro D'Aiuto[1], Marta Dani[1], Giorgia Ottini[2], Fabio Croveri[1], Andrea Boggio[1], Vittorio Maurino[1], Lucia Tettamanti[1], Lorenzo Azzi[1]

[1]Department of Medicine and Surgery, University of Insubria ASST dei Sette Laghi, Dental Clinic, Unit of Oral Medicine, Varese, Italy
[2]Department of Medicine and Surgery, University of Insubria ASST dei Sette Laghi, Unit of Pathological Anatomy, Varese, Italy

Aim: Oral hairy leukoplakia is a benign, asymptomatic, white, hyperkeratotic lesion affecting primarily the lateral border of the tongue, unilaterally or bilaterally; but rarely it may occur elsewhere in the mouth. This lesion was described for the first time in 1984, in subjects with HIV infection. Nowadays, it is recognized the role of sentinel of an immunocompromised state also caused by immunosuppressive therapy for

organ transplantation, bone marrow transplants, haematological malignancies or due to localised immunosuppressive drugs such as topical or inhaled steroids use for treatment of lichen planus. Rare cases of oral hairy leukoplakia have been described in healthy patients, especially in older subjects. It is not clear why this lesion prefers the lateral border of the tongue; some authors hypothesize that this is due to continuous traumatism, which facilitates the entry of viruses into the tissue or due to the reduced presence of Langerhans cells. The importance of the recognition of this lesion is due to the fact that it often represents the first sign with which the clinician can suspect a latent state of immunocompromission.
Methods: A 45-year-old male Caucasian patient presented himself to our observation for the evaluation of a diffuse hyperkeratosis affecting the mucous membranes of the lateral edges and of the relative ventral sides of the tongue. The lesions, present for about 6 months, have increased in size over time, although remaining exclusively confined to the tongue. The patient reports a moderate burning sensation, but doesn't take any drugs and his remote pathological anamnesis is negative. The local objective examination shows the bilateral and symmetrical presence of white lesions. Patient has never smoked in the past and doesn't consume any type of alcohol; secondly, a more careful visual observation shows a corrugated aspect of the lesion, with accentuation of the striae and vertical grooves of the lateral margin of the tongue following the phenomenon of marked hyperkeratosis. In agreement with the patient, incisional biopsy is carried out and subsequent histopathological examination for the diagnosis formulation.
Results: The microscopical characteristic of hairy leukoplakia are epithelial thickening due to acanthosis and hyperkeratosis, areas of ballooning cells, pyknotic-looking condensed nuclei in a few places and no associated inflammation. With specific immunohistochemical staining has allowed to demonstrate the presence of intracellular viral inclusions in the balloniform cells, caused by the Epstein-Barr virus. After the diagnosis, our patient underwent further in-depth examinations, which showed the positivity for HIV-1 and presence of a B-cell lymphoproliferative lesion in the gastric mucosa. Hairy leukoplakia rarely merits treatment, but on occasion patients complain about the appearance or slight discomfort. This lesion responds to some anti-EBV preparations including acyclovir, desciclovir, and valacyclovir. Therapy is effective short term, not curative and recurrence following discontinuation of therapy is usually seen.
Discussion: The presentation of this case report wants to highlight how a lesion, whose frequency seemed to have drastically decreased in the last decades with the introduction of HAART antiretroviral therapy, has not really disappeared: the clinician must be able to recognize it, to allow patient to reach an early diagnosis that allows him to set up rapid and effective interventions on the primary pathology.

Efficacy of a dietary supplement with carnosine and Hibiscus Sabdariffa L. (Aqualief™) in patients with xerostomia: a randomized, placebo-controlled, double-blind trial

Luca Levrini[1*], Marta Dani[2], Lorenzo Azzi[3], Sara Bossi[4]

[1]Department of Human Sciences, Innovation and Territory
[2] Dental School
[3] Department of Surgical and Morphological Sciences, University of Insubria, Varese, Italy
[4] Private practice

Aim: The purpose of this study was to test the safety and efficacy of Aqualief™ in patients affected by xerostomia. The main ingredients of Aqualief™ are carnosine and dried calyces of Hibiscus sabdariffa L. (karkadè) which were selected and appropriately mixed for their buffering effect at pH 7 as well as for their antioxidant, antimicrobial and lenitive properties.
Methods: Sixty patients with xerostomia (RTOG/EORTC grade 1-2) were randomly assigned to receive either placebo, or AqualiefTMtablets (three times/day after meals) for 6 consecutive days. A questionnaire based on six questions and a rating scale based on three scores was used to evaluate dry mouth symptoms before and after 6 days of AqualiefTMor placebo application. Unstimulated and stimulated salivary flow rates and pH were measured before and after application.
Results: Treatment with AqualiefTMfor 6 days induced a significant increase in saliva pH from 6.2 ± 0.5 to 6.4 ± 0.6 ($P< 0.05$) while placebo was ineffective (from 6.2 ± 0.5 to 6.3 ± 0.5). AqualiefTMalso induced a significant increase in the pH of stimulated saliva from 6.3 ± 0.5 to 6.6 ± 0.5 ($P< 0.01$). Placebo was ineffective also in this setting (from 6.2 ± 0.5 to 6.3 ± 0.5). Besides an expected normalization of the saliva pH value, AqualiefTMtreatment for 6 days greatly increased (56%, $P< 0.0001$) saliva production. Placebo induced a 19% increase ($P< 0.05$), which was likely due to mechanical stimulation. AqualiefTMalso increased stimulated saliva production (27% increase with respect to day 0, $P< 0.05$), while placebo was ineffective. Eventually, AqualiefTMbut not placebo significantly improved also the following dry mouth symptoms: dry mouth, difficulties in swallowing dry foods, dry lips.
Conclusion: The treatment of xerostomia patients

with AqualiefTM, three times/day for 6 days leads to a significant increase of their saliva production and pH. These properties make AqualiefTMeffective in the treatment of xerostomia and does not act by modulating muscarinic or adrenergic receptors for which scientific evidence from a clinical study is now available. Overall, AqualiefTMmay become a product for the treatment of patients affected by xerostomia and for the prevention of its complications. The efficacy of AqualiefTMin significantly increasing both saliva production and saliva pH makes it suitable not only for the therapy of xerostomia, but also for the prevention of some of its untoward consequences such as, for example, caries.

The influence of flap design on clinical outcomes after mandibular third molar surgery: a literature review

G. De Marco[1], F. Di Francesco[1], R. Rullo[1]

[1]Multidisciplinary Department of Medical Surgical and Dental Specialties, University of Campania "Luigi Vanvitelli", School of Oral Surgery

Aim: The objective of this study is to investigate the influence of flap design on clinical outcomes in terms of healing, pain, swelling, trismus in mandibular third molar surgery. Envelope flap (EF), triangular flap (TF) and modified triangular flap (MTF) were examined.
Methods: The PICO question was: "In patients (P) requiring mandibular third molar surgery (I), is there a difference between the envelope flap, triangular flap and modified triangular flap (C) in terms of analysis of clinical parameters such as healing, pain, swelling and trismus(O)? The following free text words employed in the strategy search are " mandibular third molar surgery", "mandibular third molar flap design". An electronic search through the above-mentioned key words was conducted in Pubmed database to find all relevant articles published between 1999 and 2019. The electronic search was complemented by manual checking references of relevant review articles and eligible studies for additional included studies. The search was restricted to English language articles and only studies on human species with at least 15 totally treated patients.
Results: The initial search revealed 394 articles. After reading the titles, 41 articles were selected. Subsequently, through reading the abstracts, or full text if necessary, and excluding studies that did not report at least two examined flaps design and at least one of the above-mentioned clinical parameters, 9 full-text articles were selected. In addition, 2 studies were added after manual searching, resulting in a total of 11 included articles. Several analyzed studies agree that triangular flap and modified triangular flap have showed better outcomes compared to envelope flap in terms of postoperative pain but not significant statistically. These three design flaps do not seem to have difference in term of swelling. Trismus is associated with the duration of the intervention rather than the flap design. Furthermore, these three design flaps do not seem to have a long lasting difference in term of primary wound healing and status of periodontium.
Conclusion: The influence of flap design on clinical outcomes in mandibular third molar surgery is a topic still to be discussed. This review states triangular flap and modified triangular flap have showed better clinical outcomes in the short time, when compared to envelope flap, but were not statistically significant. There were no statistical differences between flap designs in terms of pain, swelling, trismus. However, from our experience, the substantial clinical advantages of triangular flap and modified triangular flap are an increase in exposure to the surgical site, the lower incidence of damage to the flap and better management of intraoperative complications. The main advantage of the envelope flap is lower intraoperative bleeding; this is possible thanks to the minor surgical invasiveness, with respect to the periosteum and the anatomy of the buccinator muscle. Finally, the knowledge of the different type of flaps with its own advantages and disadvantages and operating skills should guide clinician to advocate proper surgical technique.

Minimal conscious sedation in oral surgery: survey on 7 marijuana abuser phobic patients

F. Dell'Olio[1], P. Lorusso[2], P. Mezzapesa[1], P. Sportelli[1], S. Capodiferro[1], S. Grasso[2], G. Favia[1]

[1] Complex Unit of Odontostomatology, DIM, Interdisciplinary Department of Medicine, Aldo Moro University of Bari, Italy
[2] Unit of Anesthesiology, DAE, Emergency Department, Aldo Moro University of Bari, Italy

Aim: Recreational use of marijuana is widespread. Tetrahydrocannabinol concentration, ranging between 0,5% and 5%, interacts with cannabinoid receptor 1, and can elicit variable parasympathetic effects in response to stressors, such as oral surgery, causing disphoria, psychotic-like paranoid thoughts, acute anxiety and syncope. Because of its high lipophilic properties, it accumulates in adipose tissue and completes its elimination 30 days after intake, making unpredictable the patients' response to anxiety related to dental treatments. Authors described conscious sedation procedures performed for lower third molar extraction in a group of dental-phobic patients who declared recreational use of marijuana, referred to Complex Operating Unit of Odontostomatology of

"Aldo Moro" University of Bari in 2018.
Methods: Only patients that reported use of marijuana more than 5 days every 2 weeks (therefore classified as habitual users) and that scored a modified dental anxiety scale value >14 were involved in this study. The resulting 7 patients underwent panoramic radiogram, cone beam computed axial tomography to asses distance between lower third molars and inferior alveolar nerve, standard blood tests, electrocardiogram, anesthesiologic evaluation, modified dental anxiety scale score. During sedation protocol ventilation rate, electrocardiogram and oxygen saturation were monitored. Preliminary anxiolysis was provided trough 2 mg of chlordemethyldiazepam per os. After a waiting period of thirty minutes, 2mg of intravenous diazepam were administered. After 2 minutes of onset, patients who referred a reduction of anxiety, received an additional 1 mg intravenous diazepam dose every 2 minutes until reaching of complete relax sensation (end-point of minimal conscious sedation). On the contrary, patients resistant to diazepam received 10mg of intravenous propofol to reach the end-point. Extractions were performed after blocking inferior alveolar nerve, buccal nerve and lingual nerve. Mepivacaine 3% without epinephrine was administered to prevent any cardiovascular event related to interaction between epinephrine and tetrahydrocannabinol. Patients were discharged 3 hours after surgery accompanied by their caregivers. All data regarding age, sex, body mass index, marijuana consumption habits, modified dental anxiety scale score, type of drug use to perform conscious sedation were collected into a database.
Results: Authors studied 7 patients (6 males and 1 female) with a median age of 33,71 years. Mean modified dental anxiety scale score, confirming the reported dental phobia, was 19,14. The patients were classified according to American society of anesthesiologists as class 2 of risk. Body mass index was calculated to assess the possible reservoir of tetrahydrocannabinol (mean = 27,44 Kg/m2). 3 patients responded to intravenous diazepam and reached complete relax sensation with mean administration of 10,67 mg, largely more of that necessary in non-abuser patients. The other 4 patients were not-responders to intravenous diazepam and conscious sedation was induced trough intravenous propofol. Vital parameters remained stable for the whole surgical procedure.
Conclusions: Marijuana recreational abuse is a widespread phenomenon, commonly under-referred by the patients. Dentists should promote empathic dialogue with patients in order to detect this habit. When these patients respond to intravenous diazepam, they seem to require higher doses than non-abusers. When patients don't respond, molecules stronger than diazepam are required. Future research should focus on standardizing protocols for minimal conscious sedation in this group of patients.

Demographic and clinical survey of odontogenic flogistic cysts: a retrospective study of 49 cases

F. Dell'Olio[1], P. Mezzapesa[1], S. Di Nanna[1], P. Lorusso[2], P. Sportelli[1], S. Capodiferro[1], G. Favia[1]

[1] Complex Unit of Odontostomatology, DIM, Interdisciplinary Department of Medicine, Aldo Moro University of Bari, Italy
[2] Unit of Anesthesiology, DAE, Emergency Department, Aldo Moro University of Bari, Italy

Aim: According to World Health Organization's classification of Head and Neck Tumors 2017, jaws cysts are classified as non odontogenic or odontogenic cysts, the latter are also divided into developmental or inflammatory cysts, due to their different origin. This study describes the cases of 45 patients affected by odontogenic inflammatory radicular cysts referred to Complex Operating Unit of Odontostomatology of the "Aldo Moro" University of Bari between 2017 and 2018, in order to analyze epidemiology and etiology of these lesions, and to describe the treatment.
Methods: Among 71 histologically diagnosed jaw cysts, authors studied only 45 cases of patients with diagnosis of radicular cyst. All patients underwent panoramic radiogram and computed axial tomography to evaluate the real extension of lesions. Standard blood tests and electrocardiogram were performed to prepare patients to surgery. All radicular cysts caused by necrotic roots were treated with the extraction of causal element and enucleation of lesions, while root-canal treatment followed by apicectomy and enucleation were suggested for patients with cysts caused by necrotic teeth. Patients underwent monthly clinical follow-up and panoramic radiogram check-up every six months till complete bone heal. Statistical analysis was performed with $\alpha<0,05$.
Results: The sample of 71 jaw cysts included 22 developmental cysts (16 dentigerous, 6 keratocysts) and 49 inflammatory odontogenic cysts (45 radicular, 4 collateral). Authors focused on the 45 radicular cysts. 25 occurred in male patients while 20 in female, showing none significant statistical difference between sexes. 28 cases occurred in 2017 and 17 in 2018. 74,42% of patients had dental abscess, 9,30% showed facial swelling caused by jaw's deformation, 6,98% developed intra-oral fistulas; only the 9,30% of patients was asymptomatic. Confidence interval of mean age of patients ranged from 46,18 to 47,97 years. Even though the incidence was statistically similar among all quadrants, radicular cysts occurred more in the second one (34,88%). The most frequent causal elements were first molars (28,57%), with incidence

statistically higher than all other teeth. According to radiologic maximum diameter, 19 cysts were ≤10 mm, 11 between 11 mm and 20 mm, 9 between 21 mm and 30 mm, and 6 ≥31 mm. The main causes were deep decays and persistence of necrotic roots (respectively 44,19% and 48,84%, statistically similar); only 6,98% of all cysts were caused by incorrect root-canal treatments. Among 23 patients that could underwent apicectomy and keep their teeth, only 17 (73,91%) accepted this treatment; the others preferred the extraction of causal tooth. All treated patients healed after a year, without recurrences.
Conclusions: This study evidences that radicular cysts are the most frequent kind of jaw cysts occurring in clinical practice. The high incidence on first molars, the high percentage of lesions arisen from persistence of necrotic roots and the number of cases of cysts larger than 20 mm should lead dental practitioners to intensify the promotion of oral health, in order to reduce morbidity related to delay or renounce to dental treatments.

Mental nerve paresthesia due to periapical pathology

F. Di Francesco[1], S. Ferrara[1], C. Maio[1], G. De Marco[1], P. Sammartino[2], M. Menditti[2], D. Menditti[1], L. Ramaglia[2]

[1] Multidisciplinary Department of Medical-Surgical and Dental Specialties, Campania University Luigi Vanvitelli, Naples, Italy
[2] University of Naples Federico II, Department of Dental and Maxillofacial Sciences, Naples, Italy

Aim: The purpose of this study is to support the resolution of paresthesia of the mental nerve region, resulting from the surgical treatment of the apical pathologies of teeth in the lateral mandibular area with a one year follow-up.
Methods: Three clinical cases are described: a 25-year-old woman, a 28-year-old woman and a 40-year-old man are presented to our observation with paresthesia of the mental nerve region and sensorial diseases deriving from the involvement of inferior alveolar nerve. The reported paresthesia was defined like a burning sensation or tingling, temporary or stable, from a time ranging from 3 months to 12 months. The clinical history of the patients was insignificant and other local factors such as fractures of the jaw, facial trauma, incorrect local anesthetic technique and third molar surgery with complication, local infiltration of a tumor and metastatic cancer were all excluded. The pathological anamnesis of patients reported recurrent abscess in the lateral mandibular area. The objective examination showed endodontic and restorative rehabilitation, third molar with periradicular infection and residual root infection, respectively in the three patients. However, no clinical signs such as abscess or swelling of the areas were found. The cutaneous areas with sensorial alterations were highlighted through the use of a "dental speculum" with a punctiform movement, followed by a stable sign after each contact using a dermographic pen in order to define the affected area. Standard radiographic examinations showed regular radiolucent areas, related to the lower arch. Thus, three-dimensional examinations were performed in order to obtain diagnostic and surgical insights. According to the patients, the teeth affected by the periapical pathology, and the corresponding periapical lesions were removed through the surgical treatment. The resulting residual cavities were not filled with any biomaterial. Bleeding and "first intention healing" were performed. No medical therapies with cortisones, B-type vitamins, or a-lipoic acid have been prescribed in order to investigate the effectiveness of surgical therapy and the real regenerative capacity of nerve fibers.
Results: The healing of surgical wounds occurred without complications in about ten days. Neurological diseases have had a regression since the early days of postoperative. The patients have declared an improvement in sensorial alterations during the first month, but the real healing of the affected skin areas has occurred between three and four months after surgery. Two of the three patients showed complete healing after four months. In these two patients, objective examinations showed no area affected by paresthesia. However, in the third patient claiming almost complete healing, the persistence of micro point areas of cutaneous paresthesia was found after six months and one year. This event reflects an involvement with irreversible damage of individual nerve fibers of the mental nerve.
Conclusion: The presentation of these three clinical cases showed a strong link between the presence of periapical pathologies and sensorial diseases of the region innervated by the mental nerve. The surgical therapy was chosen by the presence of hopeless teeth and the size of the periapical pathology. From our experience, the accurate removal of periapical lesions interesting hopeless teeth and the toilet of the residual cavities, led to a complete healing of the sites, with regression of sensorial alterations.

Custom made bone grafts in the rehabilitation of atrophic jaws: a preliminary study

A. Gonnelli, I. Di Maggio, N. Baldi, L. Barbato, C. Borgioli, P. Tonelli

[1]Chirurgia Odontostomatologica, Università degli Studi di Firenze, Direttrice Prof.ssa Gabriella Pagavino

Aim: The rehabilitation of atrophic maxillary

ridges (V class Cawood & Howell) is a hard clinical challenge due to difficulties in revitalizing every type of bone graft. The main problem is soft tissue management in order to have complete coverage of bone graft. In this pilot study we used 2 custom made heterologous bone grafts and a bilateral sinus lift to reconstruction of atrophic maxillary aimed at positioning of six fixture and Toronto bridge.
Methods: A 70-year-old woman, whit sever atrophic maxillary was enrolled. Preliminary clinical and radiographical evaluation showed massive tridimensional bone resorption and 2 implants whit fractured neck in site 23 and 13. Starting from pre-operative Tc, 2 heterologous bone blocks, treated with strontium ranelate, have been produced with CAD/CAM (Computer-Aided Design/Computer-Aided Manufacturing) technology. The bone augmentation procedure was carried out under general anaesthesia. After elevation of full-thickness flap and extraction of fractured implants, in order to create a bleeding receiving site, decortication of native bone was performed. Bone blocks were positioned in two atrophic sites and both fitted exactly into the defects without leaving void space and without need for additional adaptations. Two 10 mm titanium osteosynthesis screws with a diameter of 1.5 mm were used for blocks stabilization. Granular grafting materials enriched whit PRF was positioned around the bone blocks. In order to obtain a sufficient bone height for implant placement two lateral sinus lift were made. The complete coverage of grafts was obtained through soft tissue mobilization made possible by periosteal incision. 2 months after surgery a Tc was performed in order to evaluation the stability of bone blocks and their integration. This study is currently undergoing and the protocol foresees at 9 months from surgery a Tc to evaluation the stability and integration of grafted materials as well as width and height of bone grafted to positioning of 6 implants.
Results: Tc performed 2 months after surgery showed good stability and integration of bone blocks and good integration of granular grafting materials used in sinus lift. Bone width and height was sufficient to allow the implant placement. No resorption of bone was observed 2 months after surgery.
Conclusion: Bone blocks matched perfectly the defect geometry allowing tridimensional bone reconstruction in order to position implants according to the treatment plan. The absence of resorption does not make it necessary to overestimate the size of the graft. Custom made bone blocks reduced the time necessary for adaptation to the defect leaving more time for soft tissue management because the complete coverage of the grafts remains the hardest challenge.

The marsupialization in oral surgery: where are we in 2019?

L. Laino[1], M.G.P. Di Mare[1], A. Donzelli[1], R. Vallebona[1], M. Menditti[2], S. Melito[1], M. D'agostino[1], A.E. Di Lauro[2], D. Menditti[1]

[1]Multidisciplinary Department of Medical-Surgical and Dental Specialities, University of Campania "Luigi Vanvitelli", Naples, Italy
[2]University of Naples "Federico II," Department of Dental and Maxillofacial Sciences, Naples, Italy.

Aim: This work aims to evaluate the current importance of "marsupialization" as a surgical technique for the treatment of cystic odontogenic pathologies. The point of view about this intervention and its utility compared to enucleation has changed several times over the years. Starting from the biological bases on which it is founded; we have analyzed the criticisms received in the past and the advantages that it presents today.
Methods: Our work is based on the study of the most relevant articles published in the last years and our clinical experience. For our research we have used the keywords: Marsupialization and Decompression of odontogenic cysts or keratocyst or ameloblastoma ", "Treatment of odontogenic cysts", "Effectiveness of marsupialization". The cases we have treated with marsupialization are various: follicular cysts, odontogenic keratocysts, dentigerous cysts in critically III patients.
Results: The intervention of marsupialization is traditionally attributed to Carl Franz Maria Partsch who introduced the concept of cystotomy in 1892. This technique, today known as "Partsch I Operation", consisted in a flap to expose the outer wall of the cyst that is removed while the epithelial lining is allowed to remain and the cavity is packed with gauze obtaining the decrease in size and depth of the bone cavity. At that period the main benefit recognized to this technique compared to the cystectomy was the lower risk of dangerous infections. In the second half of the twentieth century the use of this technique was reduced for three main reasons and limited to cases of follicular cyst of teeth to recover and for inoperable patients's cyst. The first was the development and diffusion of antibiotic therapy that reduces the risk of infection after enucleation. The second was linked to the time-consuming advantages. The third had to be found in new discoveries regarding local so-named malignant cystic lesions that required a more demolitive approach. Only at the end of 20th century, new research started to evaluate the utility of marsupialization in the treatment of aggressive odontogenic lesions as the keratocyst and ameloblastoma obtaining important results as the reduction of their dimension allowing the subsequent intervention of enucleation on small-sized lesions. Finally, in the last years a lot of studies

are demonstrating the efficacy of marsupialization in the treatment of ameloblastoma and OKC evaluating the usefulness in terms of reducing the incidence of recurrences. We have treated several patients with the intervention of marsupialization obtaining the healing of the cystic lesion and now they are in follow-up. Thanks to it we have been able to save teeth involved in a follicular cyst, to reduce the risk of treatment in critically Ill patients and to heal without recurrence odontogenic keratocysts.
Conclusion: Recent results lead to more and more undisputed usefulness of the technique of marsupialization as preliminary intervention especially before the enucleation as well as an intervention to choice for a less demolitive approach. Moreover, the prospects of employing successfully in the treatment of ameloblastoma and keratocysts makes it very interesting for the modern oral surgery. Our clinical experience is positive and our results are in line with the most recent studies.

ALT/well differentiated liposarcoma of the cheek: a case report and review of the literature

D'Innella Eugenia[1]; Poletti de Chaurand Bianca[1]; Chiodo Luigi[1]; Mottola Francesca[1]; Parravicini Mattia[1]; Gastaldi Giorgio[1]; Vinci Raffaele[1]

[1]Dental School, Vita-Salute San Raffaele University, Milan.

Aim: Liposarcoma is a malignant mesenchymal neoplasm of adipose tissue, extremely rare in the oral cavity (less than 5% of all cases). The peak age of incidence is between 40 to 70 years with male predominance. The oral manifestations occur in the buccal mucosa, floor of the mouth, tongue and palate as painless, smooth and slow-growing masses; at clinical examination these can resemble benign formations such as lipomas or fibromas. The 2002 WHO classification highlights four histological types: well-differentiated (or Atypical Lipomatous Tumor), dedifferentiated, myxoid and pleomorphic. The aim of this report is to describe a case of a patient with ALT/WD liposarcoma of the cheek.
Methods: A 76 years-old man presented to S. Rocco Clinical Institute (Brescia, Italy) reporting the presence of a painless mass in the right cheek mucosa. The patient had no symptoms, negative past medical history and no previous biopsies. Radiological images (MRI) showed the existence of a suspected and well-defined mass of 4x2x2 cm of extension. After the application of local perilesional anesthesia, were performed in order: incision of the soft tissues, blunt dissection, isolation and removal of the lesion with free margins and finally flaps suture. No radiation therapy was required. After the lesion excision the patient had a perfect recovery. At 2 months follow-up no changes or recurrence of the disease has been observed.
Results: The final histopathological diagnosis was Atypical Lipomatous Tumor/Well Differentiated liposarcoma composed by neoplastic tissue with lipoblasts among heterogeneous spindle cells. DISCUSSION: The low grade (grade I) of ALT type seems to be prevalent in the oral cavity and it is also divided in adipocytic, sclerosing and inflammatory subtypes; it can recur locally and rarely metastasize. In the diagnostic process clinical and radiological aspects are less relevant than the histopathologic examination. The recommended primary treatment of ALT/WD is complete surgical resection with free margins, that, if inadequate, can lead to local recurrences. The role of adjuvant radio and chemotherapy is not clear yet, but it is proved that the surgical approach alone has higher 5-year survival rate compared to its association with radiotherapy. Prognosis is based on age and gender of the patient, size, histopathologic subtype, localization and surgical margins. A close follow-up is necessary.
Conclusion: Complete surgical excision with negative margins followed by long-term followup is indispensable as the best management for these rare and malignant lesions. However, a more thorough understanding of the epidemiology and histopathological characteristics of oral and maxillofacial liposarcoma is urgently required to optimize the diagnosis and treatment strategies to achieve better outcomes.

Odontogenic keratocyst: a case report

D. Menditti, A. Donzelli, R. Vallebona, M. D'Agostino, M.G.P. Di Mare, S. Melito, D. Russo, L. Laino

Multidisciplinary Department of Medical-Surgical and Dental Specialities, University of Campania "Luigi Vanvitelli", Naples, Italy

Aim: We present a case report of a relapsed orthokeratinized mandibular keratocyst previous operated in another hospital and then treated with an enucleation-curettage intervention and extraction of the right mandibular first molar in our University.
Methods: The 58-years-old male patient presented a relapsed orthokeratinized cystic formation – an intraosseous odontogenic cyst originated from cellular residues of the dental lamina – extending from the right mandibular premolar to the third molar area. Radiographically it demonstrated a well-defined radiolucency with smooth and corticated margins. The clinical examination revealed the presence of pain, continuous abscesses, absence of paresthesia – even though the erosion of the superior portion of the mandibular canal – and alteration of the lower facial third morphology. The treatment of the OKC remains controversial and it is generally classified as conservative or aggressive. Conservative treatment

generally includes simple enucleation with curettage or marsupialization. Aggressive treatment generally includes peripheral osteotomy, chemical curettage. The conservative treatment with enucleation and curettage can be used specially in very large lesions that treated with resection would interrupt the continuity of the jaw. Orthokeratinized OKC can become quite large because of its ability for significant expansion, extension into adjacent tissues and rapid growth. The choice of treatment should be based on multiple factors: patient age, size and location of the cyst, soft tissue involvement, history of previous treatment and a histological variant of the lesion. In this case, following the onset of recurrences, the lesion was treated with enucleation, curettage and extraction of 4.6.

Results: The preoperative exams showed the exact location and size of mass and relationship to adjacent structures, but did not give a definitive preoperative diagnosis. The final diagnosis was established after the histopathological study. The histological result was orthokeratocyst. It showed a thin epithelial layer (ortho-keratinized squamous epithelium), friable wall and minimum infiltrative potential (aggressiveness) and possible recurrences. The patient was under follow up for 5 years, and showed a complete recovery and no recurrence confirmed by radiographies with intact bone where it previously appeared with osteolysis. The patient is a candidate to receive implant supported rehabilitation.

Conclusion: The surgical therapy through enucleation and curettage in the treatment of OKC presented an effective and minimally invasive method that successfully preserves anatomical structures and maintains the patient's quality of life. Enucleation in combination with a curettage offers an effective surgical option for the treatment of large OKCs of the mandible.

The DOOR Technique: an innovative bone regeneration method and the use of autogenous hard tissue grafts from intraoral sites

Alessandro Federico, Andrea Cassandro, Giuseppe Coti, Mauro Libertucci, Davide Lilli

Department Interdisciplinary of Medicine, Dental Clinic University Aldo Moro of Bari, Italy

Aim: The goal of this study is to show the outcome of an innovative bone regeneration method and to evaluate the use of autogenous grafts coming from intraoral hard tissues.

Methods: We propose a case of bone regeneration, in which bone from edentulous alveolar ridge was used as graft. The bone sample is repositioned according to the D.O.O.R. technique (Double Overturning Of Ridge) by Mauro Libertucci. This technique, much like split-crest technique, can be used for horizontal bone defects. After the preparation of a vestibular flap, D.O.O.R. starts with performing a longitudinal fracture of the alveolar bone ridge in order to obtain a socket of vestibular bone. Then, the fixture is inserted by fixing it to the residual ridge. Once that is done, the bone socket is overturned twice: medullary-cortical overturning, and coronal-apical overturning. This double overturning allows the cortical concave surface of the socket to better surround the fixture without bone asperity to contact with the flap. Neither fillers or membranes were used to help the healing process.

Results: The DOOR technique has shown tissue healing with new bone formation in radiological follow-up, performed with 2D exam and TC-cone beam exam, after 16 years. No bone loss was found from the radiological follow-up. It is noted that the cortical bone has become medullary and the medullary bone has become cortical. In this case no postoperative complications were encountered.

Conclusions: the DOOR technique has shown to be an innovative and efficient method which uses an autogenous bone sample, the best material for bone regeneration, according to literature. The main donor sites for autogenous and intraoral hard tissue grafts, in literature, are: mandibular symphysis, ascending and horizontal ramus, coronoid process, zygomatic buttress, maxillary tuberosity, anterior nasal spine, and teeth. In this study, we propose the alveolar ridge as a donor site. In this technique as well as any other technique that uses intraoral autogenous grafts, there are multiple benefits. Compared to methods that use autogenous extraoral grafts, methods that use intraoral autogenous grafts take overall less time to perform and the procedure can be completed in one sitting. In addition, the surgery performed is less heavy on the patients, and so is their postoperative. Autogenous grafts are less expensive than non-autogenous grafts: using bone or tooth samples which would be instead destinated to waste avoids buying commercial preparations of graft. Finally, using autogenous grafts has shown better results in histological exams compared to non-autogenous grafts for the osteoconduction process, and also for the osteoinduction process mediated by morphoproteins (BMP) which are found in bone and tooth, according to literature.

Use of piezosurgery in the surgical therapy of osteolithic neoformations of jaw bones: clinical case

S. Ferrara[1], A. Russo[1], R. Rullo[1], V. Festa[1]
[1]Multidisciplinary Department of Medical-Surgical and Dental Specialties, University of Campania "Luigi Vanvitelli, Naples, Italy.

Aims: The aim of the work is to highlight the efficacy of

Piezosurgery in the techniques that involve the removal of osteolytic neoformations of the maxillary bones in continuity relationship with noble structures.
Methods: Piezosurgery is a recent application in the medical field that makes it possible to exploit the ultrasonic waves generated by a piezoelectric device for bone surgery. Special inserts allow to cut or cut the bone tissue while preserving the soft tissues (the so-called selective cut) to the maximum, which make up some noble parts such as nerves, arteries or membranes. This technology is spreading a lot in oral surgery thanks to the possibility of intervening in delicate areas with minimal surgical invasiveness, especially in implantology and in surgery of new forms.
Description of the intervention: Patient man, adult, without relevant pathologies; presence of osteolytic neoformation of ndd in the right hemimandible site in continuity relation with the inferior alveolar nerve.
The dental elements 37 and 38 are extracted which appeared compromised both from a periodontal point of view and from the lesion itself. Ridge incision edentulously distal to the dental element 35, with a mesial discharge cut at the same with a total thickness; follows the detachment of the flap. Through the use of Piezosurgery, a bone trap is made to access the lesion and visualize it, and through a special insert proceed with the detachment of the lesion wall both in a vestibular-lingual, antero-posterior and inferior direction. The lesion is thus isolated from the bone structure and removed entirely.
Finally, the residual cable, silk suture, is reviewed.
Results: Removal of the whole lesion without involving the inferior alveolar nerve, absence of paresthesia both in the immediate post-operative and in the long term.
Conclusions: The use of Piezosurgery despite today is not yet widespread, probably represents the future of oral surgery, especially when you are faced with having to remove a large neoformation that in its growth process involved noble structures (such as the nerve lower alveolar in the case presented by us). The piezoelectric cut takes place thanks to an ultrasonic microvibration that is able to cut the mineralized tissues with great effectiveness in the maximum respect of soft tissues to which no damage occurs even in case of accidental contact. Moreover, the cavitation that is typical of the ultrasonic mechanism promotes a good view and the micrometric vibration ensures a great cutting precision that allows the operator to get close to very delicate structures such as the alveolar nerve. This characteristic is in fact not typical of rotary instruments that are normally used for bone surgery, as a possible contact with noble soft structures would cause irreparable damage. Finally, although it is obvious that to master the technique requires a learning curve of variable length according to the manual skill and experience of the operator, the case presented by us wants to highlight how piezoelectric surgery represents the gold standard when it is it is necessary to intervene surgically with the imperative to preserve the noble structures involved in the operative field.

Peri-implant squamous cell carcinoma in the oral cavity

F. Ghielmi[1], M. Festa[1], S. Magistro[3], A. Nanussi[2], F. Angiero

Università Degli Studi di Milano, IRCSS Cà Granda, UOC chirurgia Maxillofacciale ed Odontostomatologia, Direttore Prof. A.B. Giannì Scuola di Specializzazione in Ortognatodonzia, Presidente: Prof. G. Farronato
[1]Specializzando in Ortognatodonzia
[2]Dipartimento di Chirurgia e Medicina Traslazionale, Ospedale San Gerardo, Monza, Università degli studi di Milano Bicocca
[3]Specialista in Ortognatodonzia

Aim: The present study investigated whether genes of the p21, p16, p53, MYC p27, Ki67, caspasi, E-caderina, CD44, EGFR, γH2AX, CK5/6 play a role in oral cancer.
Materials and methods: Immunohistochemical analysis using a tissue microarray (TMA) containing 10 oral sample of healthy tissue and 12 biopsie di mucosa prelevati from peri-implant mucosa was performed to determine the prognostic role of this marker In order to identify the immunophenotype expression. The markers used were P21, P16,P53, P27, CD44 E-caderina, ki67,YH2Ax, Caspasi, Ck5/6, MYC,EGFR. The effects of this protein on proliferation, apoptosis, adhesion, invasion, epithelial-mesenchymal transition (EMT) and anchorage-independent growth were assessed in cells with up- and down-regulation- expression.
Results: We showed that the immuno positivity are more abundant on machined surfaces than in non machined surfaces of the oral mucosa. In particular, CD44, which has been described as one of the HOX members that plays an important role in tumorigenesis, was significantly more expressed in OSCCs compared to healthy oral mucosas. Further analysis demonstrated that overexpression of HOXA1 in HaCAT human epithelial cells promotes proliferation, whereas downregulation of HOXA1 in human OSCC cells (SCC9 cells) decreases it. Enforced HOXA1 expression in HaCAT cells was not capable of modulating other events related to tumorigenesis, including apoptosis, adhesion, invasion, EMT and anchorage-independent growth.
Conclusions: We found a more expression of P53, p63 in fewer and p16 in one patient. The significance of this positivity, together with histology, and if these may serve as biomarkers to predict the risk of developing oral cancer it's a question that still remains open. From our study it's clear that although the details of the mechanisms leading to cell death, genotoxicity, and cell-cycle delay are not fully understood, implants may alter the functions of the cells of the oral cavity.

Surgical and non-surgical treatment of denosumab related osteonecrosis of the jaw (DRONJ). The role of stopping treatment interruption

M. Frontera, G. Ghidini, M. Meleti, M. Manfredi, P. Vescovi

Oral Medicine and Oral Surgery Laser Unit, University Center of Dentistry, Department of Medicine and Surgery, University of Parma, Italy. EMDOLA (European Master Degree in Oral Laser Applications) Dir. Prof. Paolo Vescovi

Aim: Medication-related osteonecrosis of the jaw (MRONJ) is a potential pharmacological complication of therapy with bisphosphonates and some monoclonal antibodies as well as biologic agents. This study aimed to compare different manifestations of denosumab-related osteonecrosis of the jaws (DRONJ) in patients treated with Denosumab alone or in combination with other monoclonal antibodies and/or bisphosphonates. Moreover, we compared two different therapeutic approaches: conservative approach versus the association to traditional surgery or Er:YAG laser.
Methods: Twenty-two patients affected by DRONJ were included in the present evaluation. Among these, 15 (68.2%) were females and 7 (31.8%) males, 16 (72.7%) had cancer and 6 (27.3%) were non-cancer cases. Patients presented 26 DRONJ sites. Among these, 20 (76.9%) were observed in cancer patients and 6 (23.1%) in non oncologic cases. We considered two different clinical approaches: T1: 11 (42.3%) sites treated without surgery; T2: 15 (57.7%) treated with traditional surgery or Er:YAG laser (2940nm, 250mJ, 20Hz). Patients in T1 and T2 were all treated with amoxicillin 1g twice a day in association with metronidazole 500mg twice a day for three weeks. All lesions were additionally administered with low level laser therapy (LLLT, 1064nm, 1.25w, 15 Hz) using Nd:YAG laser. In T1, 9 (81.8%) sites were localized in patients who were not currently taking denosumab and 2 (18.2%) in patients that were continuing denosumab therapy. In T2, 9 (60%) sites were observed in patients who were not taking denosumab at the time of observations and 6 (40%) in patients who were continuing denosumab. Based on the AAOMS classification (update 2014), the present study included 7 (26.9%) sites in stage I, 14 (53.8%) in stage II and 5 (19.3%) in stage III.
Results: In T1, depending on the stage at diagnosis, 10 (90.9%) of sites improved clinically and 3 (27.3%) completely healed. In T2, 14 (93.4%) of sites improved clinically and up to 13 (86.7%) got complete healing.
For patients in T1, results are as follows: 6 (66.7%) of patients who were not taking denosumab anymore improved clinically and 2 (22.3%) had complete healing; 2 (100%) of patients who were continuing denosumab improved clinically while in no one was observed a complete healing. For patients in T2: 8 (88.9%) of patients who interrupted denosumab treatment improved clinically and 6 (66.7%) got complete healing; similar results were obtained in patients of T2 that who were continuing denosumab; 6 (100%) of patients who were continuing denosumab improved clinically and was observed a complete healing.
Conclusions: Sites that received surgical treatment had a better outcome when compared to those treated with a conservative approach. In such a group, there was no significant difference between patients not taking denosumab anymore and those who were continuing it. In the group of patients treated with a conservative approach, the interruption of denosumab is a positive prognostic factor both for clinical improvement and for complete healing.

The compact Bio-Bone® an innovative bio-scaffold solution for bone regeneration

Andrea Ballini[1], Ciro Gargiulo Isacco[2,3], Stefania Cantore[2,4], Giuseppina Malcangi[2], Gregorio Paduanelli[2], Francesco Pettini[2], Danila De Vito[1], Gianna Dipalma[2]

[1]Dipartimento di Scienze Mediche di Base, Neuroscienze ed Organi di Senso, University of Bari Aldo Moro, School of Medicine; Dental Hygiene School, Bari, Italy
[2] Dipartimento Interdisciplinare di Medicina, University of Bari Aldo Moro, School of Medicine, Bari, Italy
[3] Human Stem Cells Research Center, Ho Chi Minh City, Vietnam
[4] Sorriso & Benessere Ricerca e Clinica S.r.l., Bari, Italy

Aim: The goal of each oral surgeon is to be able to treat fast and secure avoiding secondary complications during surgical graft procedures such as infections, rejection and morbidities. Challenges and efforts have involved the use of engineered bio-materials that can mimic both the mechanical and biological properties of autologous bone tissue, supporting stem cell (SCs) homing and proliferation, the vascularization and new compatible bone tissue growth. Grinded teeth and β-tricalcium phosphate (β-TCP) have been used extensively in the literature since the 60's of last century. In addition, autologous human peripheral blood (hPB) includes a great variety of SCs such as mesenchymal (MSCs), neural (NSCs), hematopoietic (HSCs) and embryonic like (ESCs) whilst autologous fibrin gel-matrix have gained a great attention for its functional contribution in bone re-growth and regeneration. This study aimed to explore the effectiveness of Compact Bio-Bone® composed by a balanced combination of autologous tooth granule paste (0.4-0.8 mm) obtained by a special grinder device (The Tooth Transformer®) and β-tricalcium phosphate (β-TCP) granules (GUIDOR Calc-i-Oss) enfolded into an autologous fibrin gel matrix from hPB as graft to allocate autologous hPB-SCs.

Methods: Isolated hPB-SCs, after patient's informed consent, were directly relocated and seeded into the tooth particulated (0.4-08 mm) and β-TCP granules of 3x0.5ml 315-500µM (GUIDOR Calc-i-Oss), embedded in a fibrin gel matrix and condensed in a unique semi-dense scaffold paste by using the centrifugation and heat procedure.During the in vitro study procedure, the bio-scaffold was poured into flask cell-culture with serum free medium (SFM-Gibco-Thermo Fisher Germany) for a period of 7-10 days. Improved proliferation of hPB-SCs was assessed by the expression of multipotent and pluripotent stem cells bio-markers as CD34, CD45, CD90, CD105 and SSEA3, performed by flow-cytometry analysis; osteoblasts markers were assessed by qPCR expression gene of Runx2 (203 Kb), osteocalcin-OCN (150 kb), dentin matrix acidic phosphoprotein 1 - DMP1 (200 Kb) and Nestin (496 Kb) and by the positive expression of immune-histochemical stain with Alizarine red (AR), Von Kossa (VK) and Alkaline phosphatase (ALP).
Results: Outcomes showed that the Compact Compact Bio-Bone® allowed us to achieve either a faster bone tissue restoration or higher superior healing results. At 1 week mature osteoblasts were detected within and outside the fibrin structure, the samples were positive for the expression of AR, VK and ALP; qPCR assessed the expression for typical osteogenic expression genes such as Runx2, OCN, Nestin and DMP1. At 3 months histology analysis confirmed well established bone structure with well-organized vascularized osteo configurations.
Conclusion: The Compact Bio-Bone® system is a method to create an autologous bio-compound suitable to increase and preserve the bone during oral implantology procedures. Outcomes confirmed a high and well balanced performance of the Compact Bio-Bone® both in vitro and in vivo and at least comparable to extensively used of xenogenic or allogenic biomaterials present on the market. We are well aware that further studies are necessary to confirm these data.

Cryosurgery: a reliable and minimally invasive ablative treatment for selected cases of oral potentially malignant disorders

Gianluca Gesualdo[1], Matteo Vala[2], Davide Mirra[1], Octavian Fiore[1], Monica Pentenero[1,2]

[1]Oral Surgery Specialty School, Department of Oncology, San Luigi Gonzaga University Hospital - Orbassano, University of Turin, Italy
[2]Oral Medicine and Oral Oncology Unit, Department of Oncology, San Luigi Gonzaga University Hospital - Orbassano, University of Turin, Italy

Aim: The present study aims to describe the effectiveness and post-surgical course of cryoablation used to treat oral potentially malignant disorders.
Methods: This retrospective cohort study collected data from clinical charts of patients treated in our department from 2009 to 2018. Data extraction addressed: demographical information, clinical features of the treated lesions including lesion site, pre-surgical incisional biopsy diagnosis, drugs prescribed after treatment, symptoms reported after treatment, healing time, relapse and free of disease period, development of new lesions in other anatomical sub-site, malignant transformation.
Results: Thirty-seven lesions were treated in twenty-four patients, 15 females and 11 males with a mean age of 71 (range 51 – 85 years). Most often treated lesions had patch/plaque features (70%) sometimes with non-homogeneous aspect including mucosal erosions (30%). All treated lesions had a pre-surgical histological diagnosis based on incisional biopsy samples. Usually, cryosurgery with ablative intent has been performed in non-dysplastic lesions (54%); 3 lesions had moderate dysplasia and 8 showed mild dysplastic alterations. Of note the 3 lesions showing moderate dysplasia, were treated using cryosurgery rather than scalpel as this would not have allowed an acceptable post-operative function. Most of treated lesions were on lateral tongue (16/37; 43%) or buccal mucosa (14/37; 37%). The therapeutic protocol used in our department is based on the use of a closed system cryotome applied on the entire lesion for two cycles under local anaesthesia. After the procedure, painkillers (usually acetaminophen 1 gr as needed), prednisone (usually 25 mg a day for 3 days and 12.5 mg a day for the following 3 days, depending on the patients' weight) and chlorhexidine mouthwashes. Of note prednisone was prescribed in order to reduce the postoperative oedema. A complete healing was achieved in a mean of 30.5 days (range 21 - 40 days). Lesion larger than 2 cm2(4/37; 11%) were treated in more than one session. After healing, the patient entered a follow-up. Currently, the average duration of the follow-up is 7.5 years; no relapse was observed in the treated sites. Lesions belonging to oral potentially malignant disorders are preferentially excised with scalpel and the site closed by primary intention, with the clear advantage that the whole lesion is available for histopathological examination. Therefore, cryosurgery should be reserved to selected cases and should not be employed in the absence of a diagnostic biopsy. Of note, notwithstanding the diagnosis of moderate dysplasia, we treated with cryosurgery 3 lesions as scalpel excision would not have allowed a feasible intervention with acceptable post-operative function.Consistently with the literature, we found that cryosurgery is an effective technique to excise selected lesions. Even if the low sample size and the design of the study does not allow any statistical evaluation, the absence of relapses after excision seems at least to support a

non-inferiority effectiveness when compared to other surgical techniques. Cryosurgery implies an absolutely non-bleeding field, low postoperative pain, absence of scar and low incidence of wound superinfection; moreover, for anatomical reasons, the oral mucosa is an ideal site for this technique for both the simple access and the presence of humidity.
Results: The cryoablation of lesions belonging to oral potentially malignant disorders has both peculiar advantages and disadvantages, which should be carefully assessed in order to select cases where such technique can be preferred to scalpel.

Multidisciplinary approach to the treatment of a supernumerary included element with radicular surface resorption of the adjacent tooth: case report

S. Giuntoli Vercellin, B. D'Orto, C. Ruscica, E. Moratti, P. Capparè, R. Vinci

Department of Dentistry, IRCCS San Raffaele Hospital, Milan, Italy

Aim: Supernumerary teeth can be present individually or in groups in both arches, can erupt or remain included, completing their formation or remain simple tooth-like structures. They are more common in permanent dentition, the etiology is unknown and the prevalence varies from 0.1 to 3.6% depending on the breed. The aim of this paper is to demonstrate the validity of a multidisciplinary approach to the treatment of the included supernumerary element, thus avoiding the extraction of the adjacent tooth.
Methods: The 16-years-old patient at the first visit complains of mobility and pain of the element 1.6. At probing, this tooth showed a loss of palatal attachment equal to 6 mm. An intraoral RX, done to deepen the diagnostic investigation, revealed the presence of a supernumerary element adjacent to the affected tooth's roots. To investigate the relationship between the included tooth and the element 1.6 and to establish the treatment plan, also a second level X-ray examination was done. The young age of the patient and the incomplete skeletal growth have led to the exclusion of the implantology and to choose the most conservative treatment possible. In a first session, the devitalization of the element 1.6 was done. Then, in a second session, after anesthesia, the opening of a total thickness palatal flap preserving the papilla, with contextual rizectomy of the palatine root of the element 1.6 and extraction of the supernumerary element were done. This last intervention showed a large area of osteolysis, with a residual crest at 8 mm apically to 1.6 tooth's CEJ. The supernumerary element has completely reabsorbed the 1.6 tooth's palatine root and the palatine side of the buccal roots. It also affected part of the disto-buccal root's dentin. Circumferentially to the supernumerary element, there was a lot of inflammatory tissue with partially organized exudate outcomes. The site has been accurately reviewed without smoothing the root surfaces to avoid further loss of periodontal attachment. Because of the potential risk of infection, biomaterial was not inserted into the site, which, moreover, would not have radically modified the healing model, given the maintenance of the palatine cortical. After an abundant wash with saline solution, the flap was sutured on the 1.6 tooth's palatal side, using synthetic sutures. Then, a vestibular splint was placed, in order to consolidate the element 1.6. An antibiotic (amoxicillin and clavulanic acid - 2 grams per day for 6 days) and anti-inflammatory therapy (ibuprofen 600 mg - 2 times a day for 6 days) has been prescribed.
Results: At two months, the tooth is stable and asymptomatic: the splinting is then removed and the element is prepared for its own prosthesis. After 4 years, the element continues to be stable, asymptomatic and without any pocket at probing.
Results: The present study demonstrates how it is possible, starting from a careful diagnostic evaluation, to reach an effective and conservative solution to the problem, allowing to bypass the extraction of an element in the arch and the consequent implant placement, absolutely contraindicated in a young age patient, in which there is not yet a completed skeletal growth.

Medication-related osteonecrosis of the jaws. A large multicentric case-and-control retrospective review

:
Marcianò, G. Guzzo*, E. Rubino, R. Mauceri, A. Picone, G.Oteri

University of Messina, Italy

Aim: This multicentric case and control study has been designed for a comparative evaluation of MR-ONJ occurrence in order to provide a risk stratification between medications related to osteonecrosis of the jaws and cancer patient population.
Methods: Recruitment was a two-step process involving patients treated at the Osteonecrosis of the Jaws Treatment Center, University of Messina and patients treated at the Oncology Unit of a large Cancer Center of Catania. Were considered eligible for the study oncology patients currently receiving or previously exposed to intravenous zoledronic acid and/or rank-ligand inhibitor (denosumab). To meet the objectives of our study we have created a database containing two sets of data:
- First set of data: Patients referred for oral/dental evaluation to the Osteonecrosis of the Jaws Treatment

Center, University of Messina;
-Second set of data: Patients undergoing treatment with zoledronic acid / denosumab at a large Cancer Center of Catania.
The data were extracted from pre-existing databases periodically updated and then analyzed retrospectively. We enrolled three controls for each MR-ONJ case. Controls were matched for type of suspected medication and year of hospitalization. Demographic data and the primary cancer type were reported. The total number of zoledronic acid/denosumab administered doses was recorded. Concurrent cancer treatments (chemotherapy, target therapy or biologic drugs) were detailed; the anatomic location of exposed necrotic bone areas and potential trigger (oral/dental findings) were evaluated as well.
Results: In the period under review a total of 477 patients have been treated with zoledronic acid while during the years 2016 and 2017 the patient treated with denosumab have been 93. For this retrospective review a total of 228 patients were enrolled. 57 cancer patients who developed MR-ONJ receiving zoledronic acid/denosumab treatment were included in the MR-ONJ group, whereas control group consisted of 171 matched controls (cancer patients who did not progress to MR-ONJ although receiving zoledronic acid/denosumab treatment).
Conclusion: Results of the present study suggest early referral by oncologists for dental evaluation for every patient about to start medication related to MR-ONJ development and intense clinical observation to prevent this particular condition in patients receiving zoledronic acid and/or denosumab plus chemotherapy, target therapy or biologic is recommended. With the continuous development and clinical use of new biological drugs it is important to continue to evaluate their effects on the oral cavity. The level of risk for osteonecrosis in patients taking these new classes of medication is uncertain, but requires awareness and monitoring. It is important to have complete knowledge of the entire clinical history of the patient and of all the previous pharmacological therapies to fill the adverse reaction reporting forms with every possible detail so that emerging classes of drugs related to an increased risk of MR-ONJ could be added to the growing mass of literature on the topic.

Indications and contraindications of the treatment of odontoma

L. Impaloni[1], G. Romeo[1], P. Sammartino[2], A. Capuano[1], A. Caserta[1]

[1]Department of Neuroscience, Reproductive Science and Odontostomatology. Program of Oral and Reconstructive Surgery. Head Professor Gilberto Sammartino. University of Naples Federico II, Italy
[2]University of Naples Luigi Vanvitelli.

Aim: Odontoma is considered a part of benign odontogenic tumors, even if they don't present a proliferative appearance, typical of the tumor masses. It is composed of completely formed dental tissue and it is classified as compound or complex, according to its organization. A compound odontoma is formed by different little irregular masses like teeth,known as denticles, while a complex odontoma presents a single mass, with irregular margins. The treatment is always conservative, while the surgical treatment is indicated in the following cases: in case of secondary exposure of the mass due to bone resorption, if it prevents the eruption of a dental element, if it hinders orthodontic treatment or implant therapy. In the case of conservative treatment, it needs radiographic follow up over time. In this case report, the aim is to describe the resolution of complications due to inappropiate attempt of complex odontoma surgical removal.
Methods: A 27-year-old patient comes to our attention reporting that he was operated in 2014 for the removal of a complex odontoma in the right mandibular region, with deep inclusion of the 3rd molar impacted below the lesion. In the radiographic examination, the ortopantomography (OPT) showed a single radiopaque mass with irregular margins and a radiolucent area, associated with the 3rd molar deeply included and in contact with the mandibular canal. The patient reports repeated phenomena of abscess in this region from about one year after surgery. After the clinical examination, an ortopantomography and a cone beam computed tomography (OPT and CBCT) are prescribed, determining the presence of a small part of odontoma not removed, which causes continuous abscesses. So the surgical removal of the residual odontoma was planned. Under general anesthesia, a mucoperiosteal flap was performed. Then osteotomy, removal of the remaining lesion and suture with detached points were made. On waking up, antibiotics and painkillers are prescribed to the patient. It was recommended a soft diet, to avoid any physical efforts and trauma in that area for the following three months.
Results: After the complete removal of the odontoma, it was decided to not extract the impacted 3rd molar, in order to resolve exclusively the infection and abscess problem. There were no post-operative complications. The patient didn't show alveolar nerve injury, or any paresthesia. There was no infection or fistulosis, The healing was uneventfull and soft tissue closure was complete.
Conclusion: This case report wants to highlight that we need to know the indications and contraindications of the removal of the odontoma and it is necessary to refrain from intervention if the intra-surgical condictions do not allow it.

Analysis of the effectiveness of a drug composed of herbal extracts on the management of pain and perioperative inflammatory sequelae following third molar surgery: a randomized, controlled clinical trial

Gaetano Isola[1], Giovanni Matarese[2], Marco Cicciù[2], Eugenio Pedullà[1], Luigi Laino[3], Luca Ramaglia[4], Ernesto Rapisarda[1]

[1]Department of General Surgery and Surgical-Medical Specialties, School of Dentistry, University of Catania, Catania, Italy
[2]Department of Biomedical Sciences and of Morphological and Functional Images, University of Messina, Messina, Italy
[3]Multidisciplinary Department of Medical-Surgical and Odontostomatological Specialties, University of Campania "Luigi Vanvitelli", Naples, Italy
[4]Department of Neurosciences, Reproductive and Odontostomatological Sciences, University of Naples "Federico II", Naples, Italy

Aim: To manage postoperative discomfort following the avulsion of mandibular third molar, many strategies have been developed for minimizing clinical manifestations after surgery through a pharmacological approach. This study investigated and compared the effectiveness of a phytotherapeutic drug composed of herbal extracts on postsurgical discomfort after mandibular third molar surgery.
Methods: Eighty-two patients requiring the surgical removal of a mandibular third molar were randomly assigned to receive placebo (group 1), ibuprofen (group 2), and a phytotherapeutic drug (composed of baicalin, 190 mg; bromelain, 50 mg; escin, 30 mg) (group 3). Drugs were administered after tooth extraction twice a day for 5 days. The primary outcome, pain, was evaluated using a visual analogue scale at 2 h, 6 h, 12 h, 24 h, 48 h, and 7 and 10 days after surgery. Postoperative pain intensity was measured using a 10-cm visual analogue scale (VAS), which consisted of an interval scale ranging from 0 (absence of pain or discomfort) to 10 (maximum pain or discomfort). The secondary outcomes were the changes in maximum mouth opening and facial contours (mm) between baseline and at 24 h, 72 h, and 7 and 10 days after surgery. The maximum mouth opening was measured in millimeters between the upper and lower central incisors using a calibrated sliding caliper (Therabite Range of Motion Scales), preoperatively (baseline) and at 24 and 72 h and 7 days after surgery.
Results: Compared to the baseline, all treatments demonstrated an improvement in the primary and secondary outcomes. The postoperative peak pain score occurred at 12 h in the placebo group, 12 h in the ibuprofen group, and 6 h in the phytotherapeutic group. Moreover, compared to placebo and ibuprofen, patients in the phytotherapeutic group yielded a significant reduction of the postoperative pain score at 12 h ($p < 0.001$), 24 h ($p = 0.010$), and 48 h ($p = 0.048$) after surgery. The mean reduction of the swelling and trismus was similar between groups. Postoperative facial measurements in the mean linear distances, even if lower in the phytotherapeutic group, did not differ between the groups at each observation point.
Conclusion: The results of this study suggest that a postoperative administration of a phytotherapeutic drug was found to be effective in postoperative pain management after the surgical removal of impacted mandibular third molars. The phytotherapeutic drug composed of herbal extract determined a decrease in the severity of postoperative pain compared to ibuprofen and placebo.

A minimally invasive trans-alveolar sinus floor elevation: the sincrest technique

Andrea Enrico Borgonovo, Cesare Antonio Lacaita, Susanna Ferrario, Luca Andrea Emanuele, Massimiliano Bruschi, Luigi Parazzoli, Dino Re

Università degli studi di Milano, Reparto Universitario di Estetica Dentale, Istituto Stomatologico Italiano, Milan, Italy

Aim: Due to the loss of one or more upper molar and premolar and the resultant processes of bone reabsorption and sinus pneumatization, the atrophy of postero-lateral region of upper jaw represents a great obstacle for implant rehabilitation. There are various techniques in order to increase the quantity of bone available for the rehabilitation. One of these is the trans-alveolar sinus lift. The aim of this study is to evaluate implant survival rate, bone increase, graft's reabsorption and complications rate in trans-alveolar sinus lift using the SinCrest technique.
Methods: This work consists in a retrospective experimental study on 51 trans-alveolar sinus lifts and implants in 37 patients. A remaining height between 4-8 mm of the bone ridges and 8 or more mm implant to be placed were chosen as main inclusion criteria. There are two groups of study: one includes single sinus lifts for 25 implants and the other two adjacent sinus lifts for 26 implants. As concerns the technique, after the TC pre-implant measurements and the following site preparation, the SinCrest instruments are needed. This kit includes the SinCrest device, which produces a controlled fracture of the sinus floor and gently elevate the bone layer together with the Schneider's membrane. Afterwards a graft of heterologous bone chips is inserted to increase the height of the alveolar ridge and finally the implant is placed. Clinical controls and periapical intraoral radiography at 6, 12 and 24 months using Rinn's intraoral radiography devices follow the surgery.
Results: The data analysis shows off interesting results:

the implant survival rate is 100% over a follow up of 9 ± 9 months. The average height increase of the bone is 4.81 mm with no difference between single and double implants group, but there is a statistic difference about the graft reabsorption between the two groups: the average graft reabsorption is 0.63 mm after 6 months, with less reabsorption in the doubled sinus lifts. The average graft reabsorption is 1.02 mm after 18 months, which means the 25% of the initial graft height. No perforation, sinusitis and graft infection was registered.
Conclusion: The results make the SinCrest technique a safe and predictable procedure. It provides a good height of the graft and ensures a reabsorption limited to 25% of the bone height increase at 18 months from surgery, showing the stability of the graft. Moreover, the results show less reabsorption after 6 months in two adjacent sinus lifts, probably due to less strain on the sinus membrane.

Third molars surgery: 3D preoperative planning

Andrea Enrico Borgonovo, Cesare Antonio Lacaita, Chiara Cellini, Susanna Ferrario, Andrea Emanuele Luca, Massimiliano Bruschi, Luigi Parazzoli, Dino Re

Università degli studi di Milano, Reparto Universitario di Estetica Dentale, Istituto Stomatologico Italiano, Milan

Aim: The extraction of third molars is one of the most frequent and unpredictable interventions in oral surgery. Sometimes it is associated with less or more severe complications because of its difficulties, such as limited space, reduced visibility, closeness to the IAN or the maxillary sinus and a high discomfort-low compliance of the patient. In this scenario, a surgical 2D planning with an OPT represents a good overview shot on the clinical case and it is sufficient when the tooth seems to be far from the nerve or the maxillary sinus. It may however contain inaccuracies due to the overlapping and distortion of the anatomical structures, whereas a 3D planning is more useful in order to make the intervention more predictable and to cut risks, costs and operative time. The aim of this work is to show the importance of a 3D preoperative planning in the extraction of impacted and semi-impacted third molars.
Methods: The preoperative analysis is made using the Nobel Clinician software. Once the TC image is opened in the program, it will be able to rotate the rendering image, modify the contrasts, highlight the direction path of nerves, measure the distances and simulate a 3D extraction. This 3D assistance helps the clinician to fully plan the intervention by letting him know some initial factors such as the spatial orientation and position of the tooth and its closeness to important anatomical structures. Furthermore 3D planning helps the surgeon to adopt surgical and strategic decision such as the type of flap, the quantity of bone to remove, the odontotomy, the rhizotomy, the extractive trajectory and the instruments to use.
Results: The literature shows off that a 3D planned third molar extraction has several positive effects on the extractions: this technique produces a lower income of intra and postoperative complications than a no planned or 2D planned extraction due to the lack of fundamental information, especially in difficult cases. Furthermore, the 3D planning is useful to decrease the operative time, which is a crucial issue to improve the patient's compliance and reduce his discomfort.
Conclusion: The 3D planning is a safe and predictable procedure because immediate and delayed complications can be avoided thanks to more accurate initial information. Even if it implies a longer preoperative time, the patient feels relaxed and less stressed.

Airway changes after orthognatic surgery: a cbcts retrospective study

F. Massetti, L. Laffranchi, C. Tosi, C. Gregorini, D. Dalessandri, S. Salgarello, L. Visconti, C. Paganelli

Dental School, Department of Medical and Surgical Specialties, Radiological Sciences, and Public Health, University of Brescia, Italy

Aim: Surgical procedures that manipulate the jaw and mandible could alter the soft tissues associated with the bony bases, resulting in changements involving the upper airspace. The effects of orthognathic surgery on the upper airways, especially in relation to obstructive respiratory disorders, has been largely investigated in recent years. The aim of this study was to analyze and compare airway areas and volumes changes before and after orthognathic surgery in patients with dento-skeletal deformities or respiratory diseases.
Methods: Pre operatory (T0) and post-operatory (T1) CBCTs of 13 non-growing subjects (7 males, 6 females) between 20 and 59 years old who underwent combined orthodontic-surgical treatments for the correction of dento-skeletal deformities (n=10) or for respiratory pathology (n=3) were collected retrospectively. On the basis of a comparison between preoperative and postoperative cephalometric values, the surgical movements to which each patient was subjected were identified and the initial sample was divided into two groups. Group A involved 7 subjects treated with maxillo-mandibular advancement and Group B consisted of 6 subjects treated with maxillary advancement and mandibular setback. For each groups CBCTs airway area (AA) and volume (AV) at T0 (pre-surgery) and T1 time (6 months post-surgery) were

compared. Airways space was graphically represented by the union of the selected points: posterior nasal spine, odontoid process of the epistrophile, antero-superior margin of the third cervical vertebra and the small horns of the hyoid bone. Data were analyzed with Dolphin Imaging 11.0 3D® software and statistical analysis was performed with statistical software SPSS© V23.0, IBM, US, at a significance level α = 0.05. Differences between variables were verified with paired-samples t-test. Normal distribution of data was verified through the Shapiro-Wilk Test and in case of a non-normal data distribution, the equivalent non-parametric test of Wilcoxon-Mann-Whitney was applied.

Results: In Group A the variables AV and AA resulted statistically significant before and after surgery. AV resulted at T0 8079.8 mm3 (SD = 2999.1 mm3) and 13088.7 mm3 (SD = 6733.1 mm3) after surgery at T1 in Group A ($p<0.05$). In the same group AA was 448.6 mm2 (SD =135.8 mm2) at T0 and 613.8 mm2 (SD = 210.4 mm2) at T1 ($p <0.05$). There was no statistically significant variation of AV and AA in group B. In Group B AV resulted 13901.4 mm3 (SD = 1872.7 mm3) before surgery and 15032.3 mm3 (SD= 5805.4 mm3) after surgery ($p> 0.05$). In this group AA resulted 600.14 mm2 (SD = 74.15 mm2) at T0 and 658.3 mm2(SD =126. 6 mm2) at T1 ($p >0.05$). The mean percentage of volumetric increase after maxillo-mandibular advance was significantly different in both groups, with a mean of 60% in group A and 7.47% in group B ($p<0.05$). Furthermore, the mean percentage of sagittal increase after maxillo-mandibular advance was 37.8% in group A and 11.17% in group B, a statistically significant difference ($p <0.05$).

Conclusion: Maxillo-mandibular advancement resulted in a statistically significant increase in airways areas and volumes, and the effectiveness of this type of surgery as OSAS treatment has been widely demonstrated in literature. There was no statistically significant variation in the volume and sagittal area of the airways after surgery in patients who underwent maxillo-mandibular setback. Maxillo-mandibular advancement causes a greater volumetric increase in the airways compared to maxillary advancement and mandibular setback surgery and the most significant difference between the two surgeries occurs above all at the three-dimensional volumetric levels.

Endoscopic extraction of a third maxillary molar: surgical treatment by transnasal and transoral approach (case report)

E. Loddo, F. Raimondi Lucchetti, L. Pinto, GP.. Patianna, A. Bianco, R. Vinci

Department of Dentistry, IRCCS San Raffaele Hospital, Milan Italy Dental School, Vita-Salute University, Milan, Italy Head: Prof. E. Gherlone

Aim: The presence of an ectopic tooth in the maxillary sinus is a rare event. The clinical manifestations can be different. It may cause significant morbidity such as epistaxis, paranasal sinusitis, nasal septal deviation, nasal septal abscess, and nasal oral fistula.

Case report: A 30 years old female presented with a year long history of worsering, nasal obstruction, recurrent rhinorrhea and sinusitis over a year. The patient denied any history of cough, hoarseness, febrile illness or weight loss. She did not recall any history of spontaneous or iatrogenic trauma in the ear, nose and throat regions. Rigid nasal endoscopy showed a large right-sided excoriated mass emanating in to the maxillary sinus. Computed tomography confirmed the presence of a large soft-tissue density with the tooth filling the right maxillary sinus. Surgical treatment: Treatment was provided under general anesthesia. The endoscopic technique started with a partial uncinectomy and in a middle meatal antrostomy with enlargement of the maxillary sinus ostium. By doing this, it was possible to enter in the maxillary sinus for removal of follicular cyst associated with ectopic third molar. The entire cystic lesion was enucleated from the right maxillary sinus and the tooth was located in the distal part of the maxillary sinus floor. The follicular cyst was associated with ectopic third molar. The transoral approach allowed the removing of the ectopic tooth. A full-thickness muco-periosteal flap was elevated and the posterior wall of the sinus was exposed. The tooth was dislocated, with a bein lever, in the maxillary sinus. Later the tooth was extracted endoscopically. Mucosa of the nasal floor was sutured with an absorbable material and a pad was inserted into the right nostril. Amoxicillina 1 gr. twice/day, dessosimetason 4 mg. and paracetamol 1gr were prescribed as needed. Four days later the pad was removed. Postoperative course was uneventful. A biopsy of the lesion was consistent whit a follicular cyst. The patient underwent excision of the follicular cyst and tooth using a combined transnasal and transoral approach. The patient resumed oral intake without difficulty on postoperative day 1. The sinonasal region and the oral area healed very well without oronasal fistulas. After 12 months of follow-up, an excellent functional outcome without any cyst recurrence was assessed.

Conclusion: This surgical approach was found to be effective in the treatment of a maxillary third molar with a follicular cyst resulting in pain, inflammation and discomfort for the patient. The intervention showed excellent results, confirmed by a follow-up to 12 months without recurrences and with a good functional performance.

Solitary neurofibroma of the tongue. Case report

L. Luigetti[1], C. Di Gioia[2], A. Pietrantoni[3], R. Carletti[4], R.Pippi[5]

Department of Odontostomatological and Maxillo Facial Sciences, Sapienza University of Rome, Italy
[1]Post-graduate Student in Oral Surgery
[2]MD
[3]PhD
[4]LT
[5]Associate Professor

Aim: Neurofibroma is a nerve cell benign tumor, derived from the neural sheaths of peripheral nerves. It is composed by Schwann cells, fibroblast-like cells and by intermediate cells. Neurofibroma is usually asymptomatic and swelling is its main clinical presentation. The lesion is commonly found on the skin, and tongue is the most common oral site of occurrence.
Case report: A 27-year-old woman was referred to the Unit of Oral Surgery of the Umberto I University Hospital of Rome, due to a painless swelling on the left lateral border of the tongue. She reported having noticed the lesion since over 5 years and that it has grown slowly over time. The intraoral examination revealed a 1 cm diameter oval swelling on the left side of the tongue. It was fibrous in consistency and not movable on the deep and superficial planes. The overlying mucosa was normal. Surgical enucleation under local anesthesia was then scheduled. A linear incision was made along the longitudinal axis of the tongue, just above the swelling, and a 1 cm encapsulated mass was then enucleated by blunt dissection. The wound was then sutured with non-resorbable material and the removed tissue was fixed in 10% buffered formalin and sent for histological examination. Histopathological report was consistent with neurofibroma. Microscopically, at a 5x magnification colored with hematoxylate, the tumor appeared as a proliferation of spindle-shaped cells, with fusiform and wavy nuclei arranged haphazardly in connective tissue matrix. The neoplastic cells were positive to S-100 protein immuno-histochemical staininig. The patient had no neurofibromatosis family history, no other similar lesions in any other part of the body, no skin pigmentation, no hearing deficit, and no any evidence suggestive of any systemic disorders that might have been attributable to type I Neurofibromatosis. Suture removal was performed after 7 days. Tissues healing was complete and the patient had no lingual sensory and motilitydeficits. No signs of recurrence and a normal appearance and functionality of the tongue were found at the 4-month follow-up visit.

Corticotomy for orthodontic purposes: randomized controlled trial

I. Lupi[1], A. Santillo[1], D. Russo[1], R. Rullo[1], G. Cervino[2], L. Fiorillo[2], L. Laino[1]

[1]Multidisciplinary Department of Medical-Surgical and Odontostomatological Specialties, University of Campania, "Luigi Vanvitelli", 80121 Naples, Italy
[1]Department of Biomedical and Dental Sciences and Morphological and Functional Imaging, Messina University, 98100 Messina, Italy

Aim: The purpose of this splith mouth randomized control clinical trial is to demonstrate the usefulness of the accelerated osteogenic orthodontics technique for the correction of dental malocclusions .Malposition of dental elements can be easily corrected when the patient is young; however, the opposite is true for adults. An increasing number of adult patients are seeking orthodontic treatment and a short treatment time has become a recurring request. To meet their expectations, a number of surgical techniques have been developed to accelerate orthodontic tooth movement. Shortening the orthodontic treatment time is possible but not easy to achieve. We applied piezosurgical bone cuts to 8 patients affected by bilateral dental malpositions to determine the real effects of a shorter treatment time.
Methods: We selected 8 patients with bilateral dental malpositions to determine the real effects of reduction of treatment time in the test group (corticotomies) comparing with control group (covenational orthodontics). Two weeks before surgical procedure, all patients underwent oral hygiene instructions and professional debridement, when necessary. On the day of start treatment , the envelopes containing the randomized codes were opened. In each patient, certain sites were treated with a corticotomic procedure (test group), others with traditional orthodontics (control group) in order to evaluate the time taken to finalize the orthodontic movement (T1). The reference period has been calculated in days.
Results: A total of eight patients (4 women and 4 men) presenting various types of malocclusions were selected for the study. In six of them we obtained a cas resolution in a period of time ranging from a minimum of 3 months and 17 days to a maximum of 13 months. From the graph, it can be seen that there is a real difference in the end of orthodontic movement time (days) between the control group and the corticotomy group. This implies that in the sites in which the corticotomy has proceeded, the time taken to obtain the desired movement is undoubtedly 25.05% lower than the sites whose movement was obtained by traditional orthodontics.
Conclusion: The accelerated osteogenic orthodontic technique provides an efficient and stable tooth

orthodontic movement. In this study we observed a statistically significant reduction in treatment time in the test group. This is a result achieved thanks to a regional acceleration phenomenon (RAP) by piezoelectric surgery.

Adamantin cyst, controversial nosological classification: a case report

Claudio Maio, Marco Maisto, Angelantonio Piccirillo, Rosario Rullo

Multidisciplinary Department of Medical-Surgical and Dental Specialties, University of Campania "Luigi Vanvitelli", Naples, Italy. School of Specialization in Oral Surgery

Aim: Adamantin cyst is a type of odontogenic cyst that generally occurs in a very early period of odontogenesis. Its nosological classification is still controversial because sometimes the same type of neoformation is called primordial cyst or keratocyst. This cyst always includes part of the tooth bud which cannot complete the evolution process and grows around the tissues of the enamel organ. In some cases, adamantin cyst occurs in the first decade of life and it is presented radiographically as an unilocular osteolytic area. In this report, a case of adamantin cyst in a 4 year old child patient in primary dentition and its treatment are presented.
Methods: A 4 year old male child patient comes to our observation to the Department of Oral Surgery of University of Campania "Luigi Vanvitelli" because of a painless swelling in the right side of the mandible for the last 6 months. On general examination, the patient is apparently healthy without any significant past medical history and routine hematological tests are within the normal limits. Extraoral examination reveals a slight swelling near the lower margin of the right mandible. At the intraoral examination, the swelling is localized in the right mandibular region at the apex level of the first deciduous molar; it appears to be coated with a pink non-ulcerated mucous membrane with a smooth surface, a hard elastic consistency, not displaceable, not reducible, not painful to palpation. The adjacent mucosa is apparently normal, and there are not any signs of inflammation. Panoramic radiograph is taken for radiological examination, and it reveals the presence of a unilocular radiolucent cystic lesion with sclerotic border and areas slightly radiopaque inside in the position of mandibular right first premolar resulting in its agenesis. Additionally, the radiolucent cystic lesion extended to the lower border of the mandible. After the clinical and radiological examination, a provisional diagnosis of the dentigerous cyst is made.
Results: Surgical enucleation of the cyst is chosen as the treatment of choice. The surgical intervention is carried out with a general anesthesia. The primary mandibular right first molar tooth is extracted before the disclosing of the cyst cavity by opening a flap. After the flap opening process, the cyst cavity is identified and removed. The cyst presents odontogenic tissue inside with mineralization characteristics. The flap is sutured for closing the wound primarily. The specimen is prepared and send for histopathological examination.
Conclusion: Histopathological view shows stratified squamous epithelium reinforced by keratin-filled surface cells. Below the coating epithelium we have a connective layer. In the thickness of the cyst wall it is found the presence of ameloblastic cells arranged in nests and in lines. The definitive histological diagnosis is of adamantine cyst.

Postoperative pain and early and late complications related to the avulsion of impacted third molars

R. Marcacci[1], G. M. Giorleo[2], R. Martuscelli[3], L. Ramaglia[4]

[1]Student, Department of Neurosciences, Reproductive and Odontostomatological Sciences, University of Naples Federico II, Naples, Italy
[2]DDS Postgraduate Oral Surgery School student, Department of Neurosciences, Reproductive and Odontostomatological Sciences, University of Naples Federico II, Naples, Italy
[3]MD, DDS, Assistant Professor of Oral Surgery, Department of Neurosciences, Reproductive and Odontostomatological Sciences, University of Naples Federico II, Naples, Italy
[4]MD, DDS, Chairman of Oral Surgery Postgraduate School, Department of Neurosciences, Reproductive and Odontostomatological Sciences, University of Naples Federico II, Naples, Italy

Aim: The avulsion of impacted third molars is one of the most frequent oral surgery procedures; approximately 90% of interventions are performed without intra and post operative complications. The most common ones are edema, trismus, pain, alveolar osteitis, surgical site infections, bleeding and paresthesia. The objective of this study is to make a detailed assessment of the onset of postoperative pain and of early and late complications associated with the surgery in order to find standardized and reproducible operative protocols that may reduce as much as possible post-operative complications.
Methods: Participants were selected among patients of the Dental Clinical Department of the "Federico II University of Naples", who needed the avulsion of an impacted third molar. Data in relation to tooth inclusion and surgery intervention were recorded.

Possible haemorrhagic, infectious and neurological complications were detected and the presence of possible swelling and trismus was analyzed through objective oral and facial measurements at 3, 7 and 21 days. All the patients underwent antibiotic prophylaxis. Furthermore, the measurement of pain and postoperative discomfort was observed at 1h, 2h, 6h, 12h, 24h, 48h, 72h and at 5 and 7 days using a Visual Analogue Scale as a measurement method. The number of analgesic drugs taken by the patient and the time elapsed after each intake was recorded.
Results: In the initial group of 13 patients the facial measurements recorded have registered an average increase of 1,63 mm at 7 days and of 1,32mm after 21 days. It was observed a decrease of mouth opening of 7 mm on average at 7 days , returning to normality within 21 days. Postoperative pain was evaluated moderate at 12h, mild at 3 days, absent at 7 and 21 days. The incidence of hematoma was 20%, and the incidence of edema was 30%, they returned to base line values after 3 days. Alveolitis was evaluated in 10% of cases, no case of hemorrhage was reported. In one case a temporary paraesthesia was observed.
Conclusion: The initial results obtained don't show significative differences with data reported in the literature. In fact, meanwhile a larger patient sample will be available, the study confirms that it's possible to have a favorable management of postoperative complications and pain using standard surgical and pharmacological procedures aimed at a more conservative and less traumatic approach.

Osteonecrosis of the jaw prevention in oncological patients: preliminary results from a teledentistry sicilian project

R. Mauceri[1,2,3], V. Panzarella[1,2], C. Arena[4], G. Troiano[4], G. Oteri[3], F. Canepa[1], O. Di Fede[1,2], G. Campisi[1,2]

[1]Department DiChirOnS, University of Palermo, Palermo, Italy
[12]Oral Medicine and Dentistry for patients with special needs, AUOP "P. Giaccone" of Palermo, Palermo, Italy
[3]Department BIOMORF, University of Messina, Messina, Italy.
[4]Department of Clinical and Experimental Medicine, University of Foggia, Foggia, Italy

Aim: Teledentistry (TD) has the potential to identify high-risk populations, facilitate patients' referrals to a dental consultant and support locally-based treatment, enhancing oral health in the populations, particularly for the prevention and management of uncommon oral diseases such as osteonecrosis of the jaw (ONJ). The aim of this study is to describe our experience by means TD platform, named OloHealth®, particularly dedicated to prevention and management of ONJ in Sicilian oncological patients.
Methods: OloHealth was created in 2018 within the University of Palermo, thanks to the PSN project named "Network per la medicina orale nel paziente anziano (oncologico e fragile)". It is based on a HUB and SPOKE model network; the HUB is our Sector of Oral Medicine (AOUP "P. Giaccone" of Palermo), which is connected to several oncological Sicilian units (SPOKES), in order to carry out teleconsultations regarding the management of patients at risk of ONJ. In details, every SPOKE can upload the patient's anamnestic data, clinical and radiographical images on the platform. Subsequently, teleconsultation ends up with a HUB's temporary diagnosis, medical therapy prescription and, if necessary for demanding case, the planning of a visit at the HUB center.
Results: The HUB is actually connected with 4 Oncological Units, so dislocated: 2 in the suburbs of Palermo and 2 in different Sicilian western city (i.e. Trapani and Agrigento). In six months, 21 teleconsultations for oncological patients at risks of ONJ have been requested and performed from the HUB, All the teleconsultations are performed within 48 hours from the request by the SPOKES. The 48% (10/21) of enrolled patients were females; the mean age of the study group was of 67,7±11,4 years. The 43% (9/21) of patients declared to be non-smokers, 19% (4/21) where ex-smokers while 38% (8/21) were smokers. The most frequent cancers were the following: breast (n°7); prostatic (n°7) and lung cancer (N°3). The dental status of enrolled patients was low, the mean of DMFT score was 16,7±8,1. The 91% (19/21) of teleconsultations regarded the primary prevention measures of patients about to initiate ONJ-related treatment for cancer therapy. Mostly of indicated measures were conservative treatments, that have been performed by the patient's family dentist of their hometown. The remaining 9% (2/21) of teleconsultations regarded suspected ONJ, computed topographies were requested to confirm it and medical therapy has been prescribed. The two patients were subsequently visited and surgically treated at the HUB center.
Conclusion: This study is related to an extensive project of the University Hospital of Palermo and several hospitals in Sicily. Due to the reliability exhibited by the process, TD could be equal to a face-to-face oral screening. The use of TD by non-dental practitioner for consultations, referral and disease management has the potential to improve oral health outcomes among the populations; especially for the management of singular diseases such as ONJ.

Globulomaxillary cysts

D. Menditti[2], A.E.di Lauro[1], S. Melito[1], M. D'Agostino[1],

R. Vallebona[1], A. Donzelli, P. Sammartino[1], M.G.P. Di Mare[1], L. Laino[1]

[1]Multidisciplinary Department of Medical-Surgical and Dental Specialities, University of Campania "Luigi Vanvitelli", Naples, Italy
[2]University of Naples "Federico II," Department of Dental and Maxillofacial Sciences, Naples, Italy

Aim: To evaluate the validity of the classification of globulomaxillary cysts in relation to constant radiological and clinical aspects, non-uniformity of histological responses and carrying in mind that the so-named fissural cysts are no longer considered
Methods: This research has been carried out on numerous articles published in recent years focusing the attention on the clarity and relevance of histological data.
Results: The globulomaxillary cyst origins at the junction of the globular process and the maxillary process where are interactions of three embryological processes. This kind of cyst constitutes a diagnostic and nosological problem, in particular by comparing them to their high frequency, to the problematic related to the type of intervention for their surgical removal and to the classification. In a retrospective study, many cases of globulomaxillary cyst diagnosis are analyzed in accordance with clinical, radiological and histological aspects; the results give lateral periodontal cysts, radicular cysts, keratocystic odontogenic tumors, adenomatous odontogenic tumor, periapical granuloma, residual cyst . Some types of cysts, although not always presenting the same histologic characteristics in microscopic observations, have constant radiological and clinical aspects; thus, in the anatomical site described as "globulomaxillary", it frequently appears a type of intraosseous cyst that develops between the roots of the lateral incisor and the canines, causing a divergence of the above-mentioned dental elements and may be unilateral or bilateral. To formulate a correct diagnosis of globulomaxillary cysts, two clinical criteria are analyzed: place of the cyst and vitality of the teeth. Subsequently, the diagnosis uses two radiographic criteria: the radiotrasparent aspect of the cyst with shape at reversed pear and divergence of the roots of the elements involved. The histologic nature, i.e. the epithelium lining of the neoformation (usually squamous stratified and sometimes cylindrical) is considered as the last measure histological examination of the cysts removed in this site reveals different type of epithelium in relation to different types of cysts: stratified squamous (odontogenic), parakeratinized (keratocystic) or cylindrical (non-odontogenic). Occasionally these histologic aspects can be attributed to cysts originating from respiratory epithelium or metaplastic cells with the presence of specific patterns of cytokeratin expression and often to a periodontal type associated, so a part of the epithelium with a respiratory destiny remains trapped and causes the formation of a respiratory type cyst in the globulomaxillary site.
Conclusion: It seems appropriate to address the attention of Oral Surgeons and Pathologists on cysts appearing in this anatomical site, giving it a nosological definition and drawing attention to the fact that in this site you can also find tumor lesions. Finally, we must emphasize that real globulomaxillary cysts arise in the intersection between the jaw and premaxilla as non-odontogenic cysts: in this case the histological exam shows respiratory epithelium from embryological inclusion.

Soft tissue healing in patients undergoing antiplatelet and anticoagulant therapy in oral surgery: a controlled clinical study

P. Menditto[1], A. Miniello[1], M. Cacciola[1], P. Natale[1], A. Capuano[1], P. Sammartino[2]

[1]Department of Neuroscience, Reproductive Science and Odontostomatology. Program of Oral and Reconstructive Surgery. Head Professor Gilberto Sammartino. University of Naples Federico II, Italy
[2]University of Naples Luigi Vanvitelli, Italy

Aim: Anticoagulant and antiplatelet agents are prescribed for patients who are at high risk of thromboembolic events. These include patients who have experienced deep-vein thrombosis or pulmonary embolism or who have non valvular atrial fibrillation. Anticoagulants include the vitamin K antagonist warfarin and the newer direct oral agents, including the direct thrombin inhibitor dabigatran and the factor Xa inhibitors apixaban, rivaroxaban, and edoxaban. Antiplatelet agents include clopidogrel, ticlopidine, prasugrel, ticagrelor, and/or aspirin. The currently available literature identify a low hemorrhagic risk in these patients during simple dental extractions. The purpose of the study is to compare post-extraction healing in patients undergoing anticoagulant and antiplatelet therapy respect to healthy patients.
Methods: Thirty patients who visited the Department of Oral Surgery of the University Federico II of Naples,Italy were enrolled in this controlled study. Patients of both sexes were recruited, from 18 to 95 years old, able to sign the informed consent form. Patients undergoing anticoagulant or antiplatelet therapy who underwent extractions of single-root teeth were included. The exclusion criteria were: pregnancy or lactating, patients with concomitant diseases that compromises the healing processes of the post-extraction alveolus (diabetes,use of bisphosphonates,), immunosuppressed patients or

in therapy with corticosteroids, patients undergoing radiation therapy and/or chemotherapy or with HBV, HCV, HIV. Patients that do not comply all the clinical checks were excluded during the follow up. Patients were divided in three groups (10 persons for each group): the first one consisted of patients undergoing anticoagulant therapy, the second group consisted of patients undergoing antiplatelet therapy and the third control group of healthy patients. The extractions were made as much atraumatically as possible. All sites were closed with resorable suture. Photographs were obtained before and immediately after surgery and patients were followed after 3-7 (coinciding with removal of the sutures) -14 and 28 days. The photographic images were provided to a dentist not included in the study, who was asked to evaluate the healing, giving a rate from 1 to 5 (very poor, poor, good, very good, excellent) to each patient, based on the index of Landry et al. This index included the evaluation of: tissue color, presence of granulation tissue, incision margin (epithelialization and exposition of connective tissue), presence of suppuration or not. A comparison between the groups was performed using the paired t-test. A P-value < 0.05 was considered to indicate a statistically significant difference.

Results: For all patients the post-operative recovery was uneventful without any kind of post-extractive complications. On the third and seventh day the antiplatelet group showed a higher level of healing compared to the other two groups but there were no statistically significant differences between the groups ($p > 0.05$) at each timepoints considered.

Conclusions: The highest average in the group of the patients that were treated with antiplatelet indicates that therapy with this kind of drugs could affect positively healing processes, after dental extractions. With a greater number of cases, if these trends are confirmed, the use of antiplatelet agents could be used in patients with metabolic difficulties and healing delays (ex. Diabetes) or in patients with reduced osteomucous metabolism (patients with previous chemotherapy, bisphosphonates). A larger sample of patients is necessary to confirm this result.

Piezoelectric versus rotary instrument in third molars removal: a literature review

Margherita Minoli[1], Filippo Pirani[2], Alessandra Busa[2], Attilio Peri[2], Matteo Galullo[2], Raffaele Vinci[3]

[1]Student, Dental School, Vita-Salute University and IRCCS San Raffaele, Milan, Italy;
[2]Oral Surgery Specialization School, Vita-Salute University and IRCCS San Raffaele, Milan, Italy;
[3]Associate Professor, Department of Dentistry, IRCCS San Raffaele Hospital, Milan, Italy

Aim: The objective of this study is to compare the use of piezosurgery versus traditional rotary techniques in the removal of mandibular impacted or partially erupted third molars, performing a literature review, to evaluate intra and post-operative outcomes and bone healing between the two different osteotomy techniques. One of the most critical steps in surgical extraction is still represented by the osteotomy. The introduction of ultrasonic vibrations, nearly two decades ago, has overcome various intraoperative complications of the conventional rotary technique such as periodontal lesions to adjacent teeth, bone necrosis, soft tissues lacerations and postoperative side effects, such as pain, facial swelling, trismus, nerve injury, bleeding, dry socket. Piezoelectric surgery is a minimally invasive technique, the faster and better healing of alveolar bone induced by piezo devices is correlated to more physiological temperatures produced by the instrument, thus respecting tissues biology and preserving bone vitality. The three clinical characteristics of piezosurgery, micrometric and selective cut and a socket with less bleeding, lead to a higher intraoperative control and safety of the device, a higher precision during osteotomy and an integrity/preservation of nerves due to the elastic response of soft tissues to vibrations.

Methods: A literature search was conducted in PubMed, Embase and Cochrane electronic databases. The keywords searched were "PIEZOSURGERY", "ULTRASONIC CUTTING DEVICE", "ROTARY BUR", "IMPACTED THIRD MOLAR", "OSTEOTOMY THIRD MOLAR ". The search was restricted to English language articles, published from 1953 to 2017. To assess the efficiency of piezosurgery over the micromotor the following measured parameters were considered when selecting articles: severity of pain experienced, facial swelling, mouth opening, total number of tablets analgesics taken during the post-operative period. Furthermore, bone biopsies during surgeries were evaluated to assess differences in bone tissue damage.

Results: In literature, patients undergoing piezosurgery experience longer surgery time, but less post-operative swelling, trismus and pain. In addition, no case of paresthesia and alveolar osteitis have been reported using piezosurgery. For bone quantity and quality, statistical difference was found. Bone heat osteonecrosis was observed only in the rotatory group. The mean width of necrosis margin was smaller in samples taken with piezosurgery. Other reported clinical advantages of the aforementioned device are optimal visibility in the surgical field, less vibration and device-produced noise levels, increased comfort for the patient and lower injuries to the adjacent tooth.

Conclusion: From the search it can be concluded that the piezoelectric osteotomy technique, when

compared with the rotatory osteotomy technique in lower third molar extraction, shows a longer surgery time but significantly reduces the occurrence of sequelae, such as post-operative responses (improved clinical healing, faster improvement in trismus and quicker reduction in swelling) and surgical risks (neurological complications). It enhances bone quality within the extraction socket and bone quantity along the distal aspect of the mandibular second molar.
Piezosurgery, distinguished by a reduced biological cost for the patient, may represent in clinical practice a predictable/promising and reliable alternative technique in third molar surgery.

A full clinical assessment and a preliminary cytokine, chemokine, and growth factor profile of the wound site of case of denosumab-induced BRONJ

C. Motta[1], F. Erovigni[2], E. Duni[2], C. Bianchi[2], T. Genova[3], F. Mussano[1], S. Carossa[1]

[1]CIR Dental School, Department of Surgical Sciences, University of Turin , Turin , Italy
[2]Città della Scienza e della Salute di Torino, Turin, Italy
[3]Department of Life Sciences and Systems Biology , University of Turin, Turin, Italy

Aim: To report on a case of BRONJ associated with the usage of Denosumab and to assess the cytokine, chemokine, and growth factor profile of the wound site as a preliminary and complementary investigation route.
Methods: Here the authors report on a clinical case of a 57-year-old female patient affected by breast cancer with lymph node and bone involvement. The subject was therefore treated recurring to quadrantectomy and lymphadenectomy in 2015, plus radiotherapy. Medical treatment entailed Palbociclib and Fulverstrant since 2015, and Denosumab since November 2016. The patient underwent the following examinations: PET-CT, panoramic radiography, cone-beam volumetric computed tomography and intraoral radiography that suggested bone remodeling from region 3.3 to the angle of the mandible with the present of sequestra from 3.3-3.5 to the molar region. It could be observed also a periosteal osteogenic reaction predominantly at the lingual side of that region. In October 2018, a mandibular swelling was noticed at the site of 3.6-3.7 with probing depth of 7 mm between the two fixtures 3.6-3.7. Subsequently, the implant supported dental crown at region 3.7 was removed to allow the required therapeutic intervention of implantoplasty to that fixture, leading to the stabilization of inflammation. However, in January 2019, the patient came to observation with a new swelling regarding the bone adjacent to the dental implants at region 3.6-3.7. Immediately, it was programmed a surgery of sequestrectomy of the necrotic bone at the affected region 3.6-3.7. To promote healing the standard protocol with PRGF was adopted, a sample of which was withdrawn and analyzed through the flexible Bio-Plex system (for reference please see Mussano et al., Platelets. 2016 Jul;27(5):467-71). Briefly, the concentration of 24 major biofactors (including interleukins, INF-γ, TNF-α, MCP-1, MIP-1a, RANTES, bFGF, PDGF, and VEGF) was determined and compared against the average of healthy subjects.
Results: Based on the comparison between the patient's sample and the average, it could be noted that, among all the biofactors quantified, the interleukins IL-5 and IL-17, the chemokine MIP-1b and the growth factors FGF-basic, PDGF and VEGF were significantly lower than the reference given by the average values of healthy subjects. The onset of osteonecrosis was documented by the clinical history and the instrumental examination performed.
Conlcusion: Albeit pivotal and preliminary, this study is consistent with the great inter-individual variability of the biofactor levels present in blood. However, the authors believe it is unprecedented the quantification of the cytokine, chemokine, and growth factor profile concomitantly with the onset of Denosumab induced osteonecrosis. This finding, which is to be confirmed by larger researches, may be interesting also for the particular modulation of the biomolecules observed, as the decrease of important angiogenic and chemiotactic agents, i.e. MIP-1b, FGF-basic, PDGF and VEGF, could impair or at least delay proper wound healing, even when PRGF protocols are implemented. The authors are of the opinion that a better understanding of the effects of Denosumab over the cytokine, chemokine, and growth factor profile of the wound site would benefit from further research, including larger analysis that would considering different patients taking Denosumab.

Debridement and drainage of maxillary sinus empyema with transalveolar approach: a case report

P. Natale[1], V. Moliterno[1], M. Menditti[1], A. Caserta[1], P. Radano[1], P. Sammartino[1]

[1]Department of Neuroscience, Reproductive Science and Odontostomatology, Program of Oral and Reconstructive Surgery, Head Professor Gilberto Sammartino, University of Naples Federico II, Italy
[2]University of Naples Luigi Vanvitelli, Italy

Aim: The empyema is known as a collection of pus within a natural cavity of the body. The maxillary sinus

empyema may have different origins: dental, nasal, hematic, traumatic. The maxillary sinus empyema of dental origin may be caused by an apical periodontitis following necrosis of the dental elements in continuity or contiguity relation with the maxillary sinus as the first and second upper molar. It also may be caused by the presence of foreign bodies within the maxillary sinus like fragments of dental elements. The aim of this case report was to evaluate the effectiveness of a mininvasive maxillary sinus revision surgery with a transalveolar approach in the resolution of maxillary sinus empyema of dental origin.
Methods: A 50 years old, non-smoker male patient presented an empyema of the right maxillary sinus, caused by a failure of an endodontic therapy of the first upper molar. The patient was sent to our department for investigations and appropriate therapies. Before surgery an orthopantomography (OPG) was performed and the patient was prescribed aerosol therapy with Rinowash with beclometasone fl + tiamphenicol 500 mg fl twice a day for 14 days and oral antibiotic (amoxicilline + ac. clavulonic) 1 gr twice a day for 7 days. During the operation, which was performed in the operating room under locoregional anesthesia with mepivacaina and Adrenaline 1:100.000 the first molar was extracted, followed by an accurate cavity revision by transalveolar access. The final phase of the intervention provided for maxillary sinus lavages with disinfectant solution represented by hydrogen peroxide and with antibiotic solution of metronidazole and first intention suture.
Results: The first check was performed one week after surgery, in which the patient underwent clinical and radiographic control with OPG. At the clinical visit, the oral mucosa appeared completely healed with pink and healthy appearance, the maxillary sinus appeared radiolucent on x-ray examination, which lays in favor of healing. In addition, the patient reported the absence of algic symptoms and also a post-operative hospitalization without adverse events. Another data to support the success of the intervention was the absence of mucopurulent secretions.
Conclusion: This work aims to evaluate the possibility of performing a sinus revision surgery without performing the nasal counter-opening, which allows the patient a faster recovery and a greater compliance in the post-operative hospitalization which results to be less traumatic.

Marsupialization in the management of odontogenic keratocyst

Andrea Nicali, Daniela Sorrentino, Giulia Pradal, Giovanni Sacilotto, Chiara Battilana, Dolaji Henin, Camilla Zenoni

Università degli studi di Milano, Dipartimento di Scienze Biomediche, Chirurgiche e Odontoiatriche - ASST Santi Paolo e Carlo, Ospedale San Paolo, UO Odontostomatologia II, Milano, Italy

Aim: The aim of this report is to describe the marsupialization surgical technique as a possible treatment option for odontogenic keratocyst (WHO 2005). The keratocystic odontogenic tumour is a benign uni- or multicystic, intraosseous odontogenic tumour, with a characteristic lining of parakeratinized stratified squamous epithelium and potentially aggressive, infiltrative pattern. It occurs from the first to the ninth decades with a peak in the second and third decade. The mandible is involved more frequently than the maxilla, with 65-83% of cases. About one-half of the cases develop from the angle of the mandible, extending anteriorly and superiorly. The marsupialization surgical technique is used in order to stop the extensive growth, to reduce volume and for less invasive surgical lesion enucleation.
Methods: A 55-years-old male patient with histological diagnosis of odontogenic keratocyst presented at the oral surgery department of the San Paolo Hospital in Milan. By means of orthopantomography and CT Cone Beam, it was observed a multi-lobed osteolytic lesion of 7.5 x 4.5 cm in the left lower jaw extended to coronoid process. The intra-oral clinical examination pointed out a neoplastic lesion of stretched-elastic consistency under physiologic colored mucosa, located on left mandibular edentulous area, buccal mucosa and retromolar trigone. The lesion was treated by marsupialization technique and silicon space keeper device to maintain patency and reduce the inner area contamination. The patient was educated about wound hygiene and he was undergone a weekly follow-up for the first 2 months and then once a month. In every appointment the wound was medicated with physiologic solution at 0.9% NaCl. After a 6-12 months follow up based on clinic and radiographic controls, we observed a significant reduction of the cystic lesion, allowing a second surgical access for its complete enucleation.
Results: Marsupialization was ruled out without complications and pain, and a complete enucleation was performed. After 3 months was observed a stable clinical outcome without wound dehisce and infections signs. After 6 months from surgical session no clinical and radiographic signs of relapse were observed, as well a evidence of bone remineralization in the previous osteolytic area.
Conclusion: The odontogenic keratocyst has predisposition for bone reabsorption due to an expansive growth which could bring to a bone fracture. The marsupializacion surgery technique is useful to obtain the decompression of cystic lesions promoting a dimensional reduction of the osteolytic area. The treatment through marsupialization usually not requiring general anesthesia, allows an outpatient

management, resulting low invasive and allows a more preservative resection surgery. Particularly the following excision would be more preservative of the affected bone structures and alveolar nerve. Moreover, the new bone apposition, during marsupialization healing, leads to an increase in the residual bone volume reducing the risk of fracture.

Validation of a new surgical score system for conservative surgical treatment of medical related osteonecrosis of the jaw

Marco Nisi, Stefano Gennai, Giacomo Giuca, Filippo Graziani, Mario Gabriele

Unit of Dentistry and Oral Surgery, University of Pisa, Director: Prof. Mario Gabriele. Department of Surgical, Medical and Molecular Pathology and Critical Care Medicine, University of Pisa, Italy

Aim: Medication-related osteonecrosis of the jaw (MRONJ) is a side effect of antiresorptive medications (IV and oral BPs, rank ligand inhibitor like denosumab), antiangiogenetic medications and target therapy. The management of medical related osteonecrosis of the jaw has not been completely elucidated, and its treatment can vary from no or limited surgery to more extensive surgery. Aim of the present study was to evaluate the efficacy of localized surgical treatment of MRONJ lesions in a coorte of patients referred to the unit of Odontostomatology and Oral surgery of the University of Pisa and also to validate a new surgical score system in order to predict the success rate.
Methods: We retrospectively evaluated all subjects diagnosed with MRONJ that had undergone localized surgery in the Department of Dentistry and Oral Surgery of the University Hospital of Pisa from January 2004 to December 2017. Diagnosis of MRONJ was made according to the criteria of the American Association of Oral and Maxillofacial Surgeons. Data on demographic, health status, type and duration of antiresorptive medication and osteonecrosis characteristics were collected retrospectively. The primary outcome was a complete haling of MRONJ lesion. We performed a multiple regression analysis in order to evaluate which factors influence the surgical outcome and all variables with a level of significance $p < 0.05$ were maintain in the model. According to the score we identify five risk categories.
Results: Two hundred and sixty seven patients, with 277 MRONJ lesions, were identified and included in the present study (189 females; mean age 68,8 years; SD 10.6 years). 190 patients (71,2%) received intravenous bisphosphonates (zoledronic acid 4mg IV) for the treatment of oncologic pathologies: metastatic breast cancer (79 patients, 29,6%), multiple myeloma (45 patients, 16,9%), prostate cancer (37 patients, 13,9%), kidney cancer (6 patients, 2,2%) and metastatic lung cancer (19 patients, 7,1%). Seventy.one Sixty-four patients (26,3%) received bisphosphonates for the treatment of osteoporosis. Six (1,2%) received Denosumab for the treatment of metastatic breast cancer. The MRONJ lesions were mainly symptomatic (240 lesions, 86,6%) and bone exposure was detectable in the vast majority of cases (216 lesions, 78%); pus was detected in 87% of cases (240 lesions). 189 lesions were located in the mandible. The main event leading to MRONJ was dental extraction (153 lesions, 55,3%), periodontal/perimplant disease (29 lesions, 10,5%), prosthetic trauma (42 lesions, 16,4%), odontogenic infection (24 lesions, 8,2%) and dysodontiasis of third molar (2 lesions, 0,8%). The most frequent stage of MRONJ was stage II (147 subjects, 53,1%), whereas stage I (37 subject, 13,4%), and stage III (93 subject, 33,6%) were less common. 197 lesions show complete healing after surgical treatment. However, Eighty didn't completely recuperate and required further surgical management to treat the relapsed lesion. According to the risk score we stratified sample in five risk categories: low, medium, high, very high and extremely high.
Conclusion: Our data suggest that patients with MRONJ lesions may benefit from local surgical treatment. The surgical score seems to be a suitable diagnostic tool in order to assist clinicians in the choice of the most appropriated therapy.

Bone regeneration through the fence technique: a case report

D. Novembre, E. Giofrè, R. Cordaro, W. Colangeli, D. Caruso

Aim: Dental implants con only be placed if there is sufficient bone for implant stability.Bone augmentation procedures are applied in patients without an adequate quantity of bone for implant placement. Augmentation procedures are divided into two categories: horizontal bone augmentation and vertical bone augmentation. The aim of this study is to perform horizontal bone regeneration through a fence technique and the use of only heterologous bone.
Methods: A 62 year-old female patient with severe horizontal atrophy of the right hemimandible; the horizontal diameter of the ridge throughout the fourth sector was less than 2 mm. The surgical procedure of GBR (guided bone regeneration) through a Fence technique and the use of only heterologous bone was planned. Despite the size of the damage, the use of heterologous bone is due to the will of the patient not to undergo a second surgery to collect autologous bone. Under local anaesthesia, the patient

was subjected to the preparation of a large vestibular flap, skeletonization of the mandible, placement of the titanium plaque and through a slit cutter on the bone portion where the graft is placed, small holes were practiced with recovery of the bone material obtained after the crybratur of the affected mandibular portion making it bloody in order to guarantee the graft an adequate blood supply from the host bed. The heterologous bone particulate graft was then positioned previously mixed with the patient's blood, taking care to compact it. At this point, a slow-reabsorption collagen membrane was positioned to knight of the bone Regeneration performed and, after release cuts on the vestibular flap,the double layer suture with wires 4.0 and 5.0 of PGA was performed

Results: controls (RX-OPT and Tc Dental-scan) at time T0 and T1 (after eight months) from the surgery. Radiographic control showed an important horizontal increase of the bone crest equal to 1 mm at its most thinning point and at 9 mm along the entire regeneration site. Forty days from surgery, the patient was implanted with a mobile prosthetic artifact. Six months from surgery, 4 endosseous implants of 3.8 diameter and with a variable length from 10 to 13 mm, with a torque between 25 and 38 NCM, were positioned. After 6 months, the evaluation of implant stability was carried out through the analysis of the resonance frequency (RFA) through an electronic device with a piezoceramics transducer that allows a quantitative assessment of the implant stability. During the post-operative course the patient did not present any complications.

Conclusion: From the obtained clinical-radiographic result and the ISQ data we can deduce that for what concerns the horizontal GBR the use of the synthetic bone alone is similar to the procedure involving the use of autologous bone mixed with synthetic bone. With a reduction of the patient's discomfort and the realization of a second operative site and any associated complications (edema, bleeding, pain).

Calcifying epithelial odontogenic tumor (CEOT): a case report

M. Parravicini, L. Abruzzese, C. Pedercini, M.V. Bartolucci, A. Ligabue, R. Vinci

Departement of Dentistry, IRCCS San Raffale Hospital and Dental School, Vita Salute University, Milan, Italy

Aim: Calcifying epithelial odontogenic tumor (CEOT),also known as Pindborg tumor, is a rare benign odontogenic tumor. Arising from the odontogenic epithelium, CEOT accounts for approximately 1% of all odontogenic tumors. The aim of this case-report is to present a calcifying epithelial odontogenic tumor involving the left side of the maxilla in a 69-year-old male patient.

Methods: A 69-year-old male patient was referred to the Department of Dentistry, IRCCS San Raffale Hospital and Dental School, Vita Salute University, Milan, Italy. The chief complaint waspartially maxillary edentulism, demanding for rehabilitation. Upper left first and second molars were extracted 2 years before on patient's dental history. During initial consultation, on the panoramic radiograph two osteolytic lesions were revealed: the first one corresponding to tooth 1.2, and the second one extending from tooth 2.4 to the tuberosity. The patient was totally asymptomatic, with no signs of extraoral or intraoral swelling. Overlying skin appeared normal without any regional lymphadenopathy. As far as the lesion concerning tooth 1.2, the initial diagnosis was a radicular cyst; whereas a residual cyst was diagnosed for the other finding on the upper left side. We proceeded with the surgery, consisting in total excision of the cysts. After full-thickness mucoperiosteal flap reflection, both anterior and posterior lesions were totally excised. However, even though we were able to completely remove the posterior lesion, the tissue presented an uncommon hard consistence.

Result: The two surgical findings were preserved in formalin and sent to the anatomopathology department. The final histological diagnosis was radicular cyst for the lesion on the right side of the premaxilla; and Calcifying epithelial odontogenic tumor (CEOT) for the one in the left side.

Conclusion: The radiographic appearance of the CEOT is variable, depending on the stage of development. Mixed radiolucent- radiopaque lesions are seen in 65% of cases. 32% of the tumors are completely radiolucent, and only 3% of the tumors are completely radiopaque with a "wind-driven snow" pattern. The association between the CEOT and the impacted tooth producing pericoronal radiolucency can mimic dentigerous cysts. The radiographic borders of the lesion may be non-corticated or diffuse on conventional radiography in about 80% of cases. Radiographically, it may be difficult to differentiate the CEOT from the ameloblastoma and the adenomatoid odontogenic tumor. In conclusion, an accurate differential diagnosis must be made in case of an osteolytic lesion: because even rare lesions can occur without having a characteristic radiographic pattern.

A tale of forbidden love: bilateral kissing molars. a case report

Matteo Peditto

Department of Biomedical and Dental Sciences and Morphofunctional Imaging, Post-graduate School of Oral Surgery,

University of Messina, Messina, Italy

Aim: The term "kissing molars" or "rosette formation" refers to molars impacted in the same quadrant with their occlusal surfaces contacting each other within a single dental follicle and their roots pointing in opposite directions. This phenomenon usually occurs between the second and third mandibular molars, but it can affect the mandibular third molar and a fourth supernumerary molar. While mostly appearing as unilateral, bilateral kissing molars can be very rarely observed. This study reports a case of bilateral kissing molars and their surgical removal.
Methods: A 42-year-old healthy male was referred to the Oral Surgery Unit, School of Dentistry - University of Messina suffering from pain in the lower retromolar region on both sides. The orthopantomography revealed the symmetrical bilateral impaction of the lower second and third molars in the posterior region of the mandible. On each side, the impacted teeth had their occlusal surfaces contacting each other in a single follicular space. The treatment of choice was surgical removal of both kissing molars. Before the surgical procedure, computed tomography was prescribed to acquire additional info on the impacted molars and the anatomical structures surrounding them. After performing infiltration alveolar nerve block, a full-thickness mucoperiosteal flap was reflected. Bone removal with a drill and cold sterile saline irrigation was performed to obtain sufficient access, and then teeth were sectioned using a drill and the fragments removed by the use of levers. The residual socket was revised, and the flap repositioned to obtain primary intention wound closure. The wound was closed with a simple interrupted stitch with a 5.0 size Nylon suture. Surgical procedures were performed two months apart from one another. Postoperative treatment consisted of amoxicillin/clavulanic acid at 875mg/125mg every 12 hours for six days and Chlorhexidine 0.12% oral rinse for one week. The sutures were removed after seven days.
Result: No signs of infection or postoperative anesthesia/paraesthesia were detected at one month from both surgeries.
Conclusion: Bilateral kissing molars are very rarely reported in dental literature. In the clinical case reported in this paper, both sites showed radiographic signs of inflammation and were symptomatic, despite the fact that kissing molars are often detected as incidental radiographic findings. Thus, surgical removal was prescribed in order to treat the symptoms and to prevent further bone resorption, pericoronitis, cystic changes, and root resorption of adjacent teeth. The surgical management proved to be successful on both sides, with no postoperative complications observed at one month from the procedures.

Prognostic value of [18F]fluoride positron emission tomography to drive surgical treatment and improve outcome in MR-ONJ disease

A. Marcianò, G. Picciolo, A. Caputo, M. Peditto, E. Rubino, S. Baldari, G. Oteri

Department of Biomedical and Dental Sciences and Morphofunctional Imaging, Post-graduate School of Oral Surgery, University of Messina, Messina, Italy

Aim: The research project focus on the prognostic value of [18F]Fluoride positron emission tomography (PET) with computed tomography (CT) in staging medication related osteonecrosis of the jaws (MR-ONJ) and suggests the use of the SUV max cut-off to predict the clinical course of the disease and the outcome resulting from surgical treatment highlighting a possible utility of this parameter in pre-operative evaluation. The main limitation of surgical treatment of MR-ONJ is difficulty in defining resection margins. Standard preoperative evaluation involves imaging to delineate the extent of necrotic bone which is essential for surgical planning. The outcome of surgical treatment is variable, lower and more heterogeneous in advanced stages. Starting from this observation we have formulated the hypothesis that the identification of an imaging parameter as a prognostic factor for clinical success of surgical treatment may be useful in determining the indication for surgical/ conservative treatment. As showed in literature [18F]Fluoride accumulates at the level of high turnover bone resettling sites and in our hypothesis could reveals a more extensive bone involvement of MR-ONJ compared with cone beam computed tomography (CBCT) and clinical examinations. The study aim to evaluate the diagnostic sensitivity of [18F]Fluoride-PET/CT in assessing the extension of MR-ONJ lesions. Secondary objective of the study is to evaluate [18F] Fluoride-PET/CT positivity as a factor associated with better/poor prognosis in patients who are candidates for surgical treatment and determine if this parameter should be used as a rationale for decision- making.
Methods: A prospective study will be conducted in the Department of Oral Surgery of the University of Messina providing data on patients subjected to [18F] Fluoride-PET/CT with statistical analysis for SUV max cut-off and detection rate. Patients with diagnosis of MR-ONJ will be included in the study if they had focal osteonecrosis and are eligible for surgical treatment. Surgical procedure will be performed using an intraoral approach under local anesthesia. Surgery will consist in piezoelectric marginal resection of necrotic bone areas detected with a [18F]Fluoride-PET/CT. Clinical outcome after surgical treatment will be defined as mucosal healing rate and presence/absence of clinical sign of infection.

Result: Patients enrollment in progress.
Conclusions: [18F]Fluoride-PET/CT may demonstrates high diagnostic performance in detecting MR-ONJ lesions. Differences in SUV max cut-off may be due not only to acquisitions, but also to tracer activity. [18F]Fluoride-PET/CT could detect greater metabolic changes on head bone window that may facilitate surgical treatment of MR-ONJ allowing to determine new evaluation parameters for the indication to the surgical intervention. Assessment of fluoride metabolism with [18F]Fluoride-PET/CT may represent a powerful tool to detect MR-ONJ lesion extension.

Assessing histomorphological pattern and biomolecular environment as prognostic factor for MR-ONJ treatment outcome and recurrence

Marcianò, B. Pilot*, E. Rubino, V. Nigrone, A. Ieni, G. Oteri

Department of Biomedical and Dental Sciences and Morphofunctional Imaging, Post-graduate School of Oral Surgery, University of Messina, Messina, Italy

Aim: To date no official guidelines are available for the management of patients with medication-related osteonecrosis of the jaws (MR-ONJ); interventions range from medical treatment going through conservative debridement to major resection. In general MRONJ treatment outcome is evaluated in terms of clinical wound healing without dehiscence or evidence of recurrence.About this, prognostic factors for recurrence of MRONJ after surgical treatment are not fully elucidated. Different factors that may possess an impact on the recurrence of MRONJ have been explored, stage of the disease and the amount of bone resected possesses an impact on the recurrence of MRONJ, as well as being able to get primary wound closure healing, this in surgically treated cases. The role of infection and accordingly the antimicrobial concept in the perioperative treatment owns a key role as well. Furthermore the preoperative duration of the disease as postulated by different author may be a prognostic factors for recurrence. Nevertheless some experiences in literature are in disagreement showing how the preoperative duration of MRONJ disease is not a prognostic factor in respect to recurrence as well as there was no relevance of duration of anti-resorptive therapy, stage of MRONJ or location of necrosis. Aim of the present study is to investigate the morphological pattern together with the biomolecular environment in which osteonecrotic lesions arise and develop with the aim of identifying possible prognostic factors related to the outcome of MRONJ surgical treatment.
Methods: This is a prospective study conducted in the Department of Oral Surgery of the University of Messina which proposes the observation of histological preparations of tissue removed from the lesional and peri-lesional area of patients undergoing surgery for MR-ONJ treatment. The tissue samples obtained from osseous-resective bone surgery are collected and stained by immunochemistry to evaluate the expression of endothelial markers CD31 and CD34 and factor VIII in maxillary osteonecrosis. The pathway in which necrosis occur has been explained with a large number of theories. The hypothesis that the impairment/inhibition of angiogenesis have an important role in the development and maintenance of MRONJ seems to be the most relevant. It involves avascular necrosis confirming the interplay between angiogenesis and osteogenesis in mainteining bone integrity, hence the choice of markers of angiogenesis.
Results: In consideration of the rarity of the disease, patient enrollment is still ongoing in order to reach a statistically significant sample. From January 2018 to January 2019 five patients have been surgically treated, patients are included in a follow-up examination schedule to assess the incidence of recurrence.
Conclusions: To investigate in this area could represent a research address to reverse the microenvironment and provide new adjuvant agents to improve treatment outcome of MRONJ.

Surgical enucleation of an odontogenic keratocyst: a case report

L. Pinto, F. Raimondi Lucchetti, H. Panajoti, E. Loddo, L. Pittari, R. Vinci

Department of Dentistry, IRCCS San Raffaele Hospital, Milan Italy Dental School, Vita-Salute University, Milan, Italy Head: Prof. E. Gherlone

Aim: A female Italian patient aged 37 referred to the Departments of Dentistry and Maxillo-facial Surgery of San Raffaele Institute for a multilocular neoformation localized in the left jaw. At the clinical examination, symptoms included painful chewing and swelling while the mucosa was light pink with the presence of oedema. A pulp vitality test was taken for the dental elements 3.6 and 3.7, which resulted positive and without any evidence of paraesthesia. The 1st level of X-ray examination, consisting of an OPT, revealed the presence of a radiolucency lesion, associated with the completely impacted 3rd homolateral molar. Because of the proximity of 3.6 and 3.7 roots to the mandibular canal, a 2nd level of X-ray examination, i.e. a CBCT, was prescribed. The radiographic examination showed a massive buccal resorption, with a downward displacement of the

neurovascular bundle and a complete erosion of the mandibular canal roof.
The clinical and radiographical appearance of the lesion and its aggressiveness oriented the surgeon towards the hypothesis of a multilocular odontogenic keratocyst.
Case report: Following a careful pre-operative examination, the surgical procedure consisted in the complete enucleation of the lesion, including the extraction of the elements nearby (the 1st, the 2nd and the 3rd impacted molar). To directly access the lesion, the ostectomy was performed using a piezoelectric handpiece with constant irrigation in order to allow the safe and complete enucleation of the lesion. Amoxicillin (1g) was prescribed to be taken twice a day for six days. Non-steroidal anti-inflammatory drugs as needed and rinses with chlorhexidine mouthwash 0,20% were also prescribed. The size of the specimen was 6 cm maximum and it was sent for histopathological examination that confirmed the diagnosis of multilocular odontogenic keratocyst. Sutures were removed one week after surgery. A close follow-up was performed and the site healed without any complication within a period of 6 months. The 12-month X-ray examination showed a complete ossification of the site previously belonging to the neoformation.
Conclusion: This case report demonstrates how a precise pre-surgical evaluation allows the complete enucleation of extensive lesions, even in the most complex cases, without risks and any particular complications, whilst ensuring sufficient preservation of the residual bone structures. The use of the piezoelectric handpiece is mandatory when the lesion results adjacent to important anatomical structures that must be preserved.

Pitfalls from incisional biopsy in the diagnosis of minor salivary gland tumours

Rossella Presta[1], Octavian Fiore[1], Giovanni Agrò[1], Martin Giorgio Campolongo[1], Matteo Vala[2], Monica Pentenero[1,2]

[1]Oral Surgery Specialty School, Department of Oncology, San Luigi Gonzaga University Hospital - Orbassano, University of Turin, Italy
[2]Oral Medicine and Oral Oncology Unit, Department of Oncology, San Luigi Gonzaga University Hospital - Orbassano, University of Turin, Italy

Aim: Minor salivary gland tumours are quite often located on the hard palate. The pre-surgical diagnosis based on incisional biopsy specimen may harbour some pitfalls oral surgeons must be aware of.
Case report: A 62-year-old male was referred by his dentist to the oral medicine section of San Luigi Gonzaga Hospital, University of Turin for a swelling located on the right palate. The patient had no symptoms, the lesion was a submucosal node resulting in a swelling with a maximum diameter of 30 mm, with elastic texture and covered by normochromic mucosa. The patient reported a slow growth. The patient's pathological anamnesis included type II diabetes, hypertension, and hypercholesterolemia, the whole under pharmacological therapy. An incisional biopsy of the lesion was done and the histological examination identified a pleomorphic adenoma. Hence, a contrast computed tomography (CT) was scheduled in order to program the surgical treatment. The CT showed a full-thickness erosion of the palatal bone with a diameter of about 15 mm, with the tumour jutting but not protruding into the nasal cavity. Before surgery, impressions were taken in order to produce a custom-made palatal plate to be positioned immediately after surgery. Surgical removal of the lesion was performed with safety margins. The mass showed a cleavage plan with respect to deep tissues and the nasal mucosa was found to be undamaged. Hemostasis was obtained through diathermocoagulation and placing fibrillar collagen and collagen sponge. Notwithstanding the use of the palatal plate, two days after surgery the nasal mucosa flaked off resulting in an oronasal communication. The histological assessment of the excised specimen finally revealed a polymorphous low grade adenocarcinoma. After further investigations including nasal fibroscopy and head-neck-chest contrast CT, no adjuvant treatments were scheduled and the patient entered an oncologic follow-up program. Topical applications of silver nitrate were performed in order to favour a spontaneous closure of the oronasal communication.
Results: The polymorphous low grade's adenocarcinoma is a rare salivary malignant tumour, more commonly found in the palate. It has a high histological variety such as epithelial cells arranged in duct-like structures, sheets, clumps, myoepithelial cells with a myxoid or mucoid stroma. It also has a low proliferation grade and sometimes a tendency to perineural invasion. Both pleomorphic adenoma and polymorphous low grade adenocarcinoma are rare salivary gland tumours frequently located on the palate. They show up with the same clinical features such as absence of symptoms and slow growing. Even histological pattern may be similar, so that the assessment of small incisional biopsy specimens may result in a deceiving diagnosis. In the present case, only the assessment of the entire surgical specimen was able to achieve a definitive diagnosis.
Conclusion: Histological characterization of salivary gland tumours is challenging, even more on incisional biopsy samples. When programming surgical excision clinicians must be aware of potential pitfalls in the pre-surgical pathological diagnosis of salivary gland tumours.

Conservative surgical treatment of an atypical base cell ameloblastoma with adipose Bichat bulla flap (case report)

F. Raimondi Lucchetti, L. Pinto, E. Loddo, G.P. Patianna, A. Bianco, R. Vinci

Department of Dentistry, IRCCS San Raffaele Hospital, Milan Italy Dental School, Vita-Salute University, Milan, Italy Head: Prof. E. Gherlone

Aim: Ameloblastoma is a rare, benign or cancerous tumor of odontogenic epithelium much more commonly appearing in the lower jaw than the upper jaw, it is often associated with the presence of unerupted teeth. Symptoms include painless swelling, facial deformity if severe enough, pain if the swelling impinges on other structures, loose teeth, ulcers, and periodontal disease. The lesion has a tendency to expand the bony cortices because slow growth rate of the lesion allows time for periosteum to develop thin shell of bone ahead of the expanding lesion. Ameloblastoma is tentatively diagnosed through radiographic examination and must be confirmed by histological examination. Radiographically, it appears as a lucency in the bone of varying size and features sometimes it is a single, well-demarcated lesion whereas it often demonstrates as a multiloculated "soap bubble" appearance. Resorption of roots of involved teeth can be seen in some cases, but is not unique to ameloblastoma. The disease is most often found in the posterior body and angle of the mandible, but can occur anywhere.
Case report: A 52-years-old female referred to the Dentistry and Maxillo facial department of San Raffaele Institute with the chief complaint of a painless radiolucent lesion in the posterior right maxilla, revealed occasionally by a panoramic radiography without remarkable dental and medical history. The patient was asymptomatic, while the clinical intraoral examination revealed a swelling in the right maxillary vestibule extending mesiodistally from the maxillary right first molar to the maxillary right tuberosity. On palpation the swelling was bony hard in consistency with buccal cortical expansion, without fluctuation. Egg shell crackling was present buccally. The overlying mucosa appears smooth and normal. There was no pain, tenderness or discharge. No mobility was present in relation to the nearby implant. Limph node examination revealed no changes. A provisional clinical diagnosis of residual odontogenic cyst was considered. The OPT revealed a well-defined, unilocular radiolucency with sclerotic margins, while the CBCT revealed an expansive lytic lesion involving the right maxillary sinus. Surgical treatment:The surgical procedure was performed under local anaesthesia with articain 4% and adrenaline 1:100'000. A crestal incision was made with two vertical incisions to raise a trapezoidal mucoperiosteal flap and to expose the lesion. Aspiration revealed no fluid. A trap door has been created by ostectomy and, using a spoon, the surgeon has carefully removed the entirely lesion. The enucleation not included the extraction of the nearby implant. The specimen had size of 4cm and was sent for histopathological examination. Then a blunt clamp was introduced to the temporomandibular angle in order to separate the fibres of the buccinator muscle. A light pressure was exerted on the cheek to prolapse the buccal extension of Bichat's ball. Once placed on the entirely bone defect, the buccal fat was covered with the mucoperiosteal flap and sutured. Amoxicillina (1g) was prescribed to be taken two times daily for six days. FANS and chlorhexidine 0,20% were prescribed too. Sutures were removed one week after surgery. A close follow up was performed without any complication within 6 months.
Conclusion: The basal cell ameloblastoma is a rare variant, which shows a remarkable resemblance to the basal cell carcinoma, that needs an appropriate diagnosis based not only on clinical and radiological principles but also on histopathologic analysis. Long-term follow-up is necessary to establish the recurrence rate.

Upper maxilla mini-invasive technique to restore bilateral posterior edentulism: a case report

M. Manacorda, L. Redi, L. Scudieri, R. Uccioli, F. Cattoni, A. Merlone, R. Vinci

Aim: Nowadays the rehabilitation of totally/partially edentulous patients is a common situation that comes to our attention in the daily practice. Searching through literature it is possible to find various techniques used to restore the masticatory function, especially for the treatment of partial edentulism in the upper posterior maxilla. We can propose to our patients many different approaches to the treatment but we have to considerate the expectations of our patients and the predictabilty of the outcome. We approached this particular case with two axial implants (placed in site 1.4 and 2.4) and two tilted ones (placed in site 1.6 and 2.6): this technique reduced significantly the invasiveness for the patient and allowed us to provide an immediate prosthetic loading.
Methods: A 62 years old Female patient was referred to the Oral Surgery Department at S. Raffaele Vita-Salute University for bilateral posterior upper maxilla rehabilitation. The patient has been evaluated as ASA I and her only request was to restore the function as quickly as possible. The CBCT done with the radiological guide reveals that in position 1.6 and 2.6 there's no enough bone height for the placement of

two axial fixtures. After the realization of a 3D project we realized that tilting the implants would allow them to emerge in position 1.6 and 2.6. We proceeded to place 4 fixtures; 2 axial (position on site 1.4 and 2.4), and two tilted (with emergency in position 1.6 and 2.6). The fourth fixtures reached over 40 N/cm of torque. 4 M.U.A abutment were placed so we could realize an immediate loaded screwed prosthesis. Every occlusal contact was deleted.

Results: This technique allowed us to by-pass the sinus antrum: this reduced significantly the invasiveness for the patient and the healing times. Tilted implants represents a good choice when it comes to preserving or involving noble anatomy structures during our surgical procedures. This alone is a good reason to define this technique a a a very predictable way to give our patient an immediate masticatory function. The patient was very satisfied at the end of the surgical and prosthetic treatment.

Conclusion: Tilted implants are commonly associated with the rehabilitation of totally edentulous patients: in this case we performed the technique to restore the bilateral posterior upper maxilla. The angulation of the fixtures allowed us to avoid bilateral maxillary sinus lift. This is to be considered a great advantage because it enables the placement of the fixtures in basal bone which represents the gold standard for osseointegration and fixtures stability. Nowadays we are not concerned anymore with the angulation of the implants since it can be easily solved by the placement of M.U.A (multi unit abutments). The great advantage provided by this technique consists in the reduction of both the healing time for the patients and the loading time: both of these aspects are one of the first requests of our patients.

Mandibular angle fracture as complication of an impacted third molar extraction associated with cyst enucleation : a case report

O. Riccardo, P. Scalzone, R. Rullo

Multidisciplinary Department of Medical-Surgical and Dental Specialties of the University of studies of Campania "Luigi Vanvitelli", School of Specialization in Oral Surgery, Neaples, Italy

Aim: Extraction of impacted third molars is a common surgical procedure performed in dentistry. A reported, but nevertheless rare, complication of third molar extraction is mandibular angle fracture. For this reason we decided to present the case of a patient with a mandibular angle fracture after the extraction of the left lower third molar associated with follicular cyst enucleation that was treated through maxillomandibular fixation .

Methods: The patient who came to our observation was a 62-year-old woman who presented the impacted left mandibular third molar associated with follicular cyst. Intraoral examination revealed absence of left mandibular third molar. Panoramic radiograph and Cone Beam computed tomography revealed that the left third mandibular molar was impacted in mesioversion and associated with an osteolytic lesion, covered by sclerotic border, that was extended by the mandibular angle to inferior surface of the mandible, involving also the roots of the left omolateral second molar. Considered radiological characteristics, we decided to proceed with the extraction of the left mandibular third molar and with the excision of the associated neoformation and its subsequent histological examination, that was compatible with the diagnosis of follicular cyst. The patient was raccomended to follow a soft diet for at least 4 weeks postoperatively and to restrict mandibular moviments. During a follow-up visit, 10 days later, the patient reported that she heard a crackling noise during chewing. She reported pain and neurologic injuries too. Moreover, intraoral examination revealed swelling in the left jaw area. Panoramic radiograph showed a left mandibular angle fracture in the same site of the previous extraction. Due to the reject of surgical approach by the patient, the fracture was treated just through maxillomandibular fixation. This fixation was made through the placement of orthodontics brackets with a passive arch on mandibular teeth. Because of the presence of a fixed prosthesis on natural teeth, we placed four miniscrews, long 8mm, between maxillary central incisor and canine and between canine and first molar, on the right and on the left side. Maxillomandibular connection was made by orthodontics elastics(6 once) that connected miniscrews with orthodontics brackets.

Results: During a follow-up visit, 2 weeks later, intraoral examination revealed absence of swelling. The patient reported absence of pain. Moreover, Cone Beam computed tomography revealed the bone healing process.

Conclusion: The late mandibular angle fracture is a rare but significant complication that may result from third molar extraction associated with follicular cyst enucleation. For this reason, to avoid this complication is essential to introduce a soft diet, for at least 4 weeks, and to limit mandibular movements postoperatively.

Denosumab-related osteonecrosis of the jaws: safety considerations and management strategies in patients receiving androgen deprivation therapy for non-metastatic prostate cancer or adjuvant aromatase inhibitor for breast cancer

Marcianò, L. Romano, A. Caputo, E. Rubino, A. Picone, G. Oteri

Aim: Androgen deprivation therapy and aromatase inhibitor increase the risk of osteoporosis. Drugs for osteoporosis prevention are administered to postmenopausal breast cancer patients receiving adjuvant aromatase inhibitor therapy to improve event-free survival, and disease-free survival. The clinical use of subcutaneous denosumab 60% is approved by US Food and Drug Administration on September 16, 2011, for the prevention and treatment of skeletal-related events in patients receiving androgen deprivation therapy for nonmetastatic prostate cancer or adjuvant aromatase inhibitor therapy for breast cancer. Subcutaneous 60 mg denosumab antiresorptive therapy is administered in patients who meet criteria for a diagnosis of osteoporosis/osteopenia and is usually administered for a long period of time up to 5 to 7 years. The most common trigger for MR-ONJ is dental alveolar surgery. According to the clinical recommendations about denosumab therapy from the latest report of the American Dental Association antiresorptive therapy does not appear to be an absoute contraindication for dental extraction thus surgery is performed with specific MR-ONJ prevention protocol. The primary objective of the study is to determine if the rate of occurrence of osteonecrosis of the jaws and overall complications after dental extraction in patients exposed to antiresorptive agents for the treatment of primary osteoporosis is comparable to the incidence in cancer patients exposed to antiresorptive agents for the treatment of osteoporosis induced by adjuvant therapy and therefore if cancer is to be considered an additional risk factor beyond the exposure to suspected drugs due to the alteration of systemic homeostatic mechanism that it determine.
Methods: A prospective cohort study.has been designed. Inclusion criteria are non-metastatic prostate cancer and post-menopausal breast cancer receiving oral osteoporosis therapy with denosumab 60 mg. At their initial visit the patients' medical history is reviewed. Medical status is evaluated through blood exams. Systemic and local risk factors for MR-ONJ are analyzed. Administrated drug types and cumulative dose are recorded. The dental extraction occurred during administration of denosumab therapy are recorded. Oral examination is performed at post-operative follow up visit and a panoramic radiograph taken to evaluate the presence or absence of clinical and/or radiological signs suggestive of MR-ONJ. Patients with suspected MR-ONJ receive a three-dimensional radiographic examination to confirm the diagnosis and to determine the extention of the MR-ONJ lesions. All patients are scheduled to have at least 4 study visits with clinical evaluation.
Results: We await the achievement of a cohort of at least 50 patients for a preliminary analysis of the results.
Conclusions: To evaluate whether the incidence of MR-ONJ is lower, greater or comparable in cancer patients assuming denosumab at 60 mg for osteoporosis prevention than in non-cancer patients treated for primary osteoporosis will allow us more correct patient stratification and risk assessment.

Role of local flaps to achieve primary wound closure in MRONJ osseous-resective surgery

A. Marcianò, E. Rubino, A. Barresi, M. Peditto, M. Pisano, G. Oteri

Aim: MRONJ outcome after surgical treatment is evaluated in terms of clinical wound healing without dehiscence or evidence of recurrence. Surgical treatment of MRONJ showed higher success rate when osteotomy was performed and primary wound closure was achieved without tension on the mucoperiosteal flap. To achieve this local flaps may be mobilized and either advanced or rotated into the defect to be closed. Nevertheless only a small number of papers clearly describe the soft tissue management for achieving a safe wound closure. Techniques range from advancement to propeller (rotations up to 180 degrees around the pedicle) flaps with multilayered (bilayered/three-layered) wound closure suturing to submucosal connective tissue, nasolabial flaps, mylohyoid, and others. The use of advancement and propeller flaps has expanded the possibilities of covering large complex defects after MRONJ osseous-resective surgery with local tissue. The authors present advancement and propeller oral flaps as a surgical approach for single-stage covering of alveolar defects with the purpose to provide a valid surgical solution for patients suffering from MRONJ. Aim of this study is to present the more indicated technique of wound closure in relation to bone necrosis localization and extent and assess its impact on the success rates of MRONJ surgical treatment.
Methods: A prospective study was conducted in the Department of Oral Surgery of the University of Messina. Patients both with cancer or osteoporosis with diagnosis of MRONJ were included in the study if they had focal osteonecrosis and were eligible for surgical treatment. Participants received antibiotic prophylaxis before operation. Surgical procedure was performed using an intraoral approach under local anesthesia. Surgery consisted in piezoelectric marginal resection of necrotic bone areas and primary wound healing achievement. Flap donor site was selected according to MRONJ lesion location (maxillary/mandibular) and registered as following: cheek, floor of the mouth, tongue, retromolar trigone, hard palate, and soft palate. Patients stratification was done by closure techniques.
Post-operative complications were registered to

evaluate morbidity and functional results. Success will be assessed as the maintenance of full mucosal coverage without bone exposure recurrence or signs of mucosal dehiscence at (T0) four weeks (T1), three months (T2), and six months (T3) after operation.
Results: The authors always achieved primary wound closure. The only complications were infection and oro-nasal fistula.
Conclusions: Local flaps are an important tool in the surgical treatment of MRONJ. Oral advancement and propeller mucoperiosteal flaps facilitate healing and may represents a reliable and effective option for one-stage reconstruction of moderate to large MRONJ defects with local mucosa.

The surgical management of a post-extractive naso-alveolar fistula in an adult patient previously treated for congenital unilateral cleft lip and palate

R. Russo, L. Bevilacqua, M. Maglione, R. Rizzo, R. Di Lenarda

Department of Medical, Surgical and Health Sciences, University of Trieste, Italy

The nasoalveolar fistula (NAF) is an uncommon presentation in day-to-day clinical practice, except in some cleft patients. A fistula consists of an abnormal connection between two cavities in the course of a pathological evolutive process. The etiological factors can be broadly divided into 3 groups: congenital, acquired and sometimes mixed. The most common congenital cause of naso-alveolar communication is alveolar and palatal cleft defect. The acquired causes include infection and surgical complications (hematomas between the nasal and oral floors, excessive sutural tension, flap necrosis, tooth extractions). Instead, mixed causes of NAF can result from a combination of the last two. Their resolution permits the separation between oral and nasal cavity, the construction of a continuous arch form and alveolar ridge and the implant treatment for better occlusion. Different treatments have been established to treat NAF. Currently, the standard treatment for the alveolar cleft at most institutions is grafting with autogenous bone from the iliac crest.

Conservative surgical approach of a multicystic ameloblastoma: clinical, radiographic and histological evaluation

D. Russo[1], M.G.P. Di Mare[1], A. Donzelli[1], R. Vallebona[1], M. Menditti[2], S. Melito[1], M. D'Agostino[1], D. Menditti[1], L. Laino[1]

[1]Multidisciplinary Department of Medical and Dental Specialties, University of Campania- Luigi Vanvitelli, Naples, Italy;
[2]Department of Dental and Maxillofacial Sciences, University of Naples "Federico II", Naples, Italy

Aim: Ameloblastoma is the second most common odontogenic tumor arising in the maxillary bones; it accounts for 1% of all oral neoplasms, and about 15% of all odontogenic tumors. The World Health Organization (WHO) classified benign ameloblastoma into four different variants: 1. solid/ multicystic (SMA); 2. unicystic (UCA); 3. peripheral; 4. desmoplastic. The rare malignant forms are classified as: 1. metastasising ameloblastoma; 2. ameloblastic carcinoma. SMA is the most common subtype and accounts for about 80% of benign cases, and it is often diagnosed following a routine radiographic examination. Radiographically, SMA appears as a uni- or multilocular lesion often found in contact with the roots of adjacent teeth. Because of its great infiltrative potential, SMA is characterized by a higher rate of recurrence. Currently, surgery represents the best therapeutic option for this odontogenic lesion. A conservative or radical approach may be performed for SMA treatment to achieve total excision of the lesion. The aim of this study is to evaluate the new bone formation radiographically and through the histological examination of a patient with multicystic ameloblastoma who underwent surgery with a conservative approach.
Methods: A 47-year-old female patient, RP, referred to Oral Surgery Division of Multidisciplinary Department of Medical-Surgical and Dental Specialties of the University of Campania "Luigi Vanvitelli" presented deformation of the left hemi-mandibular region and paresthesia of the left hemi-labium. At the OPT, a multilocular osteolytic area, resorption of the roots of the dental elements (3.7, 3.6, 3.5, 3.4) and the inclusion of the 3.8 were appreciated. The CT scan examination showed the erosion of the mandibular canal roof with consequent involvement of the nerve and the attached vascular bundle and erosion of the vestibular cortex in the region of the mental nerve. Extraction of 3.8-3.4 was performed, subsequently, the patient has been subjected to enucleation followed by an extensive peripheral ostectomy performed with a piezoelectric device in order to minimize the neurologic sequelae. Five years after the surgical procedure, at the moment of dental implant surgery, the bone core biopsies were retrieved by using 2.9 mm diameter trephine bur (Komet 227b, Italy). After the dental implant placement, the cover screws were placed and the flap closure was obtained with Vicryl 4.0. Bone cores were retrieved, immediately stored in 10% buffered formalin, and processed to obtain thin ground sections using for the histopathological examination.
Results: Clinically it was observed satisfactory healing and there was a complete remission of the paresthesia.

Radiographic examination showed a complete healing of the operated site and the histopathological analysis demonstrates the formation of lamellar bone.
Conclusions: The choice of the surgical management of mandibular multicystic ameloblastoma is still a controversial issue, particularly if the lesion shows intimate relationships with the nervous vascular bundle. In the choice of the best treatment approach for solid/multicystic ameloblastoma, the above-mentioned issues should be considered and ensure the right balance between the biological cost and the prognosis of patients. The conservative approach and the stability of the clot, without the use of biomaterials, was found to be resolutive in the presented clinical case.

Odontogenic necrotizing fasciitis: a case report

Chiara Battilana, Giovanni Sacilotto, Francesca Iellimo, Dolaji Henin, Ivan Bancora, Alberto Pispero, Andrea Nicali

Università degli studi di Milano, Dipartimento di Scienze biomediche, chirurgiche e odontoiatriche - ASST santi Paolo e Carlo, Ospedale San Paolo, UO Odontostomatologia II, Milano, Italy

Aim: Necrotizing fascitiis is a rare but life-threatening soft-tissue infection, characterized by rapidly spreading inflammation and subsequent necrosis of the fascial planes and surrounding tissues, with necrosis of the overlying skin. This condition may be a complication of an odontogenic infection, in patients with or without any underlining medical conditions.
The aim of our work is to describe the clinical management of necrotizing fasciitis due to odontogenic infection in a young adult without any underlining medical conditions.
Case report: A 25 year old with an odontogenic infection to tooth 3.8 was admitted to the emergency service. For this reason, the patient recently underwent an unsuccessful 5-day Amoxicillin and Clavulanic Acid therapy and 3-day Ceftriaxone cycle. The clinical examination showed tumefaction of the left side of the face and involvement of the regional lymph nodes, in association with an undefined tooth pain, dysphonia, dysphagia and fever. Considering the severity of the symptomatology, a broad-spectrum antibiotic therapy, panoramic radiograph and a visit in Otorhinolaryngology department were prescribed. Based on the computerized axial tomography that showed a tracheal right deviation and compression due to the abscess left laterocervical and submandibular extension, urgent tracheal-nose intubation by endoscopy and abscess's drainage were performed in an operating room under general anesthesia. After a left cervical incision purulent material was drained mainly from the oral floor, Betadine and H2O2 washing was performed, two draining cannulas were positioned and the surgical wound was closed using sutures. The bacterial culture of purulent material was positive for Streptoccoccus anginosus. After two days 3.8 tooth was extracted under general anesthesia with patient still under intensive care treatment. Four days later draining cannulas were removed. After seven days draining cannulas were repositioned due to a latero-cervical tumefaction and trismus persistence. During a 7-day follow-up restoration of the cervical-facial symmetry and reduction of latero-cervical tumefaction, trismus and symptomatology were observed, so the patient was discharged. A week later a clinical and radiographic control indicated post-surgical healing without any signs of infection.
Conclusions: Necrotizing fasciitis arising from odontogenic infection is a rapidly progressive and life-threatening illness. Prompt recognition of the infection, aggressive and often repetitive surgical debridement are necessary to prevent serious morbidity and mortality. Odontogenic infections must not be underestimated, as they may lead to severe complications, such as necrotizing fasciitis. Moreover, this case report highlights that antibiotic resistance represents an increasing problem, therefore rational antibiotic prescription is needed.

Inferior alveolar nerve lateral transposition for atrophic mandibular rehabilitations: a case report and literature review

T. Saladino, L. Chiodo, G. Tetè, B. D'Orto, C. Ruscica, R. Vinci

Departement of dentistry, IRCCS San Raffaele Hospital, Milan Italy

Aim: The purpose of this study is to review the literature in order to evaluate the inferior alveolar nerve transposition techniques in patients with severe posterior jaw bone reabsorption. Moreover, we reported a clinical case as support.
Methods: The MedLine (NCBI PubMed and PMC) database and EBSCO resource was consulted with the following keywords: IAN transposition, mandibular rehabilitation, implants in posterior atrophic mandible. The clinical case here presented is related to a 48-years-old woman. She came to the attention of the Department of Odontostomatologic Surgery of the Dental Clinic of Università Vita-Salute San Raffaele presenting clinical and radiographic evidence of severe posterior mandibular bone loss. Among the possible surgical treatments related to the prosthetic rehabilitation of atrophic jaw, we selected the lateral transposition of the inferior alveolar nerve and subsequently the placement of four implants. Under local anesthesia, a mucosal incision is performed above the mental foramen, from the site of the first premolar to the second molar region. The mental

nerve is identified, and the periosteum is completely dissected from the surrounding mandibular bone. A unicortical lateral osteotomy, performed with piezoelectric devices, is then shaped around the mental foramen and extended inferiorly and anteriorly; so any possible "loop" of nerve is not interfered with during the osteotomy. The incisor branch is cut some 7-8mm anterior to the furcation and, starting from the mental foramen area, the neurovascular bundle is carefully lifted out of the mandible. Then, implants are placed in site 3.5-3.6-3.7 and the flap is resutured. The patient is given Penicillin V (2 g) and corticosteroids (4 mg) preoperatively. Later the same day, the patient is given again Penicillin V tablets (2 g) and corticosteroids (3 × 4 mg).
Results: Initially, a total of 40 articles were screened and among them, 5 literature reviews published in english were selected. Additionally, 2 textbooks and 3 clinical studies cited by the selected reviews were included. 4 patients underwent a total of 18 IAN transpositions, with an average age of 46 years. Two women underwent bilateral surgery and the other 2 monolateral. A total of 12 dental implants were placed. All patients reported initial change in sensation (paresthesia). The surgical protocol followed guarantees the complete recovery of sensitivity within 6 months in all patients (2 months, one case; 4 months, two cases; and 6 months, one case).
Conclusion: In the posterior part of the mandible, where the mandibular canal is positioned close to the superior cortical bone due to the resorption, the inferior alveolar nerve transposition is the only possible technique that allows the placement of implants, aimed at obtaining a complete rehabilitation with fixed prosthesis. With careful preoperative surgical and prosthetic planning, imaging, and extremely precise surgical technique, this procedure can be successfully used for implant placement in edentulous posterior atrophic jaw.

Sinus lift complications: a retrospective cohort analysis on 68 patients at the 9 year follow-up

N. Baldi, M. Bianchi, E. Del Bolgia, S Sani., M. Cavuoto, P. Tonelli

University of Florence, School of Specialization in Odontostomatological Surgery, Department of Experimental and Clinical Medicine

Aims: The main aim of the study was to assess rates of complications of sinus graft surgery.
Methods: A retrospective cohort study was performed on consecutive patients treated at the Oral Surgery Department of University of Florence (Florence, Italy). Patients that had computer tomography before sinus surgery (T0), orthopantomography after implant surgery (T1) and at the follow-up (T2) were included in the study. Variables for sample description, type of biomaterials and implant characteristics were also registered. All survived implants were analyzed with clinical and radiographic evaluation (OPT) at the follow-up. Complications analyzed in the study were divided in complications during surgery (represented by perforations and haemorrhage), and complications after surgery (represented by OAC and infection).
Results: Sixty-eight lateral sinus lifts were performed in 48 patients and 93 implants were inserted. Mean follow-up established was 9±1,8 years. In 14 cases of sinuses augmentation were recorded premature complications leading 3 graft failures. A total of 19 implants failed. The analysis showed that patients and sinus related factors did not influence premature rate of complications. The complication rates was 20,6%, 9 cases with sinus perforation, 3 cases with infection and 2 cases with OAC. The manage of perforation was made with stitches and collagen membranes, and the infection was solved with specific antibiotic therapy (amoxicillin associated with metronidazole). These treatments resulted in 90% of success sinus surgery. The OAC was resolved with both FESS and intraoral mesh surgery leading to 85% of success sinus surgery. In a total of three cases was not possible to insert implant. The Height of residual bone (HRB) resulted to have a significant influence on mid-long term implant failure, with odds ratio (OR) of 3.8 (p-value 0.0034) for each millimeter less of residual bone before the surgery. A significant implant failure difference was registered between smoking and non-smoking group, with OR of 8.3 (p-value 0.0173). No statistically significant difference was registered for implant failure among the biomaterials used for sinus lift, nor among various implants type of surfaces.
Conclusion: Lower height of residual bone (HRB) prior to the sinus surgery and smoking habits had negative prognostic effect on dental implants placed in grafted sinuses.

Peripheral giant cell granuloma removal in the aesthetic zone in a young patient: three years follow up

M. Sannino[1], A. Cuozzo[2], V. Saviano[3], L. Ramaglia[4]

Department of Neurosciences, Reproductive and Odontostomatological Sciences, University of Naples Federico II, Naples, Italy
[1]DDS, Master student, Department of Neurosciences
[2]DDS, Postgraduate Oral Surgery School student,
[3]DDS, Master student,
4MD, DDS, Chairman of Oral Surgery Postgraduate School

Aim: Peripheral Giant-Cell Granuloma (PGCG) is a reactive-neoplastic benign neoformation related to

traumatic and inflammatory factors. In the oral cavity It occurs mainly in the lower jaw, affecting interdental tissues, periosteum and periodontal ligament. A 13-year-old female patient comes to our attention complaining about the presence of a gingival tumefaction in the anterior maxillary zone, exactly in 2.1 cervical zone. Noticeable traumatic event has not been observed during anamnesis, except, the development of the tumefaction during the orthodontic treatment. The patient refers discomfort due to the reduced upper lip movement and social hardship caused by aesthetical imperfection.

Methods: During the extraoral examination a light prominence on the left upper lip is appreciable, responsible of a slight facial asymmetry due to the involvement of nose philtrum. A gingival domed tumefaction on the 2.1 element is visible in intraoral examination. The lesion covers the entire 2.1-root surface reaching the buccal fornix with 2.5cm diameter in apex-crown direction and about 1cm in mesiodistal dimension without the involvement of near teeth's adherent gingiva. The mucosa covering the tumefaction results smooth and undamaged, hard-elastic consistence and red-purplish colour.

Vitality test on the 2.1 is positive and, during periodontal examination, the dental element shows bleeding on probing (BoP+) and probing depth (PD) of 11mm due to hypertrophic-hyperplastic reaction and formation of a pseudo-pocket. Orthopantomography (OPT) shows no anomaly, so a Cone-Beam Computed Tomography (CBCT) has been used, which shows resorption of the buccal cortical bone in 2.1

Results: Lesion enucleation intervention was performed, through an conservative approach as possible, removing the neoformation in its integrity and preserving all the bone and dental structures adjacent. Two samples have been collected and dispatched to the anatomopathological laboratory, giving a diagnosis of CPCG. A periodical follow up has been established and a strict oral hygiene has been prescribed. Three years from the surgery is detectable a good oral tissue healing and CBCT exam shows a complete recovery of the buccal cortical bone in the 2.1 zone.

Conclusion: In the case described, the only traumatic event possibly related to the onset of CPCG is the beginning of orthodontic therapy. However, the data in the literature do not yet show a clear correlation and further studies will be needed to demonstrate a direct relationship. Surgery planning, aimed to the maximum preservation of the near structures with radical neoformation enucleation, with a light root planing of the compromised tooth has permitted to gain maximum aesthetics and functional results. Indeed it is possible to hypothesize, on the basis of CBCT, that both the formation of a new periodontal attack and of new cement has taken place on 2.1.

Clinical strategies for dental extraction in patients at risk of medication-related osteonecrosis of the jaw (MRONJ): a one year retrospective study

V. Saviano[1], A. Cuozzo[2], M. Sannino[3], L. Ramaglia[4]

.

Department of Neurosciences, Reproductive and Odontostomatological Sciences, University of Naples Federico II, Naples, Italy

[1]DDS, Master student

[2]DDS, Postgraduate Oral Surgery School student

[3]DDS, Master student

[4]MD, DDS, Chairman of Oral Surgery Postgraduate School

Aim: Medication-Related OsteoNecrosis of the Jaw (MRONJ) is an exposition of necrotic bone in the oral cavity lasting more than 8 weeks, in patients who took anti-resorptive or anti-angiogenic drugs and not been exposed to head and neck radiotherapy. MRONJ may arise due to oral surgery procedures and therefore the aim of this study is to evaluate the occurrence of this complication and to establish which are the best clinical strategies for dental extraction in patients at risk of Medication-Related OsteoNecrosis of the Jaw (MRONJ).

Methods: Medical records of 30 patients treated in the Dental Clinic Department of University of Naples "Federico II" were analysed, collecting data about: sex, age, primary pathology, type of drug at risk MRONJ taken with relative route of administration, duration and drug holiday (if carried out), preventive therapy before and after dental extraction and type of extraction. Data were confirmed during the periodical follow up, where mucosal healing of oral surgical site was evaluated.

Results: Primary pathologies that justify assumption of drugs at risk MRONJ were osteoporosis (25), several types of carcinoma (4) and Paget's disease (1). Drugs at risk MRONJ more commonly administered were Clodronate (i.m.; 26.67%) and Risedronate (OS; 20%) and, before oral surgery, only 8 patients had not followed a drug holiday protocol. Antibiotic and antiseptic therapy proved to be variable and the combination most frequently used was amoxicillin/clavulanic acid with a mouthwash rinses based on chlorhexidine 0,2%. Type of oral surgery was analysed, resulting in a total of 126 dental extraction sites (15 single extraction and 29 multiple extraction); L-PRF was used in 4 cases. Complete mucosal healing was found in 100% of sites after 8 weeks and in 99,2% after 1 year (osteonecrosis-stage II in one case).

Conclusion: Based on our clinical data the risk of MRONJ can be prevented or at least reduced relying on appropriate antibiotic and antiseptic prophylaxis and on a surgical approach as conservative as possible (eg. root separation in multi-rooted teeth, removal

of protruding bone margins, suture without tension). Indeed, 1 year after dental extraction complete mucosal healing was found in 99,2% of cases. Drug at risk MRONJ and its duration, type of antibiotics taken, use of L-PRF and drug holiday do not seem to influence the results. Nevertheless, because of reducted sample, further studies will be needed in order to establish the most effective antibiotic and antiseptic therapy and the best surgery approach for the prevention of MRONJ in patients at risk who underwent oral surgery.

Treatment and prevention of tooth sensitivity following third molar extraction. A biomimetic approach

Maria Giulia Pulcini, Manuel Gone Benites, Alberto Scagnelli, Andrea Bevilacqua, Arturo Dian, Matteo Basso

Università degli Studi di Milano, IRCCS Istituto Ortopedico Galeazzi, Clinica Odontoiatrica, Centro di Riabilitazione Orale Mininvasiva, Estetica e Digitale (CROMED, Milano. Italy

Aim: Impacted third molars represent in many case a risk factor for dental caries and periodontal problems for adjacent teeth. The difficulties in performing oral hygiene, pain, inflammation and/or trapping of food often lead clinicians to extraction through a surgical procedure. However, removal of an impacted wisdom tooth often leaves exposed distal surface of adjacent second molars, with consequent increase of tooth sensitivity for a medium-long period of periodontal healing. The aim of this retrospective study is to evaluate benefits of a desensitizing therapy immediately prescribed after extraction.
Methods: Patients who underwent to extraction of a lower third molar from September 2017 has been considered as eligible for the study. All surgeries have been performed by the same surgeon in 3 different clinics. As inclusion criteria, the preoperatory X-Ray had to reveal an impaction with the distal root surface of adjacent second molar, signs of bone resorption in between two elements, and the surgical procedure had to be performed through flap elevation, followed by suture. Moreover, dental sensitivity under cold stimulus with syringe of dental chair should have been evaluated and recorded at (a) 7 ± 2 days during suture removal and at (b) 30 ± 5 days, through a Visual Analogue Scale (VAS) from 0 (no pain) to 10 (extreme pain), normally used by the involved surgeon as a quality indicator after complex extractive surgeries. A total of 27 extraction of impacted third molars were selected for the final analysis. Among them, 12 (Control Group) received Chlorhexidine 0,20% twice daily for 10 days, and 15 (Test Group) received the same antiseptic therapy plus a biomimetic desensitizing protocol, to be used twice daily after surgery, involving a toothpaste containing Mg-Sr-CO3 hydroxyapatite with strontium (Biosmalto Denti Sensibili dentifricio, Curasept S.p.A., Saronno, Italy) and a topical mousse with Citrate-ACP-F (Amorphous Calcium Phosphate with Fluoride, Biosmalto Mousse Denti Sensibili, Curasept S.p.A., Saronno, Italy). Data collected have been analyzed by Student's T.Test.
Results: In the group treated with the desensitizing therapy, values of VAS were 5,7 at 7 days and 2,3 at 30 days, while in the group treated only with antiseptic therapy values were respectively 6,8 and 3,75. Differences were statistically significative both at 7 days (p=0,04) and 30 days (p=0,035). In the Control Group, 5 over 12 (42%) referred extreme sensitivity during eating (especially cold liquids) in the first week, while only 3 over 15 (20%) in the Test Group reported the same limitation.
Conclusions: Tooth sensitivity on the second molar after the extraction of impacted third molars is a common side effect that could heavily affect comfort during postoperative period, maneuvers of oral hygiene and eating ability. Referring to literature, its normalization can require even more than 12 months, when a satisfactory periodontal healing with bone repair and gingival regrowth is more or less stable. Desensitizing therapies are not fundamental for the healing processes, but they are prescribed to increase patient's comfort and reduce limitations in eating and drinking, especially only after sensitive problems reported by the patient in the healing period. A preventive approach with desensitizing actives proven to have even a biomimetic behavior, if immediately prescribed after surgical procedure, can represent a smart and valid support in the postoperative period, being able to reduce perceived pain better that native repairing processes mediated by patients' biology.

Carcinomas of tongue in Eastern Sicily: epidemiological research

Simone Scapellato

University of Catania, Italy

Aim: The aim of the work was to do an epidemiological research about carcinomas of tongue in Eastern Sicily. For this target all cases of carcinomas of tongue were extracted from the Integrated Tumors Registry (R.T.I.) of Eastern Sicily (covered provinces Catania - Messina - Siracusa -Enna), in the period 2003-2013. These tumors were divided to specific tongue areas: Posterior 1/3 of tongue (C01) and Anterior 2/3 of tongue (C02). Parameters like sex, age, diagnosis,

annual distribution, grading and morphology were analized. Besides the cancer incidence rates were studied to make regional (Sicily), national (Italy) and European matching.
Methods: The observed period of time extends from 2003 to 2013. Four hundred seventy cases of tongue carcinomas were analyzed. The cancer age-standardized incidence rates (European standard) obtained, were compared with regional (Atlante Sanitario della Sicilia 2016), national (Database of the Italian Association of Cancer Registries AIRTUM) and European (International Agency for Research on Cancer IARC) data.
Results: Results show that in Eastern Sicily, on a total of 853 oral cavity carcinomas, 470 cases belong to the tongue (56%). Examining tongue carcinomas cases, 294 are males (63%) and 176 are females (37%). The annual distribution changes from a minimum of 34 cases (2010) and a maximum of 55 cases (2004), and is uniform over the years studied (2003-2013). The most affected decades are 60s in males with 80 cases (27,2%) and 70s in females with 49 cases (27,8%). As for histologic grading and differentiation, 110 cases are not determined, 190 moderately differentiated, 83 well differentiated, 85 poorly differentiated and 2 undifferentiated. The most prevalent morphologies are: squamous cell carcinoma (72,77%), squamous cell carcinoma keratinizing (13,4%) and squamous cell carcinoma with horn formation (5,74%). On 470 cases, the most affected site is Anterior 2/3 of tongue (C02) with 399 cases (84,9%) while Posterior 1/3 of tongue (C01) only 71 cases (15,1%). Carcinomas of tongue represent 0,32% of all malignant tumors in the R.T.I. The cancer age-standardized incidence rates obtained from R.T.I. (2003-2013) is 2,2 per 100.000 person-year (male) and 1 per 100.000 person-year (female). The cancer age-standardized incidence rates obtained from regional registries (Atlante Sanitario della Sicilia 2016 - database from 2003 to 2011) is 2 per 100.000 person-year (male) and 1 per 100.000 person-year (female). National Italian data, obtained from Database of the Italian Association of Cancer Registries AIRTUM (2006-2009), show (on 38 registries) an incidence of 2,7 per 100.000 person-year (male) and 1,1 per 100.000 person-year (female). European data show that Eastern Sicily, if compared with other nations, occupies the lower positions in the male country ranking, like Sweden but occupies the middle position for females, like France.
Conclusion: Our data demonstrate, according to what has been reported in literature, that tongue carcinomas are more than oral cavity ones. Males are most affected than females at a younger age. Squamous cell carcinoma is the most represented morphology. In conclusion the cancer age-standardized incidence rates of Eastern Sicily are below national and European values, both for males and females.

Bioceramic bone substitutes in preclinical in vivo research: a systematic review

Lucia Schiavon[1], Giulia Brunello[1,2], Hamada Elsayed[3,4], Edoardo Stellini[1], Stefano Sivolella[1], Lisa Biasetto[2]

[1]Department of Neurosciences, Section of Dentistry, University of Padova, Padova, Italy
[2]Department of Management and Engineering, University of Padova, Vicenza, Italy
[3]University of Padova, Department of Industrial Engineering, Padova, Italy
[4]Ceramics Department, National Research Centre, Cairo, Egypt

Aim: The aim of this systematic review was to investigate whether bioceramic scaffolds enhance bone formation in experimental bone defects in animal models, when compared with no treatment group.
Methods: The MEDLINE (PubMed) online library was searched for animal studies involving the use of bioceramic scaffolds for bone regeneration. Detailed search strategies were developed using a combination of the following keywords: "bone", "scaffolds", "bioceramic", "bone grafting", "bone regeneration", "bone defect", "animal", "in vivo". Search was limited to studies published in English language between January 2013 and November 2018. Only works comparing the healing of bone defects grafted with bioceramic scaffolds to control sites left empty were considered. Studies with less than 6 animals per study or investigating drug/growth factor release or in which scaffolds had been loaded with stem cells were excluded.
Results: A total of 91 articles were found. 27 were included as relevant for the purpose of this review following the initial screening of titles and abstracts. Of these 27, full texts were obtained. After the screening of full texts, 9 articles completely fulfilled the inclusion criteria. The rabbit was the most adopted animal model. The calvarial and the tibial models were the most used, and the most tested bioceramic materials were based on tricalcium phosphate (TCP), dicalcium phosphate (DCP) or calcium silicophosphate (CaSi). the most frequent time point was the animal's sacrifice at 8 weeks post-implantation. At this time point histological analysis showed an average value of 12% of new bone formation in empty defects, and a range between 13,73% and 72% of new bone formation in the bioceramic scaffold-filled defects, with high variability between scaffolds' composition and manufacturing (41,48% in DCP+chitosan/gelatin/platelet gel; 13,73% TCP+chitosan/gelatin/platelet gel; 22,6% CaSi double-layer printing). Some articles evaluated the new bone formation with micro-CT analysis, and uniformly reported a significantly higher bone regeneration percentage in the bone defects

filled with bioceramic scaffolds, in comparison with the non-treated defects. Biodegradability of scaffolds was also investigated and seemed to directly increase with the porosity of the scaffold.
Conclusion: The current review aimed to assess whether the use of bioceramics enhances bone regeneration. The bioceramic materials tested in the selected studies seemed able to stimulate osteoconduction and bone repair, and to induce the formation, maturation and remodeling of new bone. Available studies seemed also to suggest that higher and faster bone regeneration can be achieved using bioceramic scaffolds to fill the bone defects, indicating that bioceramic materials can be promising materials for bone regeneration.

Rehabilitation with mini invasive techniques of edetulous mandibular lateral rear sector: case report

A. Merlone, F. Cattoni, L. Scudieri, L. Redi, R. Uccioli, M. Manacorda, R. Vinci

Aim: The aim of this study was to investigate the use of angled dental implants (tilted), usually associated to complete rehabilitations with All on 4 technique, or partial edentulism as an alternative technique able to manage anatomical limits with considerable advantages in reducing invasiveness and patient's treatment timing.
Methods: A 67-year-old patient comes to our attention at the Dentistry Department of the San Raffaele Hospital in Milan. Medical anamnesis does not reveal any previous condition that may compromise the outcome of the therapy (the patient was classified as ASA I).The dental anamnesis includes: a total upper prothesis and an inferior prosthetic rehabilitation supported by implants and natural teeth, with an edentulous saddle between the elements 4.5 and 4.8. The objective examination shows the presence of an implant-prosthetic rehabilitation between the third and fourth quadrant of the lower maxilla: a dental bridge of 11 elements on 5 implants on the sites 3.7-3.5-3.3-3.1-4.2 and on 2 natural elements (4.3 - 4.4) with previous endodontic treatments and a cantilever on site 4.5. Considering the edentulous area between sites 4.5-4.7, the proposed treatment was to insert two implants, one axial in 4.3 and one tilted in 4.5, with an angle of 45° and MUA of 30°, which allowed us to obtain a correct masticatory function with minimum cantilever on 4.6. The case has been followed at the Department of Dentistry of San Raffaele Hospital (Milan) and it was documented with digital photos taken before, during and after the treatment. The diagnosis has been clinically and radiographically done through a Cone beam Computer Tomography (CBCT) before the surgery. The patient was previously informed of the aim of the study and expressed her written consent to the procedure.
Results: After one year follow up, the prothetic device appears to be well tolerated by the patient and there are no biological or mechanical complications; no signs of peri-implant pathology and re-absorption of the residual marginal ridge have been reported.
Conclusion: The adoption of this alternative "simplified " technique implies several clinical advantages: 1) Position of a longer implant with a bone-to-implant contact increase and more stability 2)Increased distance with the front implant and more distribution of masticatory loads 3)Significant reduction of the distal cantilever in the prosthetic design 4)Reduction a clinical invasiveness and the consequence of post operative problems.

Removal of an odontoma associated with a mandibular ectopic canine with the bone lid technique using piezosurgery: a clinical case

Manuel Sibillin[1], Giulia Brunello[1,2], Andrea Cattozzo[1], Alessandro Quercia[3], Stefano Sivolella[1]

[1]University of Padova, Department of Neurosciences, Section of Dentistry, Padova, Italy
[2]University of Padova, Department of Management and Engineering, Vicenza, Italy
3 ULSS 2- Marca Trevigiana – Regione Veneto

Aim: The aim of this case is the presentation of the surgical management of a compound odontoma associated with an ectopic mandibular right canine, conservatively treated with the bone lid technique using piezosurgery.
Methods: A healthy 24-year-old female patient was referred to our department by her dentist for the evaluation of a radiopaque lesion in the anterior mandible associated with the impaction of the ectopic permanent lower right canine and the retention of tooth 83. The patient underwent a cone-beam computed tomography (CBCT), showing a multiple small tooth-like radiopaque structures contained in a narrow radiolucent cavity in association with an ectopic, deeply horizontally impacted tooth 43. The treatment comprised the extraction of the retained primary canine, followed by the extraction of tooth 43 and the complete surgical enucleation of the lesion. The procedure was performed under conscious sedation and local anaesthesia. A full-thickness mucoperiosteal flap was reflected buccally to visualize the area. The deciduous tooth 83 was removed. Conventional ostectomy was performed to expose tooth 43, which was extracted in two pieces after crown sectioning. A bone window was fashioned using a piezoelectric device with appropriate

osteotomy insert (Piezosurgery, insert OT12; Mectron Medical Technology, Carasco, Italy). After its removal, the lid was placed in sterile saline solution. Once exposed, the lesion was enucleated taking care to remove all the denticles embedded in the bone using piezosurgery. At the end of the procedure the bone lid was repositioned and fixed with a single 13-mm bicortical screw and the flap was sutured back without tension.
Results: Any surgical complication occurred. The healing was uneventful. Clinical and radiographic short-term healing demonstrated the validity of the adopted conservative surgical approach. No sign of recurrence was assessed at 6-month follow-up.
Conclusion: The bone lid technique associated with the piezoelectric surgery appears to be an effective technique for the treatment of pathologies of the alveolar processes. It allows the preservation of the alveolar bone minimizing or eliminating the need for subsequent regenerative procedures aiming at implant-prosthetic rehabilitation.

Dental traction in cleft patient with a mini screw as a Temporary Anchorage Device

F. Z. Strangio, C. Maietta, R.Rullo

Multidisciplinary Departmement of Medical-Surgical and Dental Specialities, University of Campania "Luigi Vanvitelli" Naples, Italy

Aim: Anchorage plays a significant role in the success of orthodontic treatment. Temporary anchorage devices are increasingly used in orthodontics for the undoubted advantages they give. Orofacial cleft is a congenital malformation characterized by an incomplete formation of those structures which separate nasal from oral cavities; many dental and maxillary abnormalities are verifiable in this kind of malformation that make it even less stable to use dental anchorage in orthodontic therapy. In this article we present a case report of a dental traction in a cleft patient with a mini screw as a temporary anchorage device showing its characteristics and advantages.
Methods: A young patient, with a complete bilateral cleft lip and palate, had lip and nasal repair done when he was 9 months , palatal closure at 18 months and hard palatal revision when he was 3 year-old. At the age of 9 , the patient starts orthodontic treatment. The canine is exposed by surgical open technique, is positioned the first miniscrews between 14 and 15. The miniscrew used is a self-drilling miniscrew of 1,5 in diameter and 6 mm in length that is inserted directly into the bone . At this point we applied the elastic ligature (that is connected at superior miniscrew between 14/15), passing through the attachment positioned on the canine head of the miniscrew, orientating it, according to pre-established traction, a distal traction, to bring the canine distally traversed to the incisive side, preventing bone loss in the cleft site. The distal traction is then activated by applying a force of 7 ounces. And it is re-activated at each clinical check up every two weeks for six months. After seven months from canine exposition, a miniscrew is inserted between 43 and 44 as anchorage for the next traction of the canine in vestibule occlusal direction.
Results: After the eruption and exposition of the canine, traction is applied directly on the crown of the canine by positioning a new button in the cusp and doing change daily elastics h6. After a new radiographic and clinical evaluation having red concludes that the objectives set for the traction of the canine are comforting, the canine was recovered, we will follow with the positioning of the traction for optimal alignment. The alveolar bone graft was used to provide bony continuity between cleft segments, to provide a bed of bone for tooth eruption and movement and provide nasal support. To prevent bony dehiscence the canine was slowly advanced for one year by alternating light orthodontic force. New bone was formed in the wake of tooth movement.
Conclusion: The choice in our clinical case, to recover the upper right canine, included and transposed, by using skeletal anchorage supplied by miniscrews in the place of a conventional orthodontic treatment, has allowed us to avoid repercussion on the teeth in the arch, in particular to the upper right molar that; to reduce the duration of the treatment from the moment that the traction force can be applied solely to the included tooth and to avoid ulterior stress to the skeletal basis already submitted to surgical procedures in the past for cleft correction, thus for the satisfactory results obtained, this clinical experience can become a protocol to be followed in the future for the recovery of teeth transposed and/or inclusion in the arch, allowing movement without damaging the roots of the lateral incisors, in patients with or without cleft.

The technique of marsupialization as a minimally invasive surgical approach

Mariasofia Tammaro

Aim: Marsupialization is a surgical procedure used mainly in the treatment of cystic lesions of the jaws. Historically introduced by Partsch in 1892, the intervention consists in the creation of a gold-cystic communication aimed at the abatement of the endocyst pressure, the drainage of the contents and the reduction of the volume of the lesion. Although it is an obsolete technique, marsupialization is a simple

execution surgical procedure that can still be useful in case of large cystic lesions in the maxillary bones. The advantages are represented by the technical simplicity of the technique, the reduced risk of iatrogenic bone fractures, neurovascular lesions and the elimination of the risk of loss of vitality of the dental elements in relation to the lesion.

Methods: The case report presents the clinical case of a 44-year-old patient who comes to our observation complaining of disorders related to the swelling localized to the right hemimandible. The intraoral examination shows the absence in the arcade of 4.8 with swelling accompanied by draining abscess. The dental elements 4.6 and 4.7 contiguous to the lesion are negative to the cold test. Orthopantomography highlights the presence of the included 4.8 and a large osteolytic lesion in intimate relationship with the included dental element and devitalized 4.6. The therapeutic treatment has favored the cyst resolution with marsupialization, avoiding the excision of the same, in order to prevent the risk of mandibular fracture both during surgery and postoperative, the involvement of the inferior alveolar nerve, of the lingual nerve and the possibility of compromising the dental elements contiguous to the lesion. The surgical technique of marsupialization is practiced, whose fundamental principle is to make the cyst communicate widely with the oral cavity. The extraction of the non-vital 4.7 is performed. We proceed with the preparation of a full thickness flap at the cystic lesion and where it is possible to control easily crown of the tooth to be extracted. After exposing the cyst, a portion of the wall is removed and the cavity is emptied from the cystic content. The cyst wall with the mucosal border is sutured in order to maintain communication with the oral cavity . For preserving the openness of the opening, it is used an iodoformic gauze holding it for a few weeks and periodically replaced. Cyst healing occurs spontaneously after several months.

Results: At 1 month follow-up visit there is clinically an excellent recovery of the area of the intervention, absence of symptoms, no hyposensitivity of the lingual nerve and inferior alveolar nerve. The OPT shows a residual bone cavity. In subsequent follow-up, the OPTs show the beginning of bone healing. 18 months after surgery, OPT shows excellent bone healing.

Conclusion: Marsupialization is the elective therapeutic choice in the presence of large cystic neoformations in the maxillary bones and allows complete restitutio ad integrum ossea. In the most complex cases it may be necessary to intervene later for the disinclusion of the retained tooth. In this case the result of this surgical technique is minimally invasive and is aimed to reducing the postoperative risk of mandibular fracture and to preserve noble anatomical structures that are in close relationship with the cystic lesion.

Nitric oxide-mediated cytotoxic effect induced by zoledronic acid treatment on human gingival fibroblasts

Giulia Tetè

Aim: The aim of our work was to evaluate the role of nitric oxide (NO) in the in vitro response of human gingival fibroblasts (HGFs) to 1, 5, 10, and 100 µM doses of zoledro- nic acid (ZA), a bisphosphonate largely used in the clinical practice and for which several adverse effects are reported.

Methods: Phase contrast microscopy and live/ dead staining were used to evaluate HGFs morphology; cell viability, collagen type I and interleukin 6 (IL-6) secretion were evaluated by 3-[4,5-dimethyl-thiazol-2-yl-]-2,5-diphenyl tetrazolium bromide (MTT) and enzyme-linked im- munosorbent assay (ELISA) assays. Reactive oxygen species (ROS) production and mitochondrial membrane potential were evaluated by flow cytometry; NO production and NOS activity by spectrophotometric analysis; endothelial NOS (eNOS) and neuronal NOS (nNOS) expression by immunofluorescence.

Results: Viable fibroblasts are evidenced in control sample while floating dead cells and cells close to detachment phase in ZA-treated sample, in agreement with decreased level of collagen type I. Control sample shows higher number of viable cells respect to ZA-treated one and ROS production increases when ZA is added. Released NO in ZA-treated sample appears higher and NO overproduction is related to increased nNOS activity. IL-6 secretion level is higher in ZA-treated sample than in control one.

Conclusion: Our results suggest ROS involvement in NO overproduction, due to nNOS recruitment, both at low and high doses. In turn, NO release seems to be able to trigger the inflammatory response only when high doses are adminis- tered, thus confirming the ZA cytotoxic effect on HGFs.Clinical relevance The knowledge of ZA-mediated cytotox- icity mechanisms on HGFs allows to better understand drug pharmacological activity.

HEMANGIOMA OF THE UPPER LIP: A CASE REPORT

M. Todaro, G. Bellantoni, C. Ruscica, C. Moreschi, S. Abati, R. Vinci

Department of Dentistry, IRCCS San Raffaele Hospital, Milan, Italy; Dental School, Vita-Salute University, Milan, Italy

Aim: Hemangioma is considered an abnormal proliferation of blood vessels that may occur in every vascularized tissue, which develops after abnormal proliferation of endothelial cells of blood vessels. It commonly affects head and neck and the oral cavity is the most frequent site. Hemangiomas are three time

more common in females than in males. Historically, hemangiomas have been classified in different ways. An important descriptive classification is related to the depth of soft tissue involvement: Superficial, Deep and Mixed. Clinically hemangioma shows as smooth or lobulated soft tissue mass, measuring from few millimeters, hardly noticeable, to several centimeters causing physical abnormalities and functional disturbance. This study shows a case report of a hemangioma located in the upper lip, clinically, instrumentally and histopathologically diagnosed and surgically treated.

Methods: A 69-year-old woman patient referred to the Dental Clinic of the University Hospital San Raffaele, Milan, Italy, reporting a chief complaint of swelling of upper left lip and difficulty in pronunciation. She didn't complain about pain. Swelling started in 2004, after the patient was subjected to quadrantectomy and several cycles of chemotherapy and radiotherapy for a breast cancer, and progressively increased in size. At conventional intraoral examination revealed a solitary intramucosal mobile neoformation, measuring about 3 cm, in the upper left lip, of a bluish-violet color and stretched-elastic consistency, causing mild tenderness to palpation. Local anesthesia was performed (Lidocaine 20 mg/mL with epinephrine 1:100.000). The anesthetic was not infiltrated directly into the lesion to avoid compromising the biopsy. Lip was everted with digital pressure to increase the lesion's prominence. Later, a surgical semi-lunar incision was performed on the lesion site, according to its borders. Hanging out the neoformation, we proceed sundering the marginal tissue from the surrounding healthy tissue. Hudson pincers were used to improve visibility and to facilitate the surgical access; moreover, shear-bladed scissors were used to completely separate the lesion from the surrounding tissue. Since the lesion was in close relationship with the orbicular artery, the vase was clamped to avoid its injury. The neoformation was completely isolated and enucleated from the site of interest. Then, the cavity was cleaned with physiological solution. Flaps were sutured with a 4/0 non resorbable silk suture. Post-surgical therapy (anti-inflammatory and analgesic) was prescribed. Patient was recommended to use ice and to compress the surgery site to reduce tumefaction and post-operative pain. The enucleated lesion was placed in a formalin-based solution and sent to the pathological anatomy laboratory to identify the histological nature. Patient was monitored every week for one month to check complete healing of the surgical site.

Results: The histological examination showed the histopathological pattern of deep hemangioma. At the 3 months' follow-up visit no recurrence of the lesion was observed in the patient.

Conclusion: The identification of hemangioma is not easy because these lesions clinically resemble other entities such as other vascular malformations (lymphangioma and varices), benign salivary gland tumor, leiomyoma, and oral carcinoma in its clinical varieties. Moreover, large persisting hemangiomas may cause physical disfigurement, functional disturbance for which the treatment becomes mandatory. The certain diagnosis can be obtained only by the histological examination, that allows the differential diagnosis with other lesions. Treatment is based on several factors such as size, position, accessibility, invasion depth, patient age and aesthetic aspects. Cryotherapy, administration of systemic corticosteroids, laser therapy, watch-and-wait, isolated embolization are some of the treatment modalities adopted for hemangioma.

Osseus choristoma vs ectopic calcifications: clinical cases compared

L. Laino[1], R. Vallebona[1], A. Donzelli[1], M.G.P. Di Mare[1], S. Melito[1], M. D'agostino[1], P. Sammartino[1], D. Menditti[1], L.Ramaglia[2]

[1]Multidisciplinary Department of Medical-Surgical and Dental Specialities, University of Campania "Luigi Vanvitelli", Naples, Italy
[2]University of Naples "Federico II," Department of Dental and Maxillofacial Sciences, Naples, Italy

Aim: The aim of this work is to compare different osseus lesions: osseus chorisoma and ectopic calcifications. Choristoma is defined as mature tissue or microscopically normal cells located in an abnormal anatomical site. One type is osseus choristoma that shows up as a mass of osseus mature tissue covered by normal epithelium of the tongue. The most common sites are: the third posterior of tongue, more commonly around the circumvallate papillae, and sometimes on lateral surface or on third middle of tongue. It varies in size from 3 mm to 5 cm and it appears like a hard mass that can be sessile or pedunculated. Lesion can be asymptomatic, but often, patients have gagging, choking, nausea or dysphagia. Histologically it appears as a benign mass of normally matured bone tissue with Haversian canals covered by orthokeratinised squamous epithelium of the tongue, but real osteoblastic and osteoclastic activity is absent. Surgery excision is the more common treatment in osseus choristomas. Moreover, it is possible to find other anomalous calcifications in locations not provided for these pathologies. These lesions there may be, more or less, regular calcifications in the distal site at the lower third molar or in the site of a previous trauma. Cases of anomalous calcification were selected: one in a 22 years old female on the dorsal surface of the tongue, another in the distal third molar after an odontectomy in a man aged 26 and a third in a 40-year-old male in the cutaneous region of chin where a trauma occurred six months earlier.

Methods: The treatment chosen was in all the cases an excisional biopsy that was performed. The tissue was immediately inserted into 10% formalin for fixation. The intraoral way was chosen to remove the pathology in the lingual and the retro-molar region, while the cutaneous pathway was used for the cutaneous lesion.
Results: The histological result was osseus choristoma for one case and of anomalous calcification for the others. Several theories have tried to explain the pathogenesis of choristoma. In general, these theories can be: one suggests that this is a type of malformation, the other is the post-traumatic theory. For the first one it was suggested that pluripotential cells, from first and third arches, give origin to the osseous choristoma. The other theory says that the posterior third of the tongue is very susceptible to trauma and irritation, and an osseous lesion on the tongue may be a consequence of a post-traumatic center of ossification. For calcification in anomalous sites the theory seems valid for tissues traumatized whose cells of chronic inflammation release osteoinductor factors that give metaplastic transformation of fibroblasts into osteoclats and excess of calcium salts that may contribute to dystrophic calcification and maturation of granulation tissue into bone.
Conclusion: Lingual osseus choristoma and anomalous calcifications are rare lesions and their etiopathogenesis is still uncertain. Although these lesions are clinically benign conditions, the outcome of aberrant formation of calcified tissue close to vital structures such as nerves and blood vessels may be of clinical significance.

Oral bisphosphonates and socket preservation: a clinical and histological study

Lorenzo Vittorini Orgeas[1], Francesco Bataccia[1], Antonello Falco[2], Roberta Di Pietro[3], Giorgio Perfetti[1]

[1]Department of Medical, Oral and Biotechnological Sciences, G. d'Annunzio, University of Chieti-Pescara, Italy
[2]Private Practicioner (Italy)
[3]MD, Prof. Department of Medicine and Ageing Sciences, G. d'Annunzio University of Chieti-Pescara, Italy.

Aim: The aim of the present study is to assess the clinical and histological healing of a post extractive alveolus following the procedure for socket preservation in a patient receiving oral bisphosphonates.
Methods: A case report of a 52-year-old patient with a history of more than 6 years of oral nitrogen bisphosphonates is shown. The patient needing tooth extractions and subsequent dental implants insertion, came to our observation. The patient referred no history of cancer or radiotherapy and no co-medications. She suspended the bisphosphonates therapy 3 months before the tooth extractions. The patient was informed about the procedure and the related risks. After the upper left molar (2.6) extraction, Enzymatic deantigenated horse bone granules and an equine pericardium membrane were used to preserve the tooth socket. Because of possible complications after surgery, the patient was placed on a monthly follow-up in order to monitor the healing process. After 5 months, Cone Beam Computed Tomography (CBCT) showed a complete healing of the previous alveolus and no sign of osteonecrosis. A 3mm trephine bur was used to drill the bone for implant site preparation and to collect the bone sample. Histological and histomorphometric analyses were performed on the sample.
Results: During the monthly follow-up, no signs and symptoms related to osteonecrosis of the jaws were reported. There was a physiological healing of the site although the previous history of oral bisphosphonates. Histological data showed that there was a significant proportion of bone compared to few granules of material that did not reabsorbed after 5 months. The mean percentage of trabecular bone, bone marrow and residual bone graft were respectively 45.74±0.09%, 48.09±0.08% and 6.16±0.01%. The bone tissue from all the specimen showed features of mature lamellar bone which was almost completely mineralized but also woven bone was found. The residual graft material appeared osteointegrated and none of the particles appeared encapsulated. Few osteoclasts were found in lacunae closed to the woven bone and/or the graft particles. These data demonstrated that, despite the previous use of bisphosphonates for several years, it was possible to successfully achieve the preservation of the post-extraction alveolus.
Conclusion: The present case report supports the guidelines that assume that patients undergoing oral bisphosphonate therapy can be candidate for eligible surgical therapy. Pre-operative careful anamnesis and the following of international guidelines for treating patients taking bisphosphonates are mandatory. More clinical studies with larger sample size are needed to support this clinical evidence.

Dental implants placed in severe atrophic jaws reconstructed with fresh bone block. a 10 years follow up

S. Tognacci, P. Bellini, U. Consolo

Università degli Studi di Modena e Reggio Emilia - Dipartimento Chirurgico, Medico, Odontoiatrico e di Scienze Morfologiche con interesse Trapiantologico, Oncologico e di Medicina Rigenerativa

Aim: Fresh frozen bone allografts (FFB) is available version of homologous bone and have become a valid alternative for bone augmentation in the past decades. The purpose of this case-report is to show the clinical

and radiographic findings of a man affected by severe atrophy in both the mandibular quadrants, that has been managed by recostruction with FBB after 10 years.
Methods: A 51-years-old patient in good general health, with a partial mandibular edentulism, and presenting a severe athrophic maxilla has been subjected, under general anesthesia, to ridge reconstruction with appositional homologous fresh frozen bone (FFB) block grafts pre-contoured onto a stereolithographic model. This patient was a case of clinical control randomized trial (Lumetti et. al. "Correlation between Density and Resorption of Fresh-Frozen and Autogenous Bone Grafts"). FFB blocks derives from the tibial hemiplateau were provided by the Banca del Tessuto Muscoloscheletrico (IOR, Bologna, Italy). After 9 months from the regenerative surgery, a total number of 7 dental implants (BIOMET 3i, Zimmer Biomet) were placed in position 4.4, 4.5, 4.6,4.7, 3.5, 3.6 and 3.7 and then a prosthetic rehabilitation was performed by means of screwed crowns. The patient was followed over the years with regular professional oral hygiene maintenance. Radiographic controls were performed with endoral X-ray every 2 years and with cone beam CT after 18 months from implant placement, as the RCT protocol required .
Result: Comparing the pre-surgical, pre-implant and control cone beam CT, the homologous bone graft is still in place and it doesn't show significant tridimensional variations in 18 months. No other severe complications occured, such as dental implant failure. Examinig endoral X-ray achieved across 10 years, in the right side, the bone around the implants remained stable across the years, while, on the left side, the implant in position 3.6 lost 2,5 mm of peri-implant bone. Indeed this implant uncovered the first thread. Clinically, there were no sign of inflammation. The connective tissue is thick on the right side, while it is lacking on the other side, especially on the implant in place 3.6.
Conclusion: The use of homologous FFB grafts present some advantages compared to other biomaterials such as osteoconductive properties, reduction of postoperative discomfort, graft availability and reduction of operating time. In the reported case the FBB was a successful graft material in the treatment of a severe atrophy in the mandibular region and allowed the patient to obtain a fixed rehabilitation with also an improvement in lifestyle.

Trans-nasal endoscopic marsupialization of a voluminous radicular cyst involving maxillary sinus and nasal cavity: a case report and a literature review on this surgical approach

Tognacci S., Lizio G., Bellini P., Consolo U.

Università degli Studi di Modena e Reggio Emilia - Dipartimento Chirurgico, Medico, Odontoiatrico e di Scienze Morfologiche con interesse Trapiantologico, Oncologico e di Medicina Rigenerativa

Aim: The treatment of a huge cystic lesion in the upper jaw involving the respiratory cavities may result challenging. A traditional oral approach entails patient discomfort and may have negative aesthetic implications. This treatment, particularly in case of enucleation not preceded by marsupialization for volumetric reduction of the lesion, may cause irreversible damage to important anatomical structures and the collapse of the bone architecture. The purpose of this case report is to show the benefits of an endoscopic trans-nasal approach for the definitive treatment of such a clinical situation.
Methods: A 23-year old woman was referred to our operative division by her dentist for a supposed inflammatory process involving the left infra-orbital region and left nasal alar region associated with swelling and facial deformity. The panoramic radiograph showed an indefinite radiolucent area periapical to the upper left incisors and the canine superimposing distally to the image of the left maxillary sinus. The computed tomographic scan, requested thereafter, showed a voluminous radio-opaque area occupying almost entirely the left maxillary sinus cavity. A presumed diagnosis of an odontogenic cyst (radicular cyst, keratocyst) or neoplasm was formulated and a mini-invasive endoscopic nasal approach in general anaesthesia was chosen. The surgical technique aimed to remove part of the cystic wall and to open the inner compartment of the lesion to the nasal cavity after the resection of the anterior edge of the inferior turbinate and the lateral wall of the inferior nasal meatus. The histologic diagnosis was radicular cysts.The patient was discharged the day after surgery and the clinical course was completely uneventful. The patient was followed for transnasal cyst medications every 2 day for the first 10 days, then once a week for 2 months and then monthly for 30 months.
Result: After a follow-up period of 32 months, without any problem or discomfort for the patient, the cyst appeared radiologically healed without the loss of any lesion-associated tooth. The bone nasal cavity, the maxillary sinus and the anterior alveolar process architecture, noticeably modified by the expansive enlargement of the cyst, resulted totally restored with a complete recover of the respiratory and oral functions. Moreover there was an aesthetic improvement with with a restore of facial cutaneous symmetry. .
Conclusion: Marsupialization of an odontogenic radicular cyst involving the nasal and the sinus cavities with an endoscopic nasal-assisted surgical approach is a valid diagnostic and therapeutic alternative to a trans-oral surgical access, considering that it entails minimal operative timing, no post-operative discomfort and it can be considered definitive without risk of recurrence.

Conservative

Fracture resistance and failure mode of endodontically treated premolars restored with different post systems

Irene Balla[1], Luca Bartoletti[1], Allegra Comba[1], Tatjana Maravic[1], Vittorio Checchi[1], Nicola Scotti[2], Andrea Baldi[1], Annalisa Mazzoni[1], Lorenzo Breschi[1]

[1]University of Bologna, Italy
[2]University of Turin, Italy

Aim: Fiber posts are widely employed to restore endodontically treated teeth with limited dental sound remaining structure. The aim of this in vitro study was to test the static fracture resistance and failure mode of endodontically treated premolars restored with different post systems.
Methods: 15 mono-radicular premolars with one canal, extracted for periodontal or orthodontic reasons, were endodontically treated and randomly divided in 3 groups according to the restorative procedures performed: G1) teeth restored with direct composite restoration (Synergy D6, Coltene); G2) teeth restored with a traditional post (ParaPost Taper Lux, Coltene), composite build up and a CAD/CAM composite crown (BRILLIANT Crios, Coltene) ; G3) teeth restored with novel post (Rebilda PostGT, Voco), composite build up and a CAD/CAM composite crown (BRILLIANT Crios, Coltene) designed with Cerec system. In order to avoid morphology influence on the results, specimens were digitally scanned after preparation and restorations were produced with the same coronal shape. Cemented restorations were aged for 30 days in artificial saliva at 37° then submitted to the static fracture resistance test with a universal loading machine (Instron). A compressive force, with maximum strength of 2000 N, was applied at 30 degrees to the long axis of the teeth until fracture, using a 6mm diameter sphere with 1mm/min of speed starting from 0 N until fracture occurred. Fracture loads were collected and then statistical analysis was conducted using one-way analysis of variance (ANOVA) with the significance level set at p=0.05 followed by post-hoc comparisons (Bonferroni). Different fracture mode were evaluated by three different blinded operators and were classified as restorable/unrestorable depending on the fracture level in relation to the CEJ.
Results: No significant differences in fracture resistance were detected among the three groups. The samples restored with Rebilda PostGT showed the highest percentage of restorable fractures compared to the other groups (80%).
Conclusion: Based on the obtained results, the use of an endodontic fiber post did not improve the fracture resistance of endodontically treated monoradicular premolars. However, the presence of the post is able to increase the number of restorable fractures. Rebilda PostGT presented a favorable fracture mode. Further studies are needed to clarify the clinical behavior of the novel Rebilda PostGT.

Fracture resistance of endodontically treated premolars restored with different direct and indirect protocols

Luca Bartoletti, Tatjana Maravic, Irene Balla, Allegra Comba, Edoardo Mancuso, Lorenzo Breschi, Annalisa Mazzoni

DIBINEM, Alma Mater Studiorum Università di Bologna

Aim: The aim of this in vitro study was to test the fracture resistance and failure mode of endodontically treated teeth restored with different direct and indirect clinical approaches. Composite endocrowns were tested and compared to conventional full crown with

fiber post and direct composite restorations in terms of ability to resist to static load and "restorable"or"not restorable"pattern of fracture.
Methods: 15 monoradicular premolars with one canal, extracted for periodontal or orthodontic reasons, were endodontically treated and randomly divided in 3 group (N=5 teeth per group) according to the restoration protocol: (G1) teeth restored with a CAD/CAM composite endocrown (Brilliant Crios, Coltene); (G2) teeth restored with fiber post (ParaPost, Coltene), composite build up and composite CAD/CAM full crown (Brilliant Crios); (G3) teeth restored with direct composite restoration (Synergy D6). In order to avoid morphology influence on the results, specimens were digitally scanned after preparation and restorations were produced with the same coronal shape. Restorations were aged for 30 days in artificial saliva at 37°C then submitted to the static fracture resistance test with a universal loading machine (Instron). A compressive force, with maximum strength of 2000 N, was applied at 30 degrees to the long axis of the teeth until fracture, using a 6 mm diameter sphere with 1mm/min of speed starting from 0 N until fracture occurred. Fracture loads were collected and then statistical analysis was conducted using one-way analysis of variance (ANOVA) with the significance level set at p=0.05 followed by post-hoc comparisons (Bonferroni). Different modalities of fracture were evaluated by three different blinded operators and were classified as restorable/unrestorable depending on the fracture level in relation to the CEJ.
Results: Statistical analyses showed no significant differences in fracture resistance among the three groups. (p>0.05). However, fracture mode evaluation showed that endocrowns had the most unfavorable mode of fracture compared to the other tested groups. In fact, all the fractures in the teeth restored with endocrowns occurred below the CEJ and were considered not restorable.
Conclusion: Based on the results of the present study, all restorations tested showed comparable results but the endocrown group was the one that reached worst results in terms of quality of fracture pattern, with the highest number of non-restorable fractures. Further in vivo studies are currently ongoing to validate these findings.

Diastema reduction through direct technique

T. Zanetti[1], E. Bressan[1], M. Calabrese[1], G. Drago[1], E. Stellini[1]

[1]University of Padova, Dipartimento di Neuroscienze UOC di Clinica Odontostomatologica, Direttore Prof. E. Stellini, Padova, Italy

Aim: The diastema of the upper central incisors may represent a considerable aesthetic problem even though it is not pathological and only in very rare cases causes phonation problems. It may be due to occlusal factors, to the presence of hypertrophic labial frenulum, to iatrogenic factors, periodontal disease, spoiled habits or to dento-alveolar discrepancies.
There are many approaches to solving this problem: orthodontics help us in case a diastema is due to dental malposition, often in combination with oral surgery, periodontology, prosthesis or conservative. Traditionally, indirect restorations (veneers) offer advantages in terms of the mechanical quality of the materials used, aesthetics and durability, but modern composites allow us to create cost-effective, long-lasting and equally mimetic restorations, even if made with direct technique, with an absolutely quick and non-invasive approach. In the case under examination to correct the diastema it was decided to proceed with a direct conservative treatment, which will be followed in the future by orthodontic treatment. This aim is to show how the use of appropriate composite resins can be a valid therapeutic alternative in reducing / closing a diastema.
Methods: It comes to our attention a twenty-five year old male patient. Already subjected to previous orthodontic treatment, the lack of restraint has led to recurrence of the problem. Due to the patient's refusal to undergo a new orthodontic treatment or to use veneers, two direct restorations are proposed as a less invasive solution at a minimum biological cost. It is also possible to provide a more pleasant smile aesthetics by retouching the lateral and canine areas.
The therapeutic plan is organized in a session, preceded by a preoperative phase in which a plaster model of the upper and lower arches is developed with an alginate impression. On the model, the dental technician carries out a diagnostic wax-up following the patient's dictates. At this point, a silicone impression (putty) of the wax-up is taken, from which a mask is obtained that will serve as a mould for the reconstruction of the palatal walls and as a guide for the mesio-distal dimension of the central incisors. After isolating all the teeth with the rubber dam, the teeth are sandblasted. Afterwards, etching and the adhesive phase are carried out with the application of 37% orthophosphoric acid (Scotchbond Universal Etchant) and monophase adhesive (Scotchbond Universal Primer/Adhesive, 3M ESPE) respectively. Once the shade has been decided, the template is placed on the patient's teeth and the layering of the composite begins: the choice falls on an A2 and a WE on the incisal margin (Tokuyama Estelite Sigma Quick® composites). The restorations are then finished and polished with diamond burs and abrasive discs, which also allow the definition of the anatomical microtexture, and the occlusion is recorded.
Results: Conservative treatment has allowed to obtain an aesthetic improvement with a zero biological cost. The treatment has met the approval of the

patient allowing him a considerable economic savings associated with an excellent aesthetic result.
Conclusion: The salient feature of this type of approach for the closure of diastemas is non-invasiveness: it is interesting especially if you are dealing with young patients, for whom it is better to choose an alternative that is characterized by a low biological cost, as well as cheap.

Comparison of the microleakage in Class II bulk-fill restorations and different filling techniques: an *in vitro* study

M.S. Bua[1], G. Meazza[2], V. Lanteri[3], V. Marchio[4], M.R. Giuca[5], G. Derchi[6]

[1]Department of Biomedical, Surgical and Dental Sciences, University of Milan, Italy
[2] European University of Valencia, Spain
[3]DDS, M.Sc, PhD, Postdoc Researcher, University of Milan, Italy
[4]DDS, M.Sc Visiting Fellow, University of Pisa, Department of Surgical, Medical, Molecular Pathology and Critical Area, Pisa, Italy
[5]Professor, University of Pisa, Department of Surgical, Medical, Molecular Pathology and Critical Area, Pisa, Italy
[6]DDS, M.Sc, PhD. Researcher, University of Pisa, Department of Surgical, Medical, Molecular Pathology and Critical Area, Pisa, Italy

Aim: The aim of this study is to evaluate the microleakage at the interproximal horizontal margin in Class II restorations realized using four different types of composite resin: SDR® (Dentsply Sirona Rome Italy), Xtra-base® (VOCO GmbH, Cuxhaven, Germany), Ceram-X™ (Dentsply Sirona, Rome Italy), GrandioSo® (VOCO GmbH, Cuxhaven, Germany). Additionally, two of these (SDR® and Xtra-base®) were used following a bulk fill technique following the producer's instructions, while the other two (Ceram-X™ and GrandioSO®) were used following the traditional incremental technique.
Methods: A total of 20 freshly extracted human teeth, either molar or premolars, were selected. They were randomly divided in four groups, one for each material: for each tooth, two Class II cavities, one mesial and one distal, were realized in order to be reconstructed with the material assigned to each tooth. In total, each group had five teeth and 10 restorations made, for a total of 40 restorations. After restoration, the teeth were covered with nail polish except for a 2 mm-wide area which included the interproximal horizontal margin, and the apexes were sealed using Dyract®Seal sealer (Dentsply Sirona, Rome, Italy). The samples were then thermocycled at 55°C for 500 cycles and immersed in a solution of 0.2% Fuchsin dye for 24 hours. They were then sectioned mesiodistally and examined using an optical microscope (Leica DMS 1000) at a magnification of 20x: the microleakage was assessed by measuring the dye penetration through the floor of the restoration and scored using the Demarco scale [Demarco 2001]. A Kruskal-Wallis Test and six Mann-Whitney tests were then performed to investigate whether or not the difference between the result in the different groups was statistically significant.
Results: In this study, the best performance was observed in Group 2 (Xtra-base® VOCO; Bulk Fill technique) since no signs of microleakage were noticed. In Group 1 (SDR® Dentsply; Bulk Fill technique) the worst performance was observed: five samples showed no infiltration, while the other five showed a score of 2. In group 3 (Ceram-X™ Dentsply; Incremental technique.) six samples showed a score of 0, two samples a score of 1 and two samples a score of 2. In group 4 (GrandioSO®VOCO; Incremental technique) seven samples showed a score of 0, while one sample showed a score of 1 and two samples showed a score of 2. The Kruskal-Wallis test, however, did not reveal any statistically significant difference. Six different Mann-Whitney tests (one for each pair of groups, every combination possible) confirmed these results by not showing statistically significant differences between the different composites and techniques.
Conclusion: Within the natural limitations of an in-vitro study, there is no statistically significant difference in terms of microleakage scores, even after thermocycling between four different composite resins two of which used with a bulk fill technique and two with an incremental technique, as the manufacturer's instructions. These results encourage the design of clinical studies which could highlight differences between the performance of these composites through time.

Influence of an etchant containing CHX on bond strength

Vittorio Checchi[1], Tatjana Maravic[2], Allegra Comba[2], Luca Teuolde[2], Annalisa Mazzoni[2], Ugo Consolo[1], Lorenzo Breschi[2]

[1]Surgical, Medical and Dental Department of Morphological Sciences, University of Modena e Reggio Emilia
[2]Department of Restorative Dentistry, Department of Biomedical and Neuromotor Sciences, University of Bologna

Aim: CHX, a widely used antimicrobial agent in dentistry, is one of the most investigated MMP inhibitors, due to its ability to inhibit MMP-2, -8 and 9 in very low concentrations. Although it has been demonstrated that application of chlorhexidine (CHX) as a therapeutic primer is able to inhibit endogenous MMPs and therefore to preserve the hybrid layer over time, further steps in adhesive procedures are not favorable. Incorporation of active substances into adhesive system components have been proposed. CHX has been investigated in numerous in vitro and in vivo studies, used as either

as a separate primer in water solution, or incorporated in one of the components of etch-and-rinse (E & R) or self-etch (S E) adhesive systems, within the primer or the adhesive agent. The aim of this research is to investigate, by the means of microtensile bond strength test (μTBS) and nanoleakage, the influence on long-term bond strength of a 0.2 % CHX solution combined with a commercially available etchant (Cloetch, Sweden&Martina – 0.2% CHX).
Methods: Extracted sound molars (N = 8 teeth per group) were cut to expose middle or deep dentin layers. Using a 600 - grit silicon - carbide paper, smear layer was produced. Samples were assigned to different groups: G 1) 15" etching with Cloetch + AllBond Universal (Bisco); G 2) 15" etching with H3PO4 + AllBond Universal. After 24 h (T 0) and 12 months (T 12) storage in artificial saliva at 37° C, bonded specimens were cut and sent under μTBS in accordance with the non-trimming technique. Nanoleakage was performed (N = 3 per group) at T 0 and T 12, to examine with light microscopy silver-nitrate deposits within the hybrid layer.
Results: Variance analysis (ANOVA) showed that aging is able to significantly influence bond strength ($p < 0.05$). Presence of CHX within the etchant did not affect significantly the bond strength, immediately or over time. Nanoleakage expression was not significantly different between control and experimental group at T 0 or T 12, while nanoleakage increased during aging.
Conclusion: This study showed no influence on immediate bond strength or its stability over time of CHX when blended into the etchant.

Adhesive Class I restorations incorporating combined resin-composite and glass ionomer materials: CAD-FE modeling and analysis

G. Mosca[1], S. Ciaramella[2], A.Ianzotti[2], P. Ausiello[1].

[1]Università di Napoli Federico II- Dip. di Neuroscienze, Scienze Riproduttive ed Odontostomatologiche
[2]Dip Ingegneria Industriale

Aim: To investigate the influence of resin-based and glass ionomer cement (GIC) material combinations in a "multi-layer" technique, for class I cavity restorations, using numerical finite element analysis (FEA).
Methods: Three virtual restored tooth models, designated as A, B and C, with class I cavities, were created starting from a CAD model of a sound molar tooth: model A (adhesive + flowable + bulk fill), model B (adhesive + glass ionomer + bulk fill), model C (adhesive + bulk fill). The shapes of dentin, pulp and enamel of the sound tooth were built-up from a CT scan dataset(Bruker micro-CT, Kontich, Belgium)through image segmentation and using reverse engineering techniques. Starting from these CAD models (Rhinoceros Robert McNeel & Associates, USA)3D finite element (FE) models were created and analyzed, focusing on the load during the closing phase of the chewing cycle (HyperWorks, Altair Engineering Inc, USA).Solid food was modeled on the occlusal surface and slide-type contact elements were used between tooth surface and food. Polymerization shrinkage was simulated for the composite materials. Physiological masticatory loads were applied to these systems combined with shrinkage. Nodal displacements on the lower surfaces of FE models were constrained in all directions. Static linear analyses were carried out. The maximum normal stress criterion was adopted as a measure of potential damage.
Results: Direct resin-based composite materials applied via multilayer restoring techniques to class I cavities, with or without shrinking layers, produced different stress distributions. Models with restorative shrinking materials (A and C) showed greater stress concentration than B, where restoring via a shrinking upper layer and a non-shrinking lower layer were modelled. All models exhibited a high stress concentration principally located along the tooth tissues–restoration interface and in the restoration at the occlusal surface, near to the edge of the cavity. In general, A and C models showed a similar trend in stress along the cavity wall cavity and the highest stresses gradients in the restoration were located at the top corner of the enamel-dentin interface. Model B showed a similar trend in stress along the enamel-restoration interface and a very low stress gradient along the dentin-restoration interface and on the cavity floor. So, a reduced stress gradient in dentin and in the lower restoration layer were apparent.
Conclusion: The use of a 1 % linear shrinkage resin-composite material in bulk (E=12 GPa) employed in class I cavities created adverse stress distributions which occurred in deep dentin and at the enamel surfaces. Combining resin-composite bulk fill (E= 12 GPa) and a glass ionomer liner (E=8 GPa) may be helpful to dissipate part of the residual stresses during shrinkage and loading. This could represent a better option to replace lost dentin in class I restored teeth than flowable shrinkingcomposite (E=8 GPa). FE analysis advocated a constructive effect with a "multi-layer" restorative technique in class I cavities, limiting the stress peak in the in tooth tissues and reducing the risk of marginal gap by localizing the peak within the restorative stress absorbing materials.

Collagen cross-linker effect on the mechancial properties of the radicular hybrid layer in restorative dentistry: a nanoindentation study

Chiara Gisolo[1], Gianpaolo Serino[1], Cristina Bignardi[1],

Clelia Boccafoschi[1], Elio Berutti[2], Alberto Audenino[1], Nicola Scotti[2]

[1] Politecnico di Torino, Polito Biomed Lab Department of Mechanical and Aerospace engineering, Turin, Italy
[2]University of Turin, Department of Surgical Sciences, Dental School, Turin, Italy

Aim: This in vitro study had the aim to evaluate the effect of a collagen cross linker agent, 1-ethyl-3-(3-dimethylaminopropyl) carbodiimide hydrochloride (EDC), on the mechanical properties of the adhesive interface in endodontically treated teeth.
Methods: 20 extracted upper premolars teeth were selected. The inclusion criteria were: sound teeth extracted within one month, with nearly similar root size (length > 12 mm) and no cracks under trans-illumination and magnification. After 24 hours in water storage at 37°C, a post space was prepared in each sample, etched for 15 s, rinse for 30 s and dry. Samples were divided in 2 groups according to the dentin pretreatment procedure: no EDC application, and EDC application. In all samples, a universal adhesive system was employed in multiple application. Then, fiber posts were luted with a dual-curing luting cement and cured for 180 s. The coronal cavity was restored with a nanohybrid composite. After 24 hours, samples were embedded in resin and sectioned with diamond saw in 1 mm thick slices perpendicularly to the longitudinal axis, from the occlusal surface until the post end. Each slice was flattened with ascending sandpapers till 2400 grit. For each slice three typical zone were analyzed: the dentin, the radicular hybrid layer and the resin. Samples were tested with the Nanoindenter XP, equipped with a diamond Berkovich indenter and characterized by a theoretical force resolution of 50 nN and a theoretical displacement resolution lower than 0.01 nm. The input curve is characterized by loading and unloading phases imposing a strain rate value of 0.1 s-1. Before the onset of the unloading step the maximum load value was held for 30 s. Tests were performed in displacement control imposing a maximum value of indentation depth of 200 nm. The loading-displacement curves were analyzed by using the Oliver-Pharr method in order to obtain the nanoindentation modulus and the hardness. Obtained data were analyzed with Anova test ($p<0.05$).
Results: Nanoindentation modulus mean values of resin, with and without EDC, were respectively 9.993 GPa and 9.820 GPa; as regards the hardness, mean values were respectively 0.310 GPa and 0.275 GPa. Nanoindentation modulus mean values of the radicular hybrid layer were respectively 8.613 GPa and 9.885 GPa, found mean values of the hardness were respectively 0.210 GPa and 0.215 GPa. Finally nanoindentation modulus mean values of dentin were respectively 19.227 GPa and 11.410 GPa; while the hardness mean values were respectively 0.499 GPa and 0.337 GPa.
Conclusion: Not significant differences of the resin mechanical properties were found ($p>0.05$) when the EDC was applied. The EDC application modify the mechanical properties of the radicular hybrid layer and of the dentin in significant manner ($p<0.05$). In general with the application of the EDC a reduction of the mechanical properties is observed. The nanoindentation modulus of these two materials seems to be more sensitive to the EDC application. As matter of fact for the radicular hybrid layer the hardness did not changed at all. Radicular hybrid layer mechanical properties could be related to the efficient infiltration of adhesive systems and collagen cross linkers through dentin, giving precious information about the bond strength between restorative materials and dentin.

Different restorative materials: influence of acidic drink exposure on bacterial adhesion

Andrea Gugino, Carola Bergamelli, Luigi Pulimeno, Enrico Sangalli, Davide Dirk Kramp

Department of Clinical-Surgical, Diagnostic and Pediatric Sciences, Section of Dentistry, University of Pavia, Pavia, Italy

Aim: The purpose of this study was to evaluate and compare the adherence, after acidic drink exposure, of Streptococcus mutans to different restorative materials: four composite resins (Filtek Supreme XTE, 3M ESPE, St Paul, MN, USA; Ceram X Universal, Dentsply De Trey, Konstanz, Germany; Essentia, GC Corporation, Tokyo, Japan; Admira Fusion, Voco, Cuxhaven, Germany), four glass ionomer cements (Chemfil Rock, Dentsply De Trey, Konstanz, Germany; Equia Forte Fil, GC Corp., Tokyo, Japan; IonoStar Plus, Voco Gmbh, Cuxhaven, Germany; IonoStar Plus + Easy Glaze) and four fissure sealants (Fissurit, Voco Gmbh, Cuxhaven, Germany; Grandio Seal, Voco Gmbh, Cuxhaven, Germany; Fuji Triage, GC Corp., Tokyo, Japan; Constic, DMG, Hamburg, Germany).
Methods: Thirty specimens identical in size (height 2 mm; internal diameter 6 mm; external diameter 8 mm) of each material were prepared and divided in three groups: Group 1 (baseline), Group 2 (one day in soft drink: Coca-Cola/Coca-Cola Company, Italy), Group 3 (seven days in Coca-Cola). A strain of S. mutans (CCUG35176) obtained from the culture collection of the University of Goteborg was used for the in vitro adhesion tests. S. mutans was cultured in Brain Heart Infusion (BHI, Difco, CA, USA) supplemented with 10% (v/v) heat-inactivated horse blood serum (Oxoid, Milan, Italy) to improve its growth. The culture of S. mutans was statistically incubated under aerobic conditions for 16 h at 37°C. Bacterial suspension was cultured and deposited onto each material, and the adhesion was evalueted through the colony-forming units (CFUs) determination with or without acidic drink exposure.

Results: The materials showed different behaviours with significant differences. The highest amount of Streptococcus mutans was recorded in Group 3 and the lowest in Group 1. In general, the glass ionomer cements showed bacterial adhesion values higher than the ones related to composites and fissures sealants both in Group 2 and Group 3. Acidic soft drinks lead a time-dependent degradation of restorative materials causing an increase of the surface rugosity: a general increase in S. mutans cells adhesion to treated samples was observed.
Conclusion: The restorative materials and the glass ionomer cements demonstrated statistically significant rise in terms of bacterial adhesion after exposure to acidic drink, which in most cases increases with exposure to soft drink. Fissure sealants may be considered ideal for preventing caries in occlusal surfaces, thanks to their antibacterial effect that induces a low adhesion of S. mutans, even if exposed to acidic substances that erode their surface. Within the limits of the present in vitro study, bacterial adhesion is related to erosion of restorative materials caused by acids. The exposition to acidic soft drink resulted in a degradation of the surface layer of the restorative material with consequent increase of bacterial adhesion. The glass ionomer cements can be considered a more friendly environment for bacterial adhesion. This is true in particular if acid substances have already deteriorated the surface.

Use of direct restorative technique to finalize an orthodontic case: closure of diastema.

Enrico Lotta, Elena Marta Mattiuzzo, Giampaolo Drago, Eriberto Bressan, Marco Calabrese, Leonardo Sguotti, Edoardo Stellini

University of Padua, Department of Neurosciences, Section of Dentistry, Padova, Italy

Aim: The aim of this case report is to show how direct restorative techniques are valid treatments from an aesthetic and functional point of view. In this case report patient presented a microdontic tooth which invalidated himself aesthetically and functionally. After an orthodontic treatment a direct restoration with composite is performed to create dental harmony.
Methods: The case of a 25-year-old patient with 22 microdontic is presented. The treatment plan foresaw an additive coronoplasty in direct technique at the end of orthodontic treatment. On the first visit, dental records were made in upper and lower dental arch with alginate and anatomical occlusion was registered with putty silicone. In this way we proceeded to the study of the case on plaster models and aesthetic analysis were carried out. The diagnostic waxing was realized and then a putty silicone matrix mask has been packaged based on that.In the first meeting, elements from 15 to 25 has been insulated with rubber dam. The adhesion phases were performed with selective enamel etching, adhesive application on the whole surface of the affected teeth and polymerization were performed. Subsequently the reconstruction of the palatal enamel shell, incisal and mesial and distal angles were performed through the aid of putty silicone mask and the transparent strips were placed in mesial and distal position of 22. We proceeded with the application of dentine to shape the mamelons and with stratification of enamel mass. The case was finalized with composite to recreate the incisal corners and perform a preliminary polishing of the reconstructed element. 7 days later we proceeded with the second operative phase: the surface microanatomy of the tooth has been realized after the design of the transition lines according to dental anatomy. At this point surface polishing was performed.
Results: The mesial and distal contact points of element 22 were created and correct shape and size were performed, restoring a correct functional and aesthetic relationship between patient's teeth. The treatment was particularly satisfactory for the patient, both aesthetically and economically.
Conclusion: A direct composite restorative technique is a valid treatment as it has been demonstrated in this case. It has been useful to finalise a previous orthodontic treatment allowing acceptable aesthetic result, with a low cost and maximum maintenance of healthy dental tissue.

The effect of an experimental etchant on bond strength and dentinal enzymatic activity

Edoardo Mancuso[1], Tatjana Maravic[1], Allegra Comba[1], Eric Mayer-Santos[2], Vittorio Checchi[1], Annalisa Mazzoni[1], Lorenzo Breschi[1]

[1]University of Bologna, Department of Biomedical Science and Neuromotor Sciences, Bologna, Italy
[2]University of Sao Paulo, Department of Restorative Dentistry, Sao Paulo, Brazil

Aim: Phosphoric acid is the most commonly used etchant in dentistry and dentin demineralization greatly depends upon the concentration and the contact time with the dentin substrate. To address this problem, a new zirconium (IV) oxynitrate etchant, that could self-limits its demineralizing action, has been developed. The aim of this in vitro study was to investigate the influence of the new experimental etchant on bond strength, nanoleakage and enzymatic activity as an alternative to dentin acid etching with phosphoric acid.
Methods: Non-carious teeth (N=8 for each group) were assigned to 4 groups and treated according to the manufacturers' instructions: (G1) dentin bonded with

Adhese Universal (AU) in etch-and-rinse (E&R) mode etched with H3PO4; (G2) dentin bonded with ExciTE F (ExF) in the E&R mode etched with H3PO4; (G3) dentin bonded with AU in the E&R mode etched with the experimental etchant. (G4) dentin bonded with ExF in E&R mode etched with the experimental etchant. After the adhesive procedures, 4mm composite build-ups (Tetric EvoCeram Bulk Fill, Ivoclar Vivadent) were created. Specimens were further subjected to microtensile bond strength test (μTBS) and stressed until failure at baseline. Additionally, 8 teeth (N= 2 for each group) were prepared for nanoleakage analysis. Zymographic analysis was performed to assess the influence of the experimental etchant on dentinal MMPs activity. Obtained data were statistically analyzed with two-way ANOVA test and Tuckey post-hoc test and statistical significance was set for $p<0.05$.
Results: The bond strength was significantly higher in the experimental groups compared to the control groups. The AU showed significantly higher bond strength than the ExF when associated with the experimental etchant. There were no differences in the immediate nanoleakage expression between the tested groups. The results of the zymography assay showed no differences in the enzymatic activity between the experimental and the control groups.
Conclusion: The experimental etchant seems to have positive influence to the bond strength to dentin when used in association with the AU and ExF in the E&R mode. Hence, this new experimental etchant could be recommended as a novel, safe and efficient demineralizing technique in the every-day clinical practice. Further studies are needed to better understand the effect of the new etchant over time.

Use of ivory retractor and flexible matrix mylar strips for anterior teeth coronoplasty

E.M. Mattiuzzo, E. Lotta, G. Drago, E. Bressan, L. Sguotti, M. Calabrese, E. Stellini

University of Padua, Department of Neurosciences, Section of Dentistry, Padova, Italy

Aim: The purpose of this case report is to show the efficacy of direct restorative technique in the coronoplasty of a central and a lateral incisor, to reach an attractive and harmonic smile after orthodontic treatment. As we know from literature the shape of incisors and the ratio of tooth size are only some of the characteristics known to affect the esthetic results of orthodontic treatment. According to the preferences of orthodontists, dentists and laypeople as some research assert, worst smile characteristics include differences between the edges of the lateral incisors. In this case report the patient presented two dental elements 11 e 12 with distal incisal angles and incisal edges which are disharmonic compared to the contralateral elements and therefore to the aesthetic patterns. This fact invalidated him from an aesthetic point of view.
Methods: The case of a male patient with partially missing distal angles and incisal edges of elements 11 e 12 is presented. A direct restorative coronoplasty with composite material it's been suggested to comply his request to have a harmonic smile without expensive and long treatment. After the dental records are collected, the design of the reconstruction is been decided after the realization of a diagnostic waxing on plaster models. All stages of this case were documented with photos. During the first appointment dental rubber dam is positioned, then enamel profiles are prepared with different type of bur to at 45°. After that, selective enamel etching, adhesion phases and polymerization are performed. At this point the composite reconstruct was performed with the aid of an Ivory retractor, both for the placement of flexible matrix mylar strip (which prevents composite from adhering onto adjacent tooth and also helps in achieving the desired esthetic anatomic contour and excellent labial surface finish) and for the phase of polishing of proximal surfaces.
Results: The use of Ivory retractor allowed us to work respecting the proximal surfaces of adjacent teeth, to properly shape the elements with composite and to obtain a satisfactory polishing in this difficult area of the teeth. We achieved the result of a harmonic smile, without invasive long and expensive treatment according to patient's request.
Conclusion: A direct composite restorative coronoplasty could be a perfect solution to reach dental harmony and aesthetic after orthodontic treatment when the request is an economic, rapid and effective treatment to finalize the case. The use of a specific instrument as Ivory retractor and flexible matrix mylar strip could help us to realize a suitable direct restorative coronoplasty without hindrance in the proximal surfaces.

A new hypothesis for cervical root lesions. A paradigm for dental archeology

A.M. Messina, G. Di Carlo, E. Cristiani, I. Vozza

Department of Oral and Maxillo-facial Sciences, Dir. Prof. A.Polimeni, Sapienza University of Rome, Rome, Italy

Aim: An extensive search of the literature disclosed that there were numerous investigations on caries and the interplay between teeth and tools in studies of hominid fossils. However, there has been little information published on the presence of noncarious cervical lesions (NCCLs) among archaeological populations. Prompted by a paucity of information available at this time which has disclosed that NCCLs

existed among archaeological samples dating back to the Upper Paleolithic and among more recent groups, this investigation was initiated.
Methods: In order to make a more precise diagnosis of the NCCLs it is essential for researchers and clinicians to understand and accept the mechanisms of stress, friction, and corrosion and to use the Schema of Pathodynamics Mechanisms of tooth surface lesions to determine their etiology. Current literature abounds with confusion as to the etiology of NCCLs which is still contentious.The authors maintain that much of this confusion is a result of the teaching in dental schools, because of the studies of WD Miller in 1907 and the publication of the widely used text of GV Black in 1908. Their studies and misuse of terms which were upheld throughout the twentieth century still exist in various publications, journals, and textbooks since many researchers and clinicians viewed these lesions as being caused by the mechanisms of friction by means of abrasion, or by erosion, a physical mechanism which they term chemical degradation.
Results: In this study the term erosion was supplanted by using the more precise term biocorrosion to designate the loss of tooth substance due to chemical activity. NCCLs result from cyclic occlusal loading whereupon the resulting stress produces molecular microfracture of the hydroxyapatite crystals in the cervical region of teeth where stress is most concentrated. Caries prior to 1991 had been only considered as an acidogenic bacterial and proteolytic process. However, the presence and rapid progression of caries in the cervical area strongly indicates that occlusal loading forces during function creates stress concentration in the cervical region, thus becomes an important mechanism and cofactor in the etiology and exacerbation of root caries.
Conclusion: In view of the resistance to change for the past 100 years, the authors contend that it is time for a paradigm shift, utilizing updated terminology and concepts to designate the mechanisms involved in tooth surface lesions. As a consequence, this will improve communication with our related sciences just like archeology.

New ozonized olive oil: evaluation of cytotoxicity and antibacterial activity

Luigi Pulimeno, Davide Dirk Kramp, Andrea Gugino, Enrico Sangalli, Carola Bergamelli

Department of Clinical-Surgical, Diagnostic and Pediatric Sciences, Section of Dentistry, University of Pavia, Pavia, Italy

Aim: Evaluation of the cytotoxicityand antibacterial activity of a new ozonized olive oil compared with two common antimicrobial agents based on chlorhexidine digluconate (CHX).
Methods: The ozonizedolive oil selected for the study was O-zone gel (Alnitec, Cremosano, CR, Italy). The antimicrobial agents based on chlorhexidine digluconate (CHX) selected were Corsodyl Dental Gel® (GlaxoSmithKline, Brentford, Middlesex, UK) and Plak Gel® (Polifarma, Rome, Italy).The cytocompatibility of the samples was tested on immortalized HGF-1 cells by 3-(4, 5-dimethyl thiazolyl-2)-2,5-diphenyltetrazolium bromide (MTT) assay. The cells were incubated for 2 or 24 h with increasing dilution of ozonized olive oil or chlorhexidine digluconate (CHX). The percentage of viable cells was calculated relative to control cells set to 100%. A. actinomycetemcomitans, P. intermedia and S. mutans, were selected and the antibacterial capability of the compounds was tested by using direct contact agar diffusion test (DCT), minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) evaluations. Differences between specific means were analyzed by a one-way analysis of variance (ANOVA). Group means were compared using a one-way ANOVA and Tukey's test (P-0.05).
Results: The cytocompatibility of ozonized olive oil is proved: viability values of the cells treated for 2 or 24 h with increasing concentrations of ozonized olive oil were considerably higher ($P < 0.01$) compared with the values obtained using chlorhexidine digluconate (CHX). Agar diffusion assay: O-zone gel reported inhibition zones which correspond to 33% and 43% of that achieved by the chlorhexidine digluconate (CHX) agents. No inhibition of bacterial growth (MIC) on the Gram-positive strain by using O-zone gel was found and no antimicrobial effect (MBC) was observed by using O-zone gel on both Gram-negative and -positive strains. The two common antimicrobial agents based on chlorhexidine digluconate (CHX) selected Corsodyl Dental Gel® (GlaxoSmithKline, Brentford, Middlesex, UK) and Plak Gel® (Polifarma, Rome, Italy)were able to cause the complete bacterial suppression.
Conclusion:s: Data demonstrate O-zone gel's cytocompatibility, but the new ozonized oil was a relatively moderate antiseptic. Gram-negative bacteria proved to be more sensitive to ozonized olive oil than Gram-positive ones. The ozonized olive oil demonstrated a lower antibacterial activity if compared to the CHX-based agents tested. Anyway, further studies represent a fundamental need for more evidence of appropriate rigor and quality before the use of ozone can be accepted as a viable antimicrobial agent into routinely dental therapies.

Coronal hybrid layer mechanical properties: a nanoindentation study

M. Reda[1], A. Comba[2], R. Michelotto Tempesta[1], G. Serino[3],

A. Audenino[3], M. Alovisi[1], D.[1] Pasqualini, E. Berutti[1], N. Scotti[1]

[1]University of Turin, Department of Surgical Sciences, Dental School, Turin, Italy
[2]DIBINEM, University of Bologna, Bologna, Italy
[3]Politecnico di Torino, Department of Mechanical and Aerospace Engineering

Aim: Hybrid layer mechanical properties could predict clinical performance of composite resin restorations overtime. The aim of the study was to evaluate the mechanical properties of coronal hybrid layer, obtained with several adhesive systems, before and after artificial aging.
Methods: 48 molars, extracted for periodontal reasons, were selected for this in vitro study. Enamel surface was removed in order to expose flat sound coronal dentin. A standardized smear layer was created with a 600 grit paper. Then, samples were divided in four groups according to the adhesive system employed: Optibond FL (Kerr, USA, Group 1); SE Bond 2 (Kuraray, Japan, Group 2); Adhese Universal in etch&rinse mode (Ivoclar, Luxembourg), Group 3); Adhese Universal in self-etch mode (Ivoclar, Luxembourg, Group 4). Each group was subsequently divided in two subgroups according to the dentin pretreatment employed: subgroup A: 0,12% chlorhexidine digluconate application for 30 seconds; subgroup B: no pretreatment. Each adhesive was applied on dentin according to manufacturer's instructions. After light curing, which was performed with a LED lamp for 20 seconds, the restoration was completed with nano-hybrid resin composite (Clearfil ES-2; Kuraray), which was placed in 2mm horizontal layers and light-cured individually for 20 s. After 24h, samples were cutted in 1mm thick slices perpendicular to the hybrid layer with a diamond saw under water cooling. Each slices was flattened up to 2400grit paper. Then, samples were tested with a Nanoindenter XP (MTS/Agilent, USA), equipped with a diamond Berkovich indenter and characterized by a theoretical force resolution of 50 nN and a theoretical displacement resolution lower than 0.01 nm. The loading-displacement (P-h) curves have been analyzed by using the Oliver-Pharr method in way to obtain the Elastic Modulus and the Hardness. Samples were finally stored in artificial saliva and the above mentioned evaluations were repeated after 24h, 7 and 15 days of storage. Statistical analyses was performed with ANOVA test and significance was set for $p<0.05$.
Results: Hybrid layer hardness and young modulus were significantly correlated to the adhesive system employed ($p=0.0001$), but not to the dentin pretreatment (0.0765). Indentation map showed the mechanical properties progression along the coronal hybrid layer. The universal adhesive system shows a significantly lower hardness than the other tested adhesives.
Conclusion: The above mentioned results should be reconsidered after samples artificial aging to understand a correlation between hybrid layer mechanical properties and its degradation overtime. However, the etch-and-rinse protocol showed a higher hardness and more homogenous young modulus due to a uniform and deeper dentin demineralization and infiltration.

Influence of restorative technique on the fracture resistance of molar teeth restored with composite overlays

D. Angerame, M. De Biasi, G. Silvestri, G. Marchesi

Clinical Department of Medical Science, Surgery and Health, University of Trieste, Trieste, Italy

Aim: To evaluate the resistance to load of maxillary molars restored with composite overlays manufactured with three different techniques, namely the traditional indirect technique, a chairside semi-direct technique, and a CAD/CAM technique.
Methods: Sample size was calculated considering the results obtained in preliminary experimental studies ($\alpha=0.05$; $\beta=0.20$; $\delta=500.0$; $\sigma=300.0$). Eighteen sound maxillary molars of comparable size were selected from a pool of freshly extracted teeth and received a standardized preparation for a full-coverage overlay with two proximal boxes. The prepared teeth were randomly divided into three experimental groups of 8 elements each: traditional indirect technique with polyvinyl siloxane impression and stratification on a stone model; chairside semi-direct technique with alginate impression and stratification on a silicon model; CAD/CAM technique with digital impression and production with the Cerec 3 system. All tested materials were resin-based composites of the same brand (Voco). For the CAD/CAM production process, a custom-designed phantom model was used. The cementation protocol was the same for all groups and involved the use of sandblasting, self-etch adhesive procedures with selective enamel etching, and dual-cure resin cement. All the restored teeth underwent thermomechanical aging (1,250,000 cycles, 1Hz, 5-55°C); afterwards, they were axially loaded to fracture with a universal testing machine with a round-head stainless steel stylus. The type of fracture was registered. The groups were compared in terms of maximum load to fracture with a one-way analysis of variance and Scheffè post-hoc test ($p<0.05$).
Results: No defects were appreciable on the occlusal surface of the specimens after the thermomechanical aging. In all the tested groups, the mean registered values of maximum load exceeded the threshold of the masticatory forces (≈800 N). The CAD/CAM technique

exhibited the greatest resistance values (2136.2±295.1 N). The traditional indirect technique (1599.8±252.8 N) and the chairside semi-direct technique obtained significantly lower resistance values (1472.9±574.8 N), which were statistically similar. The most prevalent type of failure was fracture with fragment detachment below the cemento-enamel junction.
Conclusion: Under the conditions of the present study, all the tested restorative techniques showed satisfactory performance in terms of resistance to load. In the comparison among groups, composite CAD/CAM overlay.

Effect of a finishing and polishing system on hardness and gloss surface of four resin composites

Vincenzo Tosco, Riccardo Monterubbianesi, Giulia Orilisi, Maurizio Procaccini, Giovanna Orsini, Angelo Putignano

Department of Clinical Sciences and Stomatology, Polytechnic University of Marche, Ancona, Italy

Aim: The purpose of this study is to evaluate the behavior of the gloss and morphology surface and hardness of four resin-based composites before and after using the same finishing and polishing system.
Methods: Four resin-composite material was investigated: Harmonize (Kerr), Gradia Direct (GC corporation), Estelite ∑ Quick (Tokuyama Dental), TPH Spectra (Dentsply). Twenty discs of composite were prepared using homemade Teflon molds. A glass on bottom and a Mylar strip on top were used to exclude the oxygen inhibition during curing. Then, they were polymerized for 20 seconds both the top and the bottom. All the different composites specimens were divided into 3 groups (n=5): Control Group (with Mylar strip), Unpolished Group (with microbrush and spatula application) and Polished Group that consist in Sof-Lex discs (3M, ESPE), Spiral Wheels beige and then Spiral Wheels purple (3M, ESPE) with diamond paste (Enamel Shine C, Micerium). For evaluate resin-based composite hardness was used a Leitz micro-hardness tester. Gloss was determined by a glossmeter, calibrated with a reference value of 95 gloss units (GU). All samples were also examined by Scanning Electron Microscopy (SEM) to examine the morphology before and after finishing and polishing.
Results: The mean hardness and gloss values showed statistically different results among the different resin composites. For the hardness, in Control Group, Harmonize showed the highest hardness (64,3± 2), Gradia Direct showed the lowest one (31± 2). In Unpolished Group, Harmonize showed the highest hardness (66± 4). Gradia Direct showed the lowest one (35,8± 3). In Polished Group, Harmonize (68± 3) and Estelite (67± 1) showed the highest hardness. Gradia Direct showed the lowest one (37,4± 3). Estelite and TPH Spectra showed an improvement of hardness from unpolished to polished. For the gloss surface, in Control Group, TPH Spectra showed the highest gloss values (103± 3), while in Unpolished Group Estelite showed the lowest (4± 1). In Polished Group, TPH Spectra showed the highest gloss values (41± 9). SEM micrographs showed that smooth flat surfaces especially in the finished glossy samples. ANOVA test and post doc t-test were used for statistical evaluations ($p< 0.05$).
Conclusion: The hardness and gloss surface are material dependent. The hardness surface improves with the polishing. It can be also recommended to use Estelite, Harmonize and TPH Spectra on the occlusal surface. The highest gloss surface is obtained when the resin composite polymerizes against a Mylar matrix without finishing and polishing. However, this study demonstrates that acceptable gloss results are obtained using systems combined with a diamond paste. Many manufacturers offer different finishing and polishing systems, despite no consensus has been reached on the method providing the smoothest and highest gloss surface. The suggested reliable and simple protocols can be advantageous for clinicians in order to obtain a considerably worth aesthetic result.

Effect of bulk fill technique and incremental placement technique on cuspal deformation in restored premolars

V. Lodato[1], C. Rengo[3], A. Valletta[1], G. Simeone[1], E. Vaia[1], R. De Santis[2]

[1]Department of neurosciences, reproductive and oral sciences, University Federico II Naples, Italy
[2]Institute of Composite and Biomedical Materials, National Research Council, Naples, Italy
[3]Department of prosthodontics and Dental Materials, School of Dental Medicine, University of Siena, Italy

Aim: In direct restorations composite materials shrinks during the polymerization phase. Shrinkage leads to stress at the interface, it causes restoration's detachment with subsequent possibility of secondary caries and post-operative sensitivity of the dental element. A conscious and reasoned use of restoration materials available on the dental market can be useful in trying to reduce this stress. The aim of the work is to compare the cuspal strain in mesio occlusal distal restorations made with bulk-fill technique respect to conventional incremental technique.
Methods: 10 extracted premolars were collected and stored in 0.5% thymol at 5 °C. They were stabilized in metal cylinders and divided into two groups (n = 5).

Specimens received standardized MOD preparations. FL Optibond was used as adhesive system. MOD cavities were restored according to the following protocols: SDR flow applied in 2 mm increments for Group 1; SDR flow applied in bulk fill tecnique for Group 2. Before testing, each specimen was heated at 35°C through the ThermBlock system (Falc), and this temperature was kept constant during the test. An Instron extensometer in conjunction with the Signal express software (National Instruments) was used to measure cuspals' distance during the polymerization and post polymerization processes. The EMS Swiss Master Light lamp 1100 mW/cm2 operating for 21 s was used for the polymerization process, and a ThorLab power meter was used to monitor the light power level before each test, while a photo-diode was used to monitor the light power level during each test. Cusps distance values were measured up to one hour and data were subjected to statistical analysis.

Results: The tested bulk-fill composite technique caused lower cusps deformation than the incrementally placed conventional technique. Group 1 (SDR incremental technique) had a higher mean deformation value ($p<0.05$) than Group 2 (SDR bulk fill technique). The decrease of cuspals distance was higher in Group 1 compared to Group 2

Conclusion: Restoration with all bulk-fill materials resulted in lower cuspal strain compared to conventional composite resin placed incrementally. Data shown here should be interpreted with caution. As a rule, in vitro studies are not real predictors of clinical treatments. Only a bulk-fill composite resins was evaluated in this study and these results must be supported by other future tests.

Endodontics

Influence of Photon-Induced Photoacoustic Streaming (PIPS) on root canal disinfection and post-operative pain: a preliminary randomized clinical trial

F. Bonino[1], E. Gianello[1], N. Mandras[2], J. Roana [2], A.M. Cuffini[2], D. Pasqualini, M. Alovisi[1], E. Moccia [1]

[1] Department of Surgical Sciences Dental School, University of Turin, Turin, Italy
[2] Department of Public Health and Pediatric Sciences Medical School, University of Turin, Turin, Italy

Aim: Quality of endodontic treatment is the most important factor to achieve high success rate. PIPS device was introduced as a method to improve efficiency of cleaning. It implies the use of Er:YAG laser and irrigating solutions. Potential risk of apical extrusion of infected debris during endodontic treatment, correlated with use of laser, can produce an acute inflammatory response, with postoperative pain. This clinical study evaluates the ability of PIPS Er:YAG laser to reduce the root canal bacterial count in vivo compared to traditional technique by collecting intracanal bacterial samples. Moreover, the study evaluated patients post-operative quality of life after therapy through a questionnaire filled by patients.
Methods: Fourty eight anterior and posterior teeth with pulp necrosis and apical periodontits were selected for endodontic treatment and randomly assigned to group A (n=24) with traditional irrigation and group B (n=24) with PIPS method applied according to protocol. Irrigation was carried out with NaOCl 5% and EDTA 10% solutions. Intracanal samples were taken before and after endodontic treatment with sterile paper points and were subjected to culture test. Values of microbical analysis were evaluated with Kolmogorov-Smirnov normality test and Mann-Whitney test (p<0,05). Self-assessment questionnaire was presented to patients to evaluate postoperative pain during 7 days after therapy. Variation of quality of life's indicators were assessed with a form of analysis of variance for repeated measurements and the Student's T-test.
Results: The results obtained from the microbial analysis show a significant reduction of the CFU counts for both techniques in vivo, but there is no statistically significant difference between traditional method and PIPS method. In the seven days following the treatment, however, there were statistically significant differences for:
- maximum perceived pain (p = 0.02),
- difficulty eating (p = 0.03),
- difficulty in performing usual functions (p = 0.02),
lower, on Day 1, for patients who underwent endodontic treatment with PIPS irrigation method. As for the other variables analyzed, such as average perceived pain, difficulty in speaking, difficulty in relationships, quality of life in general, number of pain killers taken, PIPS method seems to cause less discomfort, but the data are not statistically significant.
Conclusion: PIPS method and traditional method seem to be equally effective in reducing the bacterial load in vivo, but PIPS method in general seems to cause less discomfort for the patient. Therefore PIPS could represent a promising aid to root canals disinfection, especially in case of simplified operative protocols and reduced times of instrumentation.

Metallurgical characterization of Reciproc and Reciproc Blue Ni-Ti instruments

Luigi Generali[1], Alessia Borghi[1], Pietro Puddu[2], Luca Lusvarghi[2], Simone Brancolini[1], Carlo Bertoldi[1], Luca Giannetti[1], Ugo Consolo[1], Eugenio Pedullà[3]

[1] Department of Surgery, Medicine, Dentistry and Morphological Sciences with Transplant Surgery, Oncology and Regenerative

Medicine Relevance (CHIMOMO), University of Modena and Reggio Emilia, Modena, Italy
[2] Department of Engineering "Enzo Ferrari" (DIEF), University of Modena and Reggio Emilia, Modena, Italy
[3]Department of General Surgery and Surgical-Medical Specialties, University of Catania, Catania, Italy

Aim: To evaluate the mechanical properties and thermal behaviour of Reciproc Blue compared to Reciproc M-wire files and to analyse the usage degradation of the files after ex-vivo test in extracted human teeth. The instruments underwent Scanning Electron Microscope (SEM) imaging, Energy Dispersion Spectroscopy (EDS), Raman Spectroscopy, metallographic analysis, DSC, XRD and nano-hardness test.
Methods: Reciproc and Reciproc Blue 25 .08 variable taper files were used in the study. Ten brand new instruments and ten used in four severely curved root canals were observed by SEM with EDS to study the new file's morphology and chemical composition and to verify the degradation of the files. The surface of both new and used files was analyse with micro-raman spectroscopy at room temperature with a Nd:YAG laser at 532.05 nm.The microstructure of both new and used files was studied with a light microscope on etched cross-sections and the samples were also observed with SEM for better analyse the morphology of the alloys' grains. DSC was used to analysed the transition temperatures of both new and used files by using segments of the files (10-15 mg of overall weight). XRD was used for investigate the phase composition of three new and used Reciproc and Reciproc Blue files at room temperature using a Cu-Kα monochromatic radiation (40 kV and 40 mA). The hardness and elastic modulus of two new and used Reciproc and Reciproc Blue files were evaluated using nano-indentation test using a Berkovich diamond tip according to ISO 14577. Statistical analyses were performed using STATA version 11 (STATA Corp., Texas, USA).
Result: Reciproc and Reciproc Blue files have a slightly different tip geometry and on both instruments are visible milling grooves perpendicular to the long axis. They are both composed of almost the same equiatomic NiTi alloy. The SEM analysis of used files reveals the presence of microcracks along the surface of four instruments per type. The micro-raman spectroscopy confirms the presence, on Reciproc Blue, of a superficial oxide layer of TiO2 arranged in Brookite and Rutile while no signal of a detectable titanium oxide was showed on Reciproc surface. The etched surface of both new and used files appeared characterized by several precipitates dispersed in a matrix composed by acicular martensitic grains and austenitic plain areas. The area of Reciproc Blue grains was statistically lesser than Reciproc one. A two-stage reverse phase transition curve was found for Reciproc Blue. M-Wire Reciproc files do not complete their reverse phase transformation at 37°C, while Reciproc Blue Austenite finish temperature is equal or less than body temperature. XRD confirms that both files have a mixed phase composition, including austenite, martensite and R-phase. Reciproc Blue have a lower nano-hardness and elastic modulus compared to Reciproc files in used conditions.
Conclusion: Reciproc and Reciproc Blue files are composed of the same NiTi alloy but they undergo different thermal treatment. The Reciproc Blue show a titanium oxide superficial layer as confirmed by Raman spectroscopy and are more flexible than Reciproc M-Wire due to their different thermal treatment. The smaller and denser grains of Reciproc Blue files are responsible for the different transition temperatures of the two instruments.

A micro-computed tomographic analysis of retreatability of two bioceramic sealers using rotary instrumentation with supplementary irrigant agitation techniques

Gianluca Conte[1], Karalambos Lazaridis[1], Giusy R.M. La Rosa[1], Pietro La Paglia[1], Prasanna Neelakantan[2], Gaetano Isola[1], Placido Verzi[1], Eugenio Pedullà[1]

[1]Department of General Surgery and Surgical-Medical Specialties, University of Catania, Catania, Italy
[2]Discipline of Endodontology, Faculty of Dentistry, University of Hong Kong, Hong Kong, Korea

Aim: Hydraulic tricalcium silicate-based bioceramic materials have been recently introduced as root repair cements. The retreatability of Guttaflow Bioseal (Coltene Whaledent, Langenau, Germany) and BioRoot RCS (Septodont, Saint Maur des Fossés, France) has not been investigated thus far. Aim of this study was to evaluate the retreatability of two tricalcium silicate-based materials (BioRoot RCS and Guttaflow Bioseal,) using a combination of rotary instrumentation and supplementary irrigant agitation techniques (syringe irrigation, Tornado Brush and ultrasonically activated irrigation) by high-resolution micro-computed tomography.
Methods: Single-rooted mandibular premolars were prepared to size 40/0.04 (Hyflex EDM rotary nickel-titanium instruments, Coltene, Coltene/Whaledent AG, Altstatten, Switzerland) and randomly divided into 2 experimental groups (n=24) depending on the root filling material. Root canals were filled with Guttaflow Bioseal (Group 1) or BioRoot RCS (Group 2), scanned using a microCT scanner (Skyscan1172, Brunker microCT, Antwerp, Belgium) at 80 kV and 100 µA with an isotropic resolution of 11 µm and stored in phosphate buffered saline for 4 months. In all the groups, the root filling was removed using the R-Endo nickel-titanium rotary instruments (MicroMega) according to the manufacturer

recommended protocol. Then, the specimens were randomly allocated to one of the subgroups for supplementary irrigant agitation: subgroup A (syringe irrigation), subgroup B (Tornado Brush, M.I.B, France) and subgroup C (ultrasonically activated irrigation). Specimens were re-scanned with micro-CT to calculate the root canal volume and volume of remnant root filling material. The volume of root canal filling material between the groups prior to retreatment procedures was compared using one-way ANOVA. To determine the effect of material and irrigant agitation method on the volume of remnant root filling, two-way analysis of variance (ANOVA) was used with post hoc Tukey test (Prism 8.0; GraphPad Software, Inc, La Jolla, CA). The significance level was set at P=0.05.

Results: The preliminary analysis of root canal volume for teeth filled with Guttaflow Bioseal and BioRoot RCS showed no statistically significant difference (P>0.05). Specimens filled with Guttaflow Bioseal showed significantly less remnants compared to BioRoot RCS (P<0.05). There was no significant difference between the supplementary irrigant agitation groups in the removal of Guttaflow Bioseal (P>0.05). In group 2 (BioRoot RCS), subgroups B (Tornado Brush) and C (ultrasonically activated irrigation) showed significantly less remnant compared to syringe irrigation (P<0.05), with no significant difference between the two (P>0.05).

Conclusion: Guttaflow Bioseal demonstrated superior retreatability than BioRoot RCS, 4 months after root filling. Supplementary irrigant agitation techniques did not influence the removal of Guttaflow Bioseal.

Rotary glide path influence on mean torque and instrumentation time: an in vitro study

M. D'Angelo, A. Zanza, F. Savo, R. Manenti, V. Ferri, L. Testarelli

Sapienza University of Rome, Italy

Aim: The aim of the present poster is to evaluate the influence of rotary glide path on torque developed by Nickel Titanium Rotary in a single instrument technique and if instrumentation time can be reduced despite the increasing of files used.

Methods: 40 S-one rotary instruments for shaping and 20 AF blue S4 18.05 for glide path (Fanta Dental, Shangai, China) were randomly divided in two groups: A, S4 18.05 and S-One 25.06 and B, S-One 25.06 only. Each instrument was previously evaluated using a 20x stereomicroscope for macroscopical defects. Each rotary file was used once and discarded. 40 resin blocks were randomly assigned at group A or B. Each block had standardised length, taper, angle and radius of curvature, to avoid influence due to different dental hardness and canal characteristics. Both groups were instrumented with the same setting 350 rpm and 2 Ncm, with the same motor (Kavo, Biberach, Germany) ,the same 1:1 handpiece and by the same operator. Torque was recorded by the motor dedicated software and compared. Instrumentation time was recorded using a digital chronometer (1/100 s). Data were recorded and statistically analysed. The comparison of both mean torque and instrumentation time was made with T-test with significance level at 95%. Instruments were used with two different techniques: Operative technique for group A (Rotary glide path and shaping), Rotary Glide Path with Af Blue S4 18.05, S-one 25.06 until resin block shaping was completed; Operative technique for group B (Single instrument shaping) 1) S-one 25.06 until resin block shaping was completed.

Results: Mean torque values were 0,52 Ncm (0.08) for Group A and 0,63 Ncm (0.04) for Group B. Mean instrumentation time values were 63,66s for Group A and 95,34s for Group B. Both techniques allowed instruments to complete resin block shaping with no deformation or fracture in all cases. Mean torque for both groups was below the torque limits, 2 Ncm, with a significant differences found between the two techniques. The use of glide path significantly reduced instrumentation mean torque values and instrumentation time.

Conclusion: Instrument separation is a problem increased with the spread of Nickel Titanium rotary instruments. According to the literature, separation can be related to two different factors: flexural and torsional stress. In order to avoid this event, several techniques has been proposed. The use of a low torque instrumentation has been proposed for reducing the torsional stress applied to the instrument, however it is not well known and quantified the amount of torque reduced by glide path techniques. The result of the present study shows that the use of rotary glide path files helps in reducing torsional stress. These instruments enlarge the canals dimension allowing a continuous progression from the orifice to the end of the root canal of the following instrument. However both the techniques allowed a safe instrumentation due to a mean torque much below the torque limit proposed by the manufacturer. Moreover the increase of instrument used did not results in an increase of time consumed for shaping procedure, this can be related to the different approach. A single file technique requires an instrumentation in accordance with the crown down principles, that seems to be more time consuming. The use of glide path files and low torque seems a promising technique to improve safety and efficiency of single file rotary techniques.

Influence of flat side design on flexural resistance

A. Del Giudice, M. D'Angelo, V. Di Giacinto, R. Reda,

M. Seracchiani, G. Miccoli

Sapienza University of Rome, Department of Oral & Maxillo-Facial Science, School of Endodontics, Professors G. Gambarini and L. Testarelli, Rome, Italy

Aim: The aim of the study is to investigate how a flat side design could affect cyclic fatigue resistance. The study has been performed comparing in vitro flexural resistance of F-one, a new instrument with a flat design surface on one side, 25.04 (Fanta Dental, Shangai, China) (Group A) to the same size, taper and alloy instrument (Prototype) without any flat design surface (Group B).
Methods: A total of 40 intruments, 20 F-One 25.04 and 20 prototype 25.04, were rotated in a stainless steel simulated canal with a 90° curvature and a 5 mm radius, until fracture occurred. Instruments were previously analyzed using a stereomicroscope at x20 magnification for morphological defects or any visible signs of deformations. Time to fracture (TtF) was recorded using a chronometer (1/100 s) and fragment length (FL) was measured. The test was perfomed using the same cordless motor (Eighteeth, Changzhou City, China) at the same room temperature and by the same operator, to avoid influence due to technique or alloy transformation. The speed for rotary files were set at at 500 rpm and both instruments were used with a torque of 2Ncm. It was used T-test with a 95% significance to statistically analyze the time to fracture and Fragment length differences.
Result: Data recorded point out a significant difference between the two different groups evaluated. The F-One, the rotary instrument designed with a flat side design, showed a statistically significant higher cyclic fatigue resistance ($p<0.05$). Mean values were 62s ±15,63 for the F-One file, while 38,4s ±11,8 for the Prototype. No significant difference was found in the fragment length, mean values were 5,9mm ±1,02 for the F-One file, 5,3mm ±0,44 for the Prototype.
Conclusions: The F-One is a recently designed and commercialized file which presents a peculiar flat side design. The concept of the instrument is a One-file system so all mechanical stress due to intracanal instrumentation will be applied to the file. For this reason, it is required an increased mechanical resistance of the instrument. Several factors are involved in the cyclic fatigue resistance such as termical treatment of the alloy, the cross section desing, the motion and the mass at the point of maximal stress. In this study, the proprietary thermal treatment, the clinical motion. This was meant in order to reduce bias in evaluating the influence of the one side flat design. The results of this test could highlights the advantages of flat desing in improving the cyclic fatigue resistance, probably due to the lower mass of the F-One at the point of maximal curvature. Clearly, due to the limitation of this kind of study, further analysis are suggested in order to better evaluate the influence of flat surface on torsional resistance and cutting efficiency of Ni-Ti rotary instruments.

Three-dimensional evaluation of endodontic anatomy in mandibular first molar's roots: an *in vivo* study

V. Di Giacinto, A. Mazzoni, F. Mazza, S. Coppola, A. Morese, G. Gambarini

Sapienza University of Rome, Italy

Aim: Cone Beam Computed Tomography (CBCT) is used to evaluate the endodontic system and its canals' complexity within mesial roots of mandibular molars. Missed canals and anatomical complexities are two of the main causes of root canal treatment's failure. The recent development of low-dose, detailed three-dimensional radiological examination (CBCT), allows to understand better the anatomy of the root canal system.
Methods: Throught CBCT, A total of 40 molars were examinated, of 30 patients which required this type of radiological study as part of the treatment plain. The evaluated parameters were:
- the canals' number;
- the root canal system;
- configuration;
- the presence of apical confluences and the distance between confluences and apical foramina.

The methods used to study endodontic anatomy can be divided into *ex vivo*, for the extracted teeth, and *in vivo*, on patients. The in vivo techniques, which investigate the endodontic space, are based on X ray examinations. The axial projections are examinated by scolling the images in coronal-apical direction; the parasagittal ones are analyzed reducing the thickness of the section to the minimum and checked from mesial to distal.
Result: All the examined roots show two canals. In 62% of cases was observed a Vertucci Type IV canal configuration, while in 38% of cases a Vertucci Type II configuration. Apical confluences are in 41% of patients. The mean distance between confluences and apical foramina was 2,80 mm.
Conclusion: Apical confluences in the mesial roots of mandibular molars occur in a significant high number of cases; and their recognition is essential to prevent iatrogenic errors during canal instrumentation. Confluences can be a challenging situation for endodontic instrumentation, because the joining of two canals always results in abrupt dangerous curvature and lead to intracanal fracture. The majority of such confluences are not visible by

traditional radiography. In this research, results show that the confluences are frequently in the mesial roots of molars. Cause of their location, mainly in the last apical millimeters, there is an increase of the intracanal breakage risk's due to metal fatigue. The preoperative recognition can eliminate this potential risk. As Vertucci suggested, when there is a confluence , the clinician should not instrument both canal to the apex, but only one; about the second one it is recommended to stop the shaping at the joining point.

Manual dynamic agitation vs passive ultrasonic irrigation. Methods over the removal of the vapor lock effect

M. Dioguardi, A. Cocco, D. Sovereto, G. Giannatempo, G. Illuzzi, G. Di Gioia, A. De Lillo

Department of Clinical and experimental medicine, University of Foggia, Foggia, Italy

Cleansing has an essential role in endodontics. In most cases, it is performed using irrigant solutions such as sodium hypochlorite or EDTA (1). Their efficacy may be compromised by different phenomena, such as the vapor lock. Vapor lock phenomenon is represented by the formation of an air or gas bubble inside a close-ended system: this bubble blocks the penetration of irrigant solutions and osmosis phenomena; so that it isolates the canal region located beyond the bubble, blocking the replacement of irrigants in the trickiest region of the canal, the apical third. There are different methods to remove it, here we compare the efficacy of two of them: MDA (Manual Dynamic Agitation) and PUI (Passive Ultrasonic Agitation). 40 endo-training-blocks have been shaped and divided in 2 groups(2), composed of 20 samples each, respectively assigned to the MDA and to the PUI. In both groups the vapor lock has been produced by delivering a watery solution using a disposable syringe, with a tip-opened needle. Using the MDA technique,in 10 cases on a total of 16 vapor lock has been completely removed, while using the PUI technique, in 12 cases on a total of 19 vapor lock has been strongly reduced. GraphPad QuickCalcs online has been used for statistical analysis and Fisher's test has been carried out for the variance analysis. The two-tailed P value equals 0.3984, and it is considered not to be statistically significant. Both techniques provide an effective removal of vapor lock, but PUI showed a greater efficacy not simply in its complete removal, but especially in its reduction. We can state that the vapor lock effect results having a great incidence on close-ended root canal systems, while in the daily practice it is less frequent, because irrigation is performed inside open-ended root canal systems. Thanks to the comparison between data gathered from the international literature and our experimentation on endo-training-blocks, it has been even more possible to confirm the PUI efficacy, able to reduce the vapor lock effect. To completely achieve its removal, it is highly suggested to use ultrasonic tips with a diameter equal or smaller than the canal one, in order to reach the narrowest spaces, and to extend the action time of this method to avoid any alteration of the root canal anatomy.

1. Dioguardi M, Di Gioia G, Illuzzi G, Laneve E, Cocco A, Troiano G. Endodontic irrigants: Different methods to improve efficacy and related problems. Eur J Dent. 2018;12(3):459-66. Epub 2018/08/28. doi: 10.4103/ejd.ejd_56_18. PubMed PMID: 30147418; PubMed Central PMCID: PMCPMC6089055.
2. Dioguardi M, Troiano G, Laino L, Lo Russo L, Giannatempo G, Lauritano F, et al. ProTaper and WaveOne systems three-dimensional comparison of device parameters after the shaping technique. A micro-CT study on simulated root canals. Int J Clin Exp Med. 2015;8(10):17830-4. Epub 2016/01/16. PubMed PMID: 26770376; PubMed Central PMCID: PMCPMC4694276.

SEM evaluation of a bioceramic sealer

Orlando Donfrancesco[1,2], Giulia Santi[1], Michela Relucenti[2], Andrea Del Giudice[1], Maurilio D'Angelo[1], Valentina Di Giacinto[1]

[1] Department of Oral and Maxillo-Facial Sciences, Sapienza University of Rome, Italy
[2] Department of Anatomy, Histology, Forensic Medicine and Orthopaedics, Sapienza University of Rome, Italy

Aim: Aim of this poster is to evaluate the marginal adaptation of EndoSequence Root Repair Material to root canal walls in a retrograde cavity after one day, seven days and thirty days from its positioning, in order to measure dimensional changes of the material.
Materials: Sample preparation: Sixty freshly extracted teeth were evaluated with an optical microscope (Zeiss Axioscop 40) at 20X magnification and twenty-two teeth were excluded due to cracks or defects. Teeth were divided in three time dependent groups: group A: marginal adaptations were evaluated one day after ERRM application; group B: marginal adaptations were evaluated after 7 days; group C: marginal adaptations were evaluated after 30 days. In all teeth a root canal treatment was performed. Teeth were horizontally cut 3mm away from the apex with a diamond fissure bur mounted on a highspeed handpiece under water spray irrigation. A 3 mm long retrograde preparation was performed using ultrasonic tips. In order to create 2mm disk samples for SEM observation, a second horizontal coronal cut was then performed. The disk samples were then obtured simulating a retrograde filling, with ERRM. The tested material was placed into the prepared neoapex using the proper syringe. Samples were then

stored at 37°in humidity and analyzed at different time intervals (1 day, 7 days and 1 month) using VP SEM (variable pressure scanning electron microscope) (Hitachi SU-3500). The presence of gaps was noted and measured by the Microscope dedicated software. Measurements were replicated at the different time intervals by superimposing images. Data were recorded and statistically analyzed.

Result: In all samples, ERRM was found to exhibit a well-preserved apical marginal adaptation to the dentin wall. None of the three groups analyzed showed a complete marginal adaptation between dentin and ERRM, instead in all groups both gap-free and gap-filled regions were observed. The mean ± standard deviation of the average gap at dentin - ERRM interface was 3.91 (± 2.5) at one day; 4,49 (± 2.53) at seven days; and 4.81(±2.85) at thirty days. No significant differences were found among the three groups (P= 0,756, P > 0,005)

Conclusions: EndoSequence Root Repair Material proved to be a material allowing an excellent marginal adaptation, which stay stable after the initial setting time (less than 24 hours). Results from our study are in accordance with a previous published studies, which only evaluated performance at setting time. In the present study a longer observation period allowed to state the dimensional stability of the material. The good results in term of marginal adaption can be explained by the physical and mechanical properties of the material given by the particle size of calcium silicate–based materials, that having a smaller particle size show a favorable flow characteristics. However, in order to confirm these results, further studies seem necessary to better evaluate the longstanding dimensional stability of the material in vivo and the influence of the sample treatment on the results.

Evaluation of pressures distribution against root canal walls of NiTi rotary instruments by finite element analysis

Umberto Gibello[1], Davide Salvatore Paolino[2], Alessandro Scattina[2], Giorgio Chiandussi[2], Andrea Marchetti[1], Mario Alovisi[1], E. Moccia [1], Giorgia Carpegna[1], Damiano Pasqualini[1], Elio Berutti [1]

[1] Department of Surgical Sciences, Dental School, Endodontics, University of Turin, Turin, Italy
[2] Department of Mechanical and Aerospace Engineering, Politecnico di Torino, Turin, Italy

Aim: Finite element analysis (FEA) was used to evaluate the contact pressure distribution of two different nickel-titanium (Ni-Ti) rotary instruments against the root canal walls and to virtually predict their centering ability during shaping procedures.

Methods: One endodontic instrument ProTaper Next (PTN) X2 (Dentsply Maillefer, Ballaigues, Switzerland) and one BioRace (BR) 3 (BioRace FKG Dentaire, La Chaux de Fonds, Switzerland) were replicated with a computer-aided design (CAD) software (Altair Hypermesh 12.0, Troy, MI, USA). Two resin blocks (Dentsply Maillefer Ballaigues, Switzerland) shaped respectively with ProGlider and PTN X1 - X2 and with ScoutRace and BR 1, 2 and 3 were also replicated. The Nickel Titanium rotary instruments and the shaped blocks geometries were discretized and exported for a dynamic FEA. The endodontic rotary motor X-smart (Dentsply Maillefer) was set at 300 rpm and 4 Ncm of torque for the Protaper Next system at working lenght. Shaping procedures for the Biorace system were performed by using X-Smart (600 rpm, 1.5 Ncm) at working lenght. For each block, Glyde (Dentsply Maillefer, Ballaigues, Switzerland) was used as lubricating agent (0.80 mg). The typical material models of the BR and PTN NiTi alloys were applied. The main body of each file was modeled with brick elements according to the formulation of the finite element solver (LS-Dyna R7.1, Livermore, USA). The instruments rotation in the root canals was virtually replicated. In order to mimic the push-pull actions during instrumentation, the finite element simulation was performed applying an insertion and extraction force of 2.5 N with a constant rotational speed. The apical third of the simulated canals was divided in three zones, which were further subdivided in Top, for the root canal portion outside the curvature, and Down, for the root canal portion inside the curvature. To highlight possible differences between pressures distributions in Top and Down zones, parameter Var was originally defined.

Results: The Varvalues were systematically larger for BR revealing a better centering ability of PTN, in agreement with a previous ex-vivo micro-CT analysis.

Conclusion: Dynamic FEA proved effective for the virtual prediction of the centering ability of NiTi instruments during an early design phase without the use of prototypes.

Cutting efficiency of heat-treated nickel-titanium reciprocating instruments at different incidence angles

Pietro La Paglia, Giusy R.M. La Rosa, Karalambos Lazaridis, Gianluca Conte, Eugenio Pedullà, Ernesto Rapisarda

Department of General Surgery and Medical - Surgical Specialties, University of Catania, Catania, Italy

Aim: Numerous variables influence cutting efficiency of NiTi files, including design, tip design, chip removal capacity, hardness, instrument motion, file inclination as well as manufacturing processes including heat-treatments. Aim of the present study was to compare

the cutting efficiency of two single file systems Reciproc R25 (REC) (VDW, Munich, Germany) and Reciproc blue R25 (REB), at different inclinations.
Methods: 60 new REC and REB files were divided into 6 groups (n=10): groups 1, 2, 3 included REC tested at 90°, 70° and 45° of inclination in relation to the sample, respectively; groups 4, 5 and 6 formed by REB tested at 90°, 70° and 45°, respectively. Cutting test was performed using a customized machine in which all instruments were activated in reciprocating motion against standardized gypsum blocks for 120 seconds. Unlike the previously employed testing machines, this device displays some new elements. In particular, an adjustable platform allows to set different predetermined angles of incidence between the instrument and the sample. The cutting efficiency was investigated at 10±0,75 mm from the tip of each instrument. The reciprocating motion was performed via a computing platform (Arduino; Smart Project Srl, Strambino, Italy) connected to a step by step motor, which allows to set up all movement parameters such as revolutions per minute (rpm), angle and direction of movement. Once the setup was accomplished, the motor of the testing device was activated and the instrument took out material passing through the sample actively. The efficiency to cut was determined by measuring the weight loss of the block using an analytical balance (±1x10-4 g, Balance E42-B, Gibertini, Italy) and by measuring the length of the surface cut in the block using a digital caliper (10-4 m). The results were expressed as means and standard deviations (SD) for each group and data were statistically analyzed by two-way ANOVA and Bonferroni t-test, with the level of significance set at P<0.05.
Results: No difference was observed for REC among 90°, 70° and 45° (P>0.05). REB had no statistical difference between 90° and 70° (P>0.05), however, its cutting efficiency significantly increased at 45° (P<0.05). A significant difference was observed between REC and REB at 45° only (P<0.05).
Conclusion: Within the limits of the present study, increased file inclination to 45° and blue heat-treatment improved cutting efficiency of reciprocating files. In particular, Reciproc with blue heat-treatment had equal or greater cutting efficiency than the ones made from M-wire.

Influence of different angles of file access on cyclic fatigue resistance of 2shape rotary instruments in different artificial canals

Giusy R.M. La Rosa[1], Pietro La Paglia[1], Gianluca Conte[1], Karalambos Lazaridis[1], Gaetano Isola[1], Eugenio Pedullà[1], Sebastiano Ferlito[1], Luigi Generali[2], Placido Verzi[1]

[1]Department of General Surgery and Surgical-Medical Specialties, University of Catania, Catania, Italy
[2]Department of Surgery, Medicine, Dentistry and Morphological Sciences with Transplant Surgery, Oncology and Regenerative Medicine Relevance, University of Modena and Reggio Emilia, Modena, Italy.

Aim: Several parameters including extent of the curvature and angulated insertion of file into the canal could influence cyclic fatigue of nickel-titanium files. The purpose of this study was to compare the influence of different access angles associated to different curvature radii on cyclic fatigue resistance of 2Shape (TS; Micro-Mega, Besancon, France) rotary instruments.
Methods: 60 instruments were tested in two 16mm-stainless steel artificial canals with angle of curvature of 60° and 5mm or 3mm radius of curvature respectively. 2Shape TS2 #25.06 and 2Shape TS1 #25.04 were evaluated at 0°, 10° and 20° insertion angles (n=10 for each angle of access). Cyclic fatigue resistance was determined by Number of Cycles to Failure (NCF) using a new testing device machine. This device consists of a platform composed of a block containing the electric handpiece and a mobile support on rails for insertion/disconnection of the file. Moreover, a metal mobile platform is connected to the mobile support. This second platform with the artificial canal produces the different inclination of insertion of tested file maintaining the entrance of instrument perpendicular to the canal. Each instrument was tested in continuous rotation (300 rpm) following the manufacturer's instructions. Fracture surface was examined with a scanning electron microscope. Data were statistically analyzed using 2-way analysis of variance and the Bonferroni multiple comparison post-hoc test (Prism 7.0; GraphPad Software, Inc, La Jolla, CA) with a significance level of P<0.05.
Results: TS1 (#25.04) exhibited higher cyclic fatigue resistance than TS2 (#25.06) for each angle and radius tested (P<0.05). When files were tested inside 3mm-radius canal, independently from taper, they recorded lower cyclic fatigue resistance than in 5mm-radius one (P<0.05). Considering canal with 5mm-radius of curvature, no significant cyclic fatigue resistance reduction was observed for .06 taper-instruments for each angle tested (P>0.05), while files with .04 taper exhibited significant lower NCF when tested at 20° (P<0.05). In canals with 3mm radius of curvature, TS2 (#25.06) showed no significant differences for each angle tested (P>0.05). TS1 (#25.04) exhibited significant resistance reduction between 0° and 10° as well as between 0° and 20° (P<0.05), with no difference between 10° and 20° (P>0.05).
Conclusion: Inclined angle of file access into the canals decreased cyclic fatigue resistance of #25.04 files especially when the radius of curvature is reduced. Cyclic fatigue resistance of #25.04 instruments was

higher than #25.06 files made with the same thermal treatment. Independently from taper, each file tested in 3mm-radius canal showed lower cyclic fatigue resistance than instruments tested in 5mm-radius canal.

3D micro-CT analysis of the interface voids associated with BioRoot RCS and Guttaflow Bioseal

Karalambos Lazaridis[1], Gianluca Conte[1], Pietro La Paglia[1], Giusy RM La Rosa[1], Prasanna Neelakantan[2], Ernesto Rapisarda[1], Sebastiano Ferlito[1]

[1]Department of General Surgery and Surgical-Medical Specialties, University of Catania, Catania, Italy;
[2]Discipline of Endodontology, Faculty of Dentistry, University of Hong Kong, Hong Kong, Korea.

Aim: The material used for root canal obturation is one of the critical determinants for the success or failure of endodontic treatment. Lately, a number of new endodontic materials have been introduced. The Aim of this study was to investigate the percentage of 3D voids within root fillings produced by BioRoot RCS (Septodont, Saint Maur des Fossés, France) and Guttaflow Bioseal (Coltene Whaledent, Langenau, Germany) using micro-computed tomography.
Methods: Forty-eight single-rooted mandibular premolars were collected and decoronated. The root canals were instrumented using Hyflex EDM nickel-titanium rotary instruments (Coltene, Coltene/Whaledent AG, Altstatten, Switzerland) up to size 40/0.04. The roots were randomly allocated into 2 groups (n=24), and each group was obturated by using single cone technique with a different material: BioRoot RCS (Group 1) and Guttaflow Bioseal (Group 2). Specimens were numbered and scanned with a micro-CT (Skyscan1172, Brunker microCT, Antwerp. Belgium) at 80 kV and 100 µA with an isotropic resolution of 11 µm. Volume rendering and multiplanar volume reconstruction were performed to calculate the volume of root filling material using the software Amira 5.3 (Mercury Computer System Chelmsford, MA, USA) which permitted the subdivision of the root canal into thirds (coronal, middle, apical and last 1mm). The volume of voids was calculated by subtracting the filling material volume from the post-obturation root canal volume. All data sets were tested for normality of the data by the Shapiro–Wilk test and the data showed a normal distribution. Data obtained were statistically elaborated using a t test ($P < 0.05$) (Prism 8.0; GraphPad Software, Inc, La Jolla, CA).
Results: Root canals obturated with GuttaFlow Bioseal showed a significantly lower percentage of volume of voids than the ones obturated with BioRoot RCS ($P<0.05$), while no statistically difference was observed between them in the last 1 mm ($P>0.05$). Within each group, the percentage volume of voids in the coronal third was significantly higher than in the other anatomical parts examined for BioRoot RCS ($P<0.05$), with no significant difference among the last 1mm, apical and middle thirds ($P>0.05$). No statistically significant difference was observed among all examined parts for Guttaflow Bioseal ($P>0.05$).
Conclusion: Within the limits of the present in vitro study, the results of micro-CT study showed that Guttaflow Bioseal, used as endodontic root canal sealer, had significant less percentage of voids in comparison with BioRoot RCS in all anatomical part examined except for sections at 1 mm.

Root-end resection after filling with single cone technique and bioceramic sealer: an effective way to simplify endodontic surgery?

D. Angerame[1], M. De Biasi[1], M. Lenhardt[1], D. Porrelli[1], E. Pedullà[2]

[1]Clinical Department of Medical Science, Surgery and Health, University of Trieste, Trieste, Italy
[2]Department of General Surgery and Surgical-Medical Specialties, University of Catania, Italy

Aim: State of the art endodontic surgery with controlled retrograde procedures may not be feasible in all teeth due to poor access and other technical difficulties. In selected cases, the possibility to perform the sole apical resection without further retrograde manoeuvres might constitute a substantial clinical advantage. The present study compared the filling quality obtained with standard retrograde procedures with that of an alternative technique without retrograde preparation and filling.
Methods: Previously published data served for sample size calculation ($\alpha=0.05$; $\beta=0.20$; $\delta=3.0$; $\sigma=1.5$). Twelve single-rooted teeth were selected from a pool of freshly extracted teeth, discarding those with aberrant anatomy. Selected teeth of comparable size were decoronated to obtain 12 mm long roots. The canals were scouted with manual files and the working length acquired. After mechanical glide path establishment, canal shaping was performed with HyFlex rotary files up to size 40, .04 taper (500 rpm; 2.5 Ncm). The roots were analysed with a computed microtomography scanner to identify the possible presence of dentine microcracks. Afterwards, all the canals were filled with the single cone technique with dedicated cones and BioRoot RCS bioceramic sealer. After 24 h, the roots were apically resected with a carbide bur 3 mm from the apex. At this point, the roots were randomly assigned to two groups: no retrograde procedures (n=6); standard retrograde ultrasonic preparation and Biodentine filling (n=6). Lastly, the formation of internal and external voids was quantified by means of a second computed microtomographic analysis. The normality

of the distribution and the equality of variance of the microtomographic datasets were tested with a Shapiro-Wilk and a Levene test, respectively; then, the volumes measured in the two groups were statistically compared with an independent sample t-test (p=0.05).
Results: Minimal voids volumes were observed in both considered groups. In the group entailing standard retrograde procedures, the mean voids volumes were 1.878±1.492 % of the entire canal space, in the group with sole root-end resection 0.823±0.576 %. The difference was not significant (p=0.137). Irrespective of the considered group, the small amounts of detected voids were mainly located inside the sealer.
Conclusion: When executable, filling the canal with the single cone technique and bioceramic sealer associated with simple root-end resection appears to provide an effective seal of the endodontic space. In selected cases, such technique could make the need to perform retrograde preparation and filling less imperative.

Clinical evaluation of a new technique: low torque, high speed instrumentation with thermally treated nickel titanium rotary files

A. Mazzoni, A. Zanza, S. Petracchiola, A. Del Giudice, M. Seracchiani, L. Testarelli

Sapienza University of Rome, Department of Oral and Maxillo Facial Sciences, School of Endodontics, Professors G. Gambarini and L. Testarelli, Rome, Italy

Aim: To present and evaluate clinically a new operative technique for thermally treated Nickel Titanium Rotary instruments. Since the introduction of Nickel-Titanium (Ni-Ti) rotary instruments have been used to shape the root canals, the efficiency and fastness of root canal treatment (RCT) has increased. Anyway, files separation increased as well. To avoid this event, many ideas have been proposed. The low torque instrumentation is one of the suggested technique to increase safety of RCT. However in most of cases low torque limit did not allow instrument to progress easily and reach working length. In the last ten years, improvments in design, cutting efficiency and manufacturing like heat treatment with softer alloys, could in part eliminate those previous limitations and permit instrumentation with torque values lower than 1 Ncm. On the other hand, to ensure the adequate progression of the files, the operative speed should be up to 800 rpm.
Methods: S-One 25.06 (Fanta Dental Materials Co., Ltd, Shangai, China) NiTi instruments were used in 10 molar cases with an endodontic motor (Eighteeth, Changzhou City, Jiangsu Province, China) using the following setting: 800 Rpm and 1 Ncm. The operative technique used for all the canals was:
1. Scouting and patency check with a K-file 10;
2. Shaping with S-One 25.06 until the torque allowed inward motion of the instrument inside the root canal;
When the maximum torque value setting is reached use an outward motion;
Repeating steps 2 and 3 until the working length was successfully reached.
Result: The root canal treatment of the 10 molar in examination were completed successfully. All the tested instruments reached the working lenght without any fracture or deformation. The AF-R Wire, an innovative alloy produced by Fanta Dental, significantly increased the resistant to flexural stress. The proposed speed and torque setting helped reducing torsional stress. The combination of manufacturing design and operative technique permitted a safer and efficient instrumentation in complex root canals.
Conclusion: Low torque values could reduce the risk of intracanal separations due to torsional stress. The increase of speed may increase the risk of separation due to fatigue but the new alloy are much more resistant than traditional Ni-Ti and could easily compensate this risk. According to the crown down principles, using inward and outward motion with the same instrument, when progression is not easy, could reduce coronal blade engagement and facilitate the file progression. In relation to the results of the tested instruments, the proposed technique seems very promising, and other similar instruments could perform similar results. More tests are necessary to prove the efficacy and safety of this technique.

Antibacterial effects of two synthetic peptides against enterococcus faecalis: an *in vitro* study

Giovanni Mergoni[1], Chiara Mirabile[1], Francesca Poggia[1], Pio Bertani[1], Maddalena Manfredi[1], Tecla Ciociola[2], Stefania Conti[2], Laura Giovati[2]

[1]Centro Universitario di Odontoiatria, Dipartimento di Medicina e Chirurgia, Università di Parma, Italy
[2]Laboratorio di Microbiologia e Virologia, Dipartimento di Medicina e Chirurgia, Università di Parma, Italy

Aim: The persistence of microorganisms within the root canal system is the main recognized cause of endodontic treatment failure. Unfortunately, current antimicrobial techniques have shown several limitations in microbial eradication. Thus, new agents that effectively eliminate endodontic pathogens are needed. The aim of this study was to assess the antibacterial properties of two synthetic peptides, namely KP and L18R, against planktonic cells and biofilms of the endodontic pathogen Enterococcus faecalis and to assess their cytotoxicity against human cells.
Methods: The KP and L18R bactericidal activity against E. faecalis (ATCC 29212) was evaluated by the colony

forming unit assay and the half maximal effective concentration (EC50) was calculated. The inhibition of E. faecalis biofilms was tested using crystal violet and Alamar blue assays and the respective EC50 values were calculated. Peptide effects on an in vitro model of dental infection consisting in 2-day-old E. faecalis biofilms grown on hydroxyapatite disks were assessed using live/dead staining and confocal scanning laser microscopy (CLSM). In order to test peptide cytotoxicity, L929 fibroblasts were exposed to KP and L18R for 24 hours and cell metabolism was evaluated by MTT assay.
Results: Both KP and L18R showed an effective bactericidal activity against planktonic E. faecalis and L18R proved to be 10-folds more effective compared to KP (EC50 value of 4.520 × 10-6 M versus 3.624 × 10-7 M). The two peptides were found to have a dose-dependent inhibitory effect on E. faecalis biofilm grown on polystyrene microplates. The EC50 values, calculated with reference to biomass reduction (crystal violet assay), were 1.607 × 10-4 M and 1.411 × 10-5 M for KP and L18R, respectively. Considering metabolic activity reduction (Alamar blue assay), KP and L18R EC50 values were 1.235 × 10-4 M and 1.585 × 10-5 M, respectively. CLSM images showed that both KP and L18R remarkably reduced the viability of E. faecalis within biofilms grown on hydroxyapatite disks. Toxicity studies demonstrated that 24-hour incubation with the two peptides at concentrations between 50 µg/ml and 200 µg/ml had no adverse effect on L929 fibroblast viability.
Conclusion: KP and L18R effectively inhibited E. faecalis, both in planktonic and biofilm state and showed no cytotoxic effects in our experimental settings. L18R demonstrated a more potent antibacterial activity compared to KP. The obtained results show that antimicrobial peptides may represent a promising new strategy for endodontic infection control.

Post-operative quality of life following root canal treatment performed with different shaping and root canal filling techniques: an observational study

S. Multari, M. Brasoveanu, A. Brondino, G. Carpegna, M. Alovisi, E. Berutti, E. Moccia, D. Pasqualini

Department of Surgical Sciences, Dental School, Endodontics, University of Turin, Turin, Italy

Aim: The aim of the study was to compare two different shaping systems, Protaper Next and WaveOne Gold, and two different root canal filling techniques, thermafil and bioceramics, in terms of postoperative quality of life (POQoL).
Methods: Sixty-nine healthy subjects with asymptomatic or symptomatic irreversible pulpitis and pulp necrosis, with or without apical periodontitis, were enrolled and a primary root canal treatment was carried out. The treatment was performed in two sessions, at least 3 days apart from each other. Cavity access and root canal shaping were carried out during the first session, while the second one was dedicated to root canal filling. After data collection, patients were divided into 4 groups:
- Shaping performed with Protaper Next (PTN) and filling with Thermafil;
- Shaping performed with WaveOne Gold (WOG) and filling with Bioceramics;
- Shaping performed with WaveOne Gold and filling with Thermafil;
- Shaping performed with Protaper Next and filling with Bioceramics;
Glide path was performed with ProGlider in group 1 and 4 and with WaveOne Gold Glider in group 2 and 3. Irrigation was conducted with 5% NaOCl and 10% EDTA for each treatment. POQoL indicators were evaluated for 3 days after each session with self-assessment questionnaires. They evaluated difficulty in chewing, speaking, sleeping, carrying out daily functions, social relations, medium and maximum pain and quality of life, with a Likert-like scale ranging from 0 (none) to 10 (very much). The variation of each indicator over time was analysed with T-student test for repeated measures, and statistical significance was set at $P<0.05$.
Results: Post-operative pain curves demonstrated a more favourable time-trend in the PTN ($P=0.02$), probably due to a lower amount of debris extruded beyond the apex during the shaping, if compared to reciprocating instruments. Moreover, lower pain values were recorded in Bioceramic groups, especially in the first day following the root canal filling ($P=0.023$).
Conclusion: Rotary instrumentation influenced POQoL less than reciprocating systems. Moreover root canal filling carried out with Bioceramic sealers may be associated to a better outcome in postoperative pain.

Use of reciproc instruments with different motions: cyclic fatigue testing with simulation of the body temperature

D. Angerame[1], M. De Biasi[1], C. Pacher[1], V. Franco[2], M. Serafin[3]

[1]Clinical Department of Medical Science, Surgery and Health, University of Trieste, Trieste, Italy
[2]Private practice, Rome, Italy
[3]Private practice, Samarate, Italy

Aim: To assess the influence of different motions on the cyclic fatigue resistance of Reciproc instruments simulating the temperature of the clinical conditions.
Methods: The sample size was determined using statistical software set with the following parameters: $\alpha=0.05$, $\beta=0.20$, $\delta=30.0$, $\sigma=28.0$. The experiment required 54 Reciproc files. Brand new R25 files were randomly

allocated to three groups defined by the tested motion: continuous rotation at 300 rpm (n=18), "RECIPROC" mode (n=18), and "WAVEONE" mode (n=18). The same endodontic motor was used for all groups (X-Smart IQ). All files were rotated/reciprocated until fracture inside a custom-designed artificial canal with 60° angle and 5-mm radius of curvature milled in a stainless-steel block. The testing device was electrically heated to keep its internal temperature at 35±1°C, which was constantly monitored with a thermometer. After file separation, the time to failure was registered with a digital chronometer and the length of the fractured fragment measured with a digital calliper. The fracture surface of each file was observed at the scanning electron microscope to perform a qualitative fractographic analysis. The collected data (time to fracture and fracture length) were tested for the normality of the distribution and the equality of variances with a Shapiro-Wilk and a Levene test, respectively. The dependent variables were compared amongst groups by means of a multivariate analysis of variance and Tuckey post-hoc test (p=0.05).
Results: The continuous rotation group exhibited the shortest lifespan among the considered groups (85.4±9.5 s to failure). Both reciprocating motions were associated with a significant improvement of fatigue resistance (p<0.001). The "RECIPROC" mode allowed for longer time to failure than the "WAVEONE" mode, with 141.6±19.4 s and 117.2±11.2 s to failure, respectively. The absence of differences among the considered groups in terms of fracture length confirmed the correct positioning of the files inside the artificial canal. The scanning electron microscopic analysis showed signs of file separation ascribable to cyclic fatigue.
Conclusion: The present study preliminary demonstrated that the native "RECIPROC" motion use of R25 Reciproc files should be preferred over other types of motions to prevent file separation in the clinical setting.

In vitro evaluation of cyclic fatigue resistance of two reciprocating endodontic instruments

S. Petracchiola, V. Di Giacinto, A. Mazzoni, A. Zanza, F. Valenti, D. Di Nardo

Sapienza University of Rome, Italy

Aim: Aim of this study is to compare and evaluate two different reciprocating rotary instruments: Wave One Gold (Dentsply, Maillefer) (WoG) Edge One Fire (EdgeEndo, Albuquerque, New Mexico). The Edge One Fire (EoF) is a new recently commercialized device for endodontic treatments. These instruments were tested because they both have the same dimension, cross section and they are used with the same reciprocating motion Therefore, data comparing EoF to other similar instruments are still missing. EoF is designed to shape canals in a reciprocating motion. The motion for WoG is well studied yet. The manufacturer suggests the use of the same motion for EoF. Thus, both instruments were used in the same alternate motion.
Methods: A total of 40 different Ni-Ti endodontic instruments of length of 25 mm and tip size 35 were tested for their fatigue cyclic resistance. The instruments were analyzed using an optical stereomicroscope with a magnification at 20X, instruments with defects were discarded from the study. They were rotated using the reciprocating motion (150° CCW - 30° CW) proprietary of the manufacturers for the WoG using the Endodontic motor X smart plus (Dentsply, Maillefer). 20 Wave One Gold medium tip size 35 and taper 6% and 20 Edge One Fire medium tip size 35 and taper 6%. Cyclic fatigue resistance was performed in a stainless steel (SS) root canal made for the aim. This artificial root canal was made with a 2 mm radius of curvature and an angle of curvature of 90° degrees. This device was previously validated in many published studies to assay in vitro cyclic fatigue resistance of instruments. Each instrument was rotated until separation happened and the time to fracture (TtF) was recorded. As the fracture occurred, the time was recorded, the fractured fragment was analyzed, and the fracture length was registered (FL). Means and standard deviations of TtF and FL were calculated and data were subjected to the Student's T-Test (P < 0.05).
Result: Data show a statistically significant difference between the two instruments. The Edge One Fire showed a higher resistance compared to Wave One Gold (p<0.05). Mean values were 14,67±0,57 and 28,00±2,64 seconds for WoG and for EoF respectively. Conversely, no significant difference was found in the fragment length, mean values 2,41±0,14 mm vs 2,44+0,38 mm for WoG and EoF respectively.
Conclusions: Our study showed a higher resistance, measured by time of fracture, of the Edge One Fire compared to Wave One Gold. Since motion, design and dimension were the same, this divergent can be related to the different thermal treatment applied on the two instruments. This statistically different allows the clinicians to a safer use of the instrument.

Improving resistance to cyclic fatigue and flexural stresses of Ni-Ti rotary instruments through different heat treatments

Martina Picariello, Dario Di Nardo, Gabriele Miccoli, Linda Quero, Valerio Ferri, Antonio Morese

Sapienza University of Rome, Italy

Aim: This study aims to evaluate the hypothesis that different heat treatments applied by manufacturers can significantly affect the in vitro resistance to cyclic

fatigue resistance of Ni-Ti rotary instruments. Therefore, the aim was to evaluate the possibility that different heat treatments can improve Ni-Ti endodontic rotary instruments resistance to fracture. The null hypothesis was that no difference would be found between similar instruments with different heat treatments.
Methods: A total of 18 Ni-Ti rotary instruments with the same size tip, taper and design, produced by the same manufacturer (United Dental, Shanghai, China), but with different performance due to different heat treatments were analyzed: 9 M3 instruments, tip size 25 and .06 taper and 9 M3 Pro Gold instruments tip size 25 and .06 taper. All of them have been inspected with an optical stereomicroscope at 20X magnification for morphological analysis and if defective instruments were found, they were discarded. The instruments were tested in a 60° curved artificial root canal, used for other studies, inserted at the same length (16mm) and then rotated at 350 rpm with maximum torque until fracture occurred. For each instrument the number of cycles to fracture (NCF) was calculated. Moreover, fragments were collected and measured. Differences among groups were statistically evaluated with an analysis of variance test (significance level was set at $P < 0.05$).
Results: Significant differences have been found between the two groups: the M3 Pro Gold instruments were considerably more resistant to fatigue than M3 instruments. Mean value of the fragment's length for M3 Pro Gold instruments was 5,5 mm and for M3 instruments was 5,4 mm, therefore statistically significant differences were not found.
Conclusion. The null hypothesis was rejected: M3 Pro Gold instruments are considerably more resistant to cyclic fatigue when compared to M3. The conclusion of the study is that an increased flexibility and the reduction of internal defects produced by heat treatments during or after manufacturing processes, may be responsible for improving resistance to cyclic fatigue and flexural stresses. Changing the heat treatment, allows manufacturers to improve clinical performance of Ni-Ti rotary instruments, with no need to change quality of the raw material or to modify the grinding machines. M3 rotary and M3 Pro Gold are an example of Ni-Ti rotary instruments with same alloy, same design and same manufacturer, but with different resistance to cyclic fatigue consequently different heat treatments.

Root canal morphology of lower lateral incisors: a cone beam computed tomography study *in vivo*

Linda Quero[1], Stefano Petracchiola[1], Andrea Del Giudice[1], Maurilio D'Angelo[1], Antonio Morese[1], Federico Valenti Obino[2]

[1]Student, Sapienza University of Rome, Dept. of Oral and Maxillofacial Science, Rome, Italy

[2]DDS, PhD student, Sapienza University of Rome, Dept. of Oral and Maxillofacial Science, Rome, Italy

Aim: The aim of this study was to analyze in vivo the root canal configuration in lower lateral incisors using cone-beam computed tomography (CBCT) imaging in a European population. The use of CBCT to clinically study root canal anatomy overcomes the limitations of conventional radiography because: it is a minimally invasive tool that can provide images displayed in coronal, sagittal and axial planes, a large number of teeth can be examined with the same exposure to the X-rays, it can provide a precise location of the tooth, it gives the possibility of making right and left symmetrical evaluations, and it allows the study of the three-dimensionality of the tooth in its entirety. Currently, very few studies have been done concerning with the endodontic anatomy of lower incisors using CBCT.
Methods: A total of 100 lower lateral incisors from 50 patients were examined using CBCT imaging, previously taken for diagnosis and treatment. The number of roots, root canal system configuration, presence of apical confluences, distance between confluences and radiographic root end, symmetry between left and right elements in the same individual were statistically analyzed through the use of SPSS 20.0 (SPSS, Inc., Chicago, IL, USA) with the significance set at $p<0.05$ and examined with the help of the Horos™ software (The Horos Project, 64-bit medical image viewer, GNU Lesser General Public Licence, version 3.0).
Results: All the examined teeth presented only one root. Type I Vertucci configuration was present in 53% of cases, type II Vertucci configuration in 30% of cases, type III Vertucci configuration in 15 % of cases, type VII Vertucci configuration in 2% of cases. Other configurations were not found. Apical confluences were present in all the incisors with a type II, type III and type VII Vertucci configuration. Overall there was 47% of confluences in lower lateral incisors. The average distance between confluences and radiographic root end was 3,102mm in type II Vertucci configuration and 3,234mm in type III Vertucci configuration. The average distance in type VII was 2,802 mm. Symmetry between right and left elements in the same individual was found in 86% of cases.
Conclusions: The percentage of Vertucci type II, type III and type VII configuration was higher than previous researches performed in the past years. Concerning with the symmetry a large number of lower lateral incisors presented an identical root canal morphology in the same individual. The average distance between confluences and radiographic root end was 3,046 mm in the apical third of the roots, the most stressful and dangerous area for the instruments. These results highlighted that only an accurate preoperative radiographic exam could identify a complex canal configuration.

Effectiveness of the phytic acid in the preparation of the post space: a confocal laser scanning microscope analysis

L. Boschetti, E. Audino, D. Forgione, R. Tonini, L. Gilberti, M. Salvadori, R. Bresciani, S. Salgarello

University of Brescia, Dept. of Medical and Surgery Specialties, Radiological Sciences and Public Health, Brescia, Italy

Aim: Validate the efficacy of phytic acid (IP6) in the cleansing of the dentinal tubules during the preparation of the post space.
Methods: Eighty teeth were selected, single-rooted, forty with circular-shaped root canal (group A) and forty with oval-shaped root canal (group B), avulsed for orthodontic or periodontal reasons. Each group has been divided into two subgroups (A1, A2, B1, B2) each consisting of 20 elements. The elements whose roots were fractured or affected by carious lesions, reconstructions, intracanal material, resorption, calcification, lateral canals and a curvature of more than 5° evaluated with the Schneider technique were excluded. The elements were decoronated, and their length was standardized; afterwards they were shaped, cleaned and obtured. The total volume of 5.25% NaOCl used for each tooth during the root canal shaping was 12.5 ml. The subgroups A1 and B1 received, as final wash, 5 ml of a phytic acid solution (IP6); similarly the A2 and B2 subgroups were treated with a solution of 5 ml of 18% EDTA. They followed, for both, three minutes of cleansing with physiological water. After seven days, post space was prepared with Largo burs # 1-2-3 and standardized to a length of 10 mm. Subsequently, a cleansing with 5 ml IP6 of 1% was carried out for subgroups A1 and B1. For subgroups A2 and B2, a cleansing was maintained with 5 ml EDTA 18%. For both groups, the perfect cleaning and permeability of the dentinal tubules was guaranteed with a wash of 5 ml of physiological solution. The composite used for adhesive cementation was the New Techcem (Isasan, Rovello Porro - Como - Italy), to which was added, during mixing, rhodamine-B powder to be able to appreciate the distribution of cement under confocal microscope. In the first group (A), Tech 2000 full fiber post, Isasan (1.2 mm diameter) was cemented; in the second group (B) Techole, Isasan hollow fiber-reinforced post (1.2 mm external diameter, 0.5 mm inner hole diameter) was used. Three cross sections, with a thickness of 1 mm, were obtained respectively from the coronal, middle and apical third of each element, for observation under confocal microscopy. The parameters examined are the percentage of circumference (PC) showing the penetration by the cement and the maximum penetration point (MP) for each section. Using the Mann-Whitney non-parametric statistical test U, the two groups were compared, using a significance level of 0.05.
Results: Comparing the elements treated with EDTA and those with phytic acid, a statistically significant difference emerges. For group A, the results were significantly higher in the elements treated with IP6 (mean PC = 83,69%; mean MP = 2061 µm) compared to those treated with EDTA (mean PC = 53,03%; mean MP = 1002µm). Also in group B, the results are significantly higher when the cleansing occurred with IP6 (mean PC = 54,65%; mean MP = 1530µm) rather than with EDTA (mean PC = 54,65%; mean MP = 844µm)
Conclusion: Phytic acid in 1% aqueous solution guarantees a better conditioning of the root dentin compared to the traditional 18% EDTA for the purpose of adhesion. Therefore, the use of the new irrigant is preferable to EDTA in the preparation of the post-space, regardless of post used or root canal morphology.

Evaluation of full fiber post and hollow fiber-reinforced post in two different root canal morphologies: a confocal laser scanning microscope analysis

L. Boschetti, E. Audino, D. Forgione, R. Tonini, L. Gilberti, M. Salvadori, R. Bresciani, S. Salgarello

University of Brescia, Dept. of Medical and Surgery Specialties, Radiological Sciences and Public Health, Brescia, Italy

Aim: Post-endodontic restoration can be obtained with adhesively cemented fiber post. Currently, hollow and full fiber posts are used without considering a protocol adapted to root canal morphology. The aim of the study is to investigate the most appropriate type of fiber post to be cemented into root canals with circular or oval anatomy.
Methods: Forty teeth were used, single-rooted, twenty with circular-shaped root canal and twenty with oval-shaped root canal, avulsed for orthodontic or periodontal reasons. The elements whose roots were fractured or affected by carious lesions, reconstructions, intracanal material, resorption, calcification, lateral canals and a curvature of more than 5° evaluated with the Schneider technique were excluded. The teeth received the decoronation procedure, and their length was standardized; afterwards they were shaped, cleaned and obtured. The total volume of 5.25% NaOCl used for each tooth during the root canal shaping was 12.5 ml. The final wash was carried out with a solution of Phytic Acid (IP6) 5 ml, followed by three minutes of cleansing with physiological water. After seven days, post space was prepared with Largo burs # 1-2-3 and standardized to a length of 10 mm. Once the preparation was completed, a cleansing was performed with 5 ml of 1% phytic acid followed by 5 ml of

physiological solution, in order to guarantee the perfect cleansing and permeability of the dentinal tubules. The composite used for adhesive cementation was the New Techcem (Isasan, Rovello Porro - Como - Italy), to which was added, during mixing, rhodamine-B powder to be able to appreciate the distribution of cement under confocal microscope (LSM510 - Carl Zeiss). Both the elements with circular and oval section root canal were divided into two groups, consisting of ten elements each. In the first group, Tech 2000 full fiber post, Isasan (1.2 mm diameter) was cemented; in the second group Techole, Isasan hollow fiber-reinforced post (1.2 mm external diameter, 0.5 mm inner hole diameter). Three cross sections, with a thickness of 1 mm, were obtained respectively from the coronal, middle and apical third of each element, for observation under confocal microscopy. The parameters examined are the percentage of circumference (PC) showing the penetration by the cement and the maximum penetration point (MP) for each section. Using the Mann-Whitney non-parametric statistical test U, the two groups were compared, using a significance level of 0.05.

Results: For circular-shaped root canals, full fiber post proved to be significantly more effective (mean PC = 83.69%; mean MP = 2060.53 µm) than hollow fiber-reinforced post (mean PC = 74.52%; mean MP = 1597.80 µm). For oval-shaped root canals, on the other hand, the parameters analyzed were significantly better for hollow fiber-reinforced post (mean PC = 75.60%; mean MP = 1530.00 µm) compared to full fiber post (mean PC = 43.75%; mean MP = 1278.06 µm).

Conclusions: The data obtained from the study show how the shape of the canal influences the distribution of cement in the dentinal tubules of the root canal, in the two different cementation techniques, both as regards the percentage of penetrated circumference and the maximum penetration recorded. The hollow fiber-reinforced post showed better efficacy in the oval root canals; in round canals, the cementation protocol of the full fiber post is even more effective.

A dynamic navigation system to prepare pulp chamber space. A new device to teach endo

Gerardo Pellegrino, Andrea Spinelli, Chiara Pirani, Fausto Zamparini, Claudio Marchetti, Carlo Prati, Maria Giovanna Gandolfi

Endodontic Clinical Section, Dental School, Department of Biomedical and Neuromotor Sciences, University of Bologna, Italy
Department of Biomedical and Neuromotor Sciences, Maxillofaccial Surgery, University of Bologna, Bologna, Italy

Aim: Design of endodontic cavities for different tooth types have remained unchanged for decades with only negligible modifications. Access cavity preparation is one of the most important factor that influences the quantity of the residual dental substance and, consequently, the fracture strength of treated teeth. The trend of the last years in dentistry is to perform minimally invasive procedures. This is true in surgery as well as in Endodontics to minimize tooth structure removal. Dynamic navigation is an innovative technology that could be used to achieve this aim. The present study describes a new method to identify with a minimally invasive procedure the root orifices via the use of a dynamic navigation system.

Methods: Three human teeth extracted for orthodontic reasons were selected, cleaned and stored in distilled water at 4° C for 10 days. Samples were fixed with a light curing resin composite into a prefabricated mouth plastic model in place of the correspondent resin teeth. Two teeth were lower premolars and one was a lower molar; one of them was endodontically treated, filled with resin sealer and gutta-percha and reconstructed with resin cement and a carbon fiber- post. A markers plate for the navigation system was placed in situ by the use of Putty impression material (Ramitec, 3M ESPE, USA), according to the protocol of the navigation system manufacturer (ImplaNav, BresMedical, Sydney, Australia). The ImplaNav Navigation System was used for this step. ImplaNav consists of a software interface running in Microsoft Windows (Microsoft), which processes positional data obtained from a stereoscopic camera. The cone beam computed tomography (CBCT) scan of the model was then imported on the ImplaNav software and a 3D reconstruction model was then obtained. A registration procedure of the model for the calibration of the system was done by touching three points with the tip mounted on the handpiece. After that, the preparation of the pulp chamber cavity was performed with a diamond bur in a dynamical way by real-time navigation. The bur position was virtually followed on the navigation system screen up to reach the root entrance. Then without any other type of preparation, the access to the root canal was verified via the insertion of an endodontic manual stainless-steel instrument. Finally, a postoperative CBCT was undertaken to prove radiographically the presence of a unique hole for each root from the enamel to the root canal.

Result: The minimal access cavity allowed to preserve the structure integrity and allowed to localize the root canal orificies with a simplified technique. No root canal perforations, canals aberrations or instrument fractured were observed.

Conclusion: From this preliminary results, the dynamic navigation appears as an useful device to aid the Endodontist to identify the root canal orifices through an image fast moving guided procedure and could be employed for teaching endodontics. Further studies are necessary to validate these method.

Influence of operator skills on operative torque and instrumentation time: an in vitro study

A. Zanza, A. Mazzoni, M. Picariello, S. Petracchiola, F. Valenti Obino, G. Gambarini

Sapienza University of Rome, Department of Oral & Maxillo-Facial Science, School of Endodontics, Professors G. Gambarini and L. Testarelli, Rome, Italy

Aim: This in vitro study was done in order to evaluate if different operators, under the same conditions (same instruments, instruction for use, clinical techniques, endodontic motor and resin blocks hardness), could result in different operative torque and instrumentation time.
Methods: 40 resin blocks, with the same canal anatomy, were randomly divided and assigned, so that the two different operators (A and B) had 20 resin blocks each. Each operator instrumented their own resin blocks with a single file technique, using F-One rotary instruments with size 25 and taper 04 (Fanta-Dental, Shanghai, China), strictly following manufactures instruction for use (500 rpm, 2.5 N·cm). Each resin block was instrumented with a new endodontic file. Clinical endodontic technique used by two operators consists in an outward motion: selective brushing movement against the lateral walls of the canal. Both operators used the same motor with the same 1:1 handpiece (KaVo, Biberach, Germany). This motor is able to record operative torque every 1/10 of a second. Operative torque was analyzed, using the methodology validated in previous published study, and then statistically studied. Also, the instrumentation time was recorded and statistically analyzed.
Results: Results and statistical analysis show a significant difference concerning operative torque between two operators A and B ($p<0.05$). The operative torque of A-operator is higher (A-operator's mean value 0.73 N·cm ± 0.09 N·cm compared to B-operator's mean value 0.47 N·cm ± 0.04 N·cm), although his mean value of instrumentation time is 39.66 s ± 3.69 s compared to the other which is 55.00 s ± 6.78 s ($p<0.05$). The torque limit was not reached by any of two operators.
Conclusion: The F-one endodontic files, used for the study, have a flat design, which provide better cutting and debris removal and also increase resistance to cyclic fatigue due to the fact that instrument's mass is deeply reduced. Despite this high cyclic fatigue resistance, instrument separation could still occur because of torsional stress. Torsional stress can be studied by evaluating instrumentation torque.
In this in vitro study it is showed how lower stressful instrumentation is linked to a longer instrumentation time, and vice versa. Furthermore, torque and consequently torsional stress depend on some subjective variables such as amplitude of pecking and pressure, although the clinical technique used by two operators was the same. It may be suggested that setting of the torque limits should not only depend on the instrument used but also on the operator's skills. Furthermore, this study shows as, using F-One rotary instruments with size 25 and taper 04 (Fanta-Dental, Shanghai, China) and an outwards action, canals are completely treated in a short time guaranteeing low torque.

Post-endodontical medication-related osteonecrosis of the jaw (MRONJ) in patients taking antiresorptive and antiangiogenic drugs: report of 8 cases

S. Di Nanna, A. Casorelli, F. Dell'Olio, De Falco, V. Acella, A. Tempesta, G. Favia

Complex Unit of Odontostomatology, DIM, Interdisciplinary Department of Medicine, Aldo Moro University of Bari, Italy

Aim: Medication-related osteonecrosis of the jaw (MRONJ) is a severe side effect of antiresorptive and antiangiogenic drugs used for bone metastases of oncologic diseases and osteoporosis. The latest literature shows a statistically significant relation between dental therapies and MRONJ, especially oral surgery. Consequently, among patients considered at risk of MRONJ development presenting dental abscess, the first choice therapy is the root canal treatment, because tooth extraction is the main cause of MRONJ. The aim of this study is to report cases of MRONJ associated to incongruous root canal treatments referred to the Complex Operating Unit of Odontostomatology of "Aldo Moro" University of Bari from 2005 to 2018.
Methods: To carry out this study, authors analysed a database comprehending 283 patients affected by 366 lesions histologically diagnosed as MRONJ. Among them, authors selected only 8 patients affected by MRONJ not related to previous dental extractions, dental implants presence, or removable dental prosthesis, but associated to the presence of teeth with unfitted root canal treatment. All patients were treated according to our protocol. They underwent panoramic radiogram and computed axial tomography to evaluate the real extension of necrotic areas and, then, the surgical resection of necrotic bone was performed, after an interruption period of both antiresorptive and antiangiogenic therapy of 3-6 months, and after almost 3 cycles of antibiotic therapy (ceftriaxone 1g daily i.m. and metronidazole 250mg twice a day per os). During surgical treatment all causal teeth and all involved dental elements were removed. Histological exam was performed to all bone specimens. Patients underwent monthly clinical follow up and panoramic

radiogram check-up every three months for a mean time of 3 years.

Result: Totally, 8 patients were included in the current study: 4 of them (50.0%) were affected by prostatic cancer, 3 (37.5%) by breast cancer, and 1 (12.5%) by multiple myeloma. Five patients (62.5%) received zolendronic acid, 1 (12.5%) clodronate, and 2 (25.0%) Denosumab. Considering lesions sites, the upper jaw was affected in 7 cases (87.5%), while the lower jaw in only one case (12.5%). Overall, all treated MRONJ healed without recurrence or complications. Moreover, the histopathological examination of surgical samples highlighted the presence of areas of active acute inflammation filled with an inflammatory infiltrate, areas of bone necrosis, without residual osteocytes/osteoblasts, with large and empty Haversian channels and reduction of vascularization, several basophilic bacterial colonies interspersed with the necrotic debris. Considering endodontic treatment of tooth directly involved in MRONJ, absence of apical seal was evaluated in 4 cases (50%), root perforation in 3 cases (37.5%), root fractures by root pin in 1 case (12.5%).

Conclusion: This study evidences how incongruous root canal treatment can cause MRONJ among patients undergoing antiresorptive and antiangiogenic drugs, as it could act as a vehicle of bacterial infection that could cause bone necrosis.

Gnathology

Prevalence of temporo-mandibular disorders in patients with obstructive sleep apnea syndrome

Anna Alessandri Bonetti, Federica Guglielmi, Andrea Camodeca, Patrizia Gallenzi

Fondazione Policlinico Universitario A. Gemelli IRCCS, Roma, Università Cattolica del Sacro Cuore, Roma, Italy - Institute of Dentistry and Maxillofacial Surgery, Dean: Prof. Massimo Cordaro

Aim: Obstructive sleep apnea (OSA) is a common chronic sleep disorder affecting from 9% to 38% of the general population. OSA is characterized by repeated pauses during breathing and has been proven to be life-threatening when untreated. Temporomandibular disorders (TMD) are the second most common musculoskeletal disorder and are characterized by pain in the facial region and temporomandibular joint. Since some studies have shown a significant correlation between reduction of sleep quality and pain perception, we conducted a research in order to evaluate the presence of TMD signs and symptoms according to the new Diagnostic Criteria for Temporo - mandibular Disorders (DC/TMD) in patients with a diagnose of OSA.
Methods: Patients with diagnose of OSA, obtained by somnographic registration, were recruited from the ENT department at "Agostino Gemelli" University. Before receiving any treatment suggestion, they were examined according to the DC/TMD axis I and axis II. The examination included some questionnaires regarding signs and symptoms of TMD and others analyzing biopsychosocial condition together with a clinical examination. In order to reduce bias, the same researcher was responsible for all the exams. Ethical approval was obtained before the study beginning.
Results: hirty-two patients with mild to severe OSA participated in the study and therefore were included in the analysis. 25 were males and 7 females with a mean age of 49.8 years old. 40.6% of all patients were diagnosed with some kind of TMD. 31.3% presented an intra articular or degenerative joint disorder where clinical disc displacement with reduction was the most common diagnose. 37.5% presented with painful TMD of which myalgia was the most common diagnose. 85.7% of women presented painful-TMD. No correlation was found between Apnea/Hypopnea Index (AHI) and TMD pain.
Conclusion: The present study is the first one in scientific literature, evaluating the prevalence of TMD in obstructive sleep apnea patients according to the DC/TMD. The prevalence of TMD is very high among these patients with a significantly higher prevalence in females. Due to the growing success of the mandibular advancement devices, dentists are gaining more power in the treatment of OSA. It is now clear that, in order to provide a proper treatment, dentists treating OSA patients should be experienced and qualified both in sleep medicine and orofacial pain.

Dimensions of the mandibular condyle and the glenoid cavity in the different sagittal skeletal patterns in adolescents. A computed tomography study

A. De Stefano[1-2], E. Guercio-Monaco[1-2], A. Impelizzeri[2], R. Vernucci[3], G. Galluccio[4]

[1]Professor. Department of Orthodontics, Faculty of Dentistry, University Central of Venezuela, Venezuela
[2]Ph.D. student Faculty of Dentistry, Sapienza University of Rome, Italy
[3]Department of Orthodontics, Faculty of Dentistry, Sapienza University of Rome, Italy
[4]Associate Professor Department of Orthodontic, Faculty of Dentistry. Sapienza University of Rome, Italy

Aim: The characteristics of the temporomandibular

joint (TMJ) are modified as a consequence of different factors. The sagittal skeletal pattern has been related to the dimensions of the osseous components of the TMJ. Objective: The aim of this study was to evaluate the relationship between the dimension of the mandibular condyle and the glenoid cavity and the sagittal skeletal pattern in adolescents.
Methods: 40 adolescent patients, between 11 and 19 years old, 12 males and 28 females, were evaluated. They were divided into three groups according to the ANB angle: 15 Class I (ANB 0 ° - 4 °), 15 Class II (> 4°) and 10 Class III (<0 °). The width and length of the condyle and the width and depth of the glenoid cavity were measured using computed tomography images. By the t-Student test, the means of the measures of the right and left side were compared. Through the ANOVA test, the means of the measurements of the condyle and the glenoid cavity were analyzed according to the vertical skeletal pattern and the post-hoc Bonferroni test was used to identify the group correlations.
Results: No significant difference was found between the right and left side averages, so the mean between sides was used for the analysis. A correlation was obtained between the depth of the glenoid cavity and the sagittal skeletal pattern (P = 0.009), was deeper in Class III and less in Class II. The rest of the variables studied did not present a statistically significant correlation with the sagittal skeletal pattern.
Conclusions: The depth of the glenoid cavity is greater in Class III subjects and less deep in those Class II. The dimensions of the condyle and the width of the glenoid cavity did not show a statistically significant relationship with the sagittal skeletal pattern in the adolescents studied.

Characteristics of the bone components of the temporomandibular joint and its relationship with the vertical skeletal pattern in adolescents. A computed tomography study

A. De Stefano[1-2], E. Guercio-Monaco[1-2], A. Impelizzeri[2], R. Vernucci[3], G. Galluccio[4]

[1]Professor. Department of Orthodontics, Faculty of Dentistry, University Central of Venezuela, Venezuela
[2] Ph.D. student Faculty of Dentistry. Sapienza University of Rome, Italy
[3] Department of Orthodontics, Faculty of Dentistry. Sapienza University of Rome, Italy
[4]Associate Professor Department of Orthodontic, Faculty of Dentistry, Sapienza University of Rome, Italy

Aim: The temporomandibular joint (TMJ) is a joint formed by the mandibular condyle and the glenoid cavity of the temporal bone. Several factors affect the morphology of the TMJ components. A relationship between the characteristics of the bone components of the temporomandibular joint and the craniofacial skeletal characteristics has been reported. Objective: The aim of the present study was to verify the relationship between the characteristics of the bone components of the TMJ and the vertical skeletal pattern in adolescent patients.
Method: A total of 45 adolescent patients (16.20 ± 1.91 years of age), 13 males and 32 females, were divided into 3 groups according to their vertical skeletal pattern: 15 normodivergent, 15 hyperdivergent and 15 hypodivergent. The TMJ was evaluated in computed tomography (CT) images, the anteroposterior and lateromedial dimensions of the condyle and the anteroposterior dimension and high of the glenoid cavity were measured. The t-Student test was used to compare the measurements of the right and left sides and between the genders, and the ANOVA test was used to evaluate the correlation between condylar and glenoid cavity measurements with the vertical skeletal pattern and the post-hoc Turkey's test was used to identify the correlation between groups.
Results: No statistical difference was found in the measurements of the condyle and glenoid cavity on the right and left sides, so a mean between both sides was used. A statistically significant relationship was observed between the medial-lateral dimension of the condyle and the skeletal pattern (P = 0.000), in the paired comparisons a statistical difference of this dimension was observed between hypodivergent and hyperdivergent. The rest of the variables studied did not present a statistically significant difference.
Conclusion: The lateromedial dimension of the mandibular condyle is greater in hypodivergent patients and lower hyperdivergent patients. The anteroposterior dimension of the condyle and the measurements of the glenoid cavity did not present a correlation with the vertical skeletal pattern in the adolescent.

Multidisciplinary approach with traditional and complementary therapies in patients with temporomandibular disorders and fibromyalgia: a randomized study

Paola Di Giacomo[1], Anna D'Urso[2], Emanuela Serritella[1], Chiara Vompi[2], Giacomo Ferrato[1], Carlo Di Paolo[3]

Department of Oral and Maxillo-facial Sciences, Gnathologic Division Sapienza University of Rome, Italy
[1] PhD
[2] DDS
[3] Full professor

Aim: Fibromyalgia (FM) is a chronic musculoskeletal pain syndrome characterized by widespread musculoskeletal pain and tenderness at specific anatomic sites (tender points. The association of FM

with other musculoskeletal comorbidities, such as Temporo-Mandibular Dysfunction (TMD) is common. The randomized study was aimed at evaluate the analgesic effect of Okada Purifying Therapy (OPT) when administered in combination with duloxetine in patients with Temporo-Mandibular Disorders (TMDs) and Fibromyalgia (FM). Okada PurifyingTherapy (OPT) is a practice of alternative medicine in which patients are treated with a technique that uses bioenergy, or qi produced by practitioner's palm, without physically touching.

Methods: Patients with TMDs visited at Policlinico Umberto I, Head-neck Department, Rome who were diagnosed with FM were selected for the study between 2010 and 2015. The final sample was composed of 31 patients: 15 patientswere treated only with duloxetine for 8 weeks (Group I or Control Group) and 16 patients received also OPT treatment (Group II). All OPT session was performed by a single well-trained certified practitioner for a period of 50 minutes. Cranio-mandibular index, total tenderness score, Brief Pain Inventory Modified Short Form, Fibromyalgia Impact Questionnaire, Beck Depression Inventory and State and Trait Anxiety Inventory-1 were assessed at the beginning (T0), during the course (T1) and after therapy (T2). Descriptive and inferential statistics were performed.

Results: In all the outcomes analyzed, both groups showed an improvement in particular between T0 and T1 and a progressive decrease of it between T1 and T2. No differences in any of the selected outcomes were observed between the two groups during the trial. No side effects due to the drug were registered in group II compared to group I.

Conclusion: The additional complementary treatment (OPT) does not seem to give the patients with TMDs and FM any further benefit but it could improve pharmacological tolerability of the traditional drug therapy. in further investigations the aim could be to administer Okada therapy alone in patients who do not accept pharmacological therapy with duloxetine, comparing results with a control group with a placebo therapy.

Polaris spectra: a new protocol for 3D evaluation of mandibuar kinesiology

M. Festa[1], F. Ghielmi[1], M. La Rovere[2], D. Lucarelli[1], S. Magistro[3]

University of Milan, Italy - IRCSS Cà Granda, UOC Chirurgia Maxillo-facciale e Odontostomatologia, Direttore Prof. A.B. Giannì, Scuola di Specializzazione in Ortognatodonzia, Presidente: Prof. G. Farronato
[1]Specializzando in Ortognatodonzia
[2]Igienista dentale
[3]Specialista in Ortognatodonzia

Aim: One of the goals for clinicians and researchers in the evaluation of mandibular kinesiology has been the riproduction of TMJ three dimentional movement .Actual technology allows the recording of these movements and the results are often expressed in graphics and numbers, and the dynamical information has to be interpreted by specialized personnel, and results are expressed in native not open files that are difficult to be shared. We present a new open source protocol, based on an extremely sharp and detailed technology, which allows to match CBCT static technology with a dynamic 3d-based virtual acquiring movement system.

Methods: Polaris spectra technology consists in a sophistacted IR based acquiring system, allowing to capture movements of a 3d object in a given field of view, combined with a native software of tracking , a standard CBCT and a specifically designed matching sofware, allows to reconstruct real time 3d mandibular movements and show them immediately in a standard pc platform.It consists in a central unit, mounting two IR precision cameras, an IR structured light source, a computer interface. The sofware for the tratment of data is NDI tracking, a specific program working with polaris spectra device that generates a conical three dimensional field of action, 3D face sofware, used to match movement informations with CBCT and upper and lower arch scanning, that generate s the project. The whole system is open source and projects can be exported in other platforms. The results combined with a 3d face scanner and a magnetic resonance create a virtual reproduction of the examined subject and can be used for every clinical purpose in a totally digital workflow system.

Results: After a three-year developing and tuning research, polaris spectra protocol is now ready for clinical use.The precision in movement recording has been measured in 0,1% and is possible to measure and view every anatomical detail in every single frame of the recorded movement.

Conclusions: The sharpness and precision of polaris spectra protocol and immediate real time results give to the study of kinesiology a new poweful instrument for temporomandibular disorders, but also in orthodontics and in all the fields of dentistry, where a dynamical non static evaluation is needed.

Use of sport bite in young soccer players: on the field clinical study

M. La Rovere[2], M. Festa[1], F. Ghielmi[1], G. Guenza[1], S. Magistro[3]

University of Milan, Italy - IRCSS Cà Granda, UOC Chirurgia Maxillo-facciale e Odontostomatologia, Direttore Prof. A.B. Giannì, Scuola di Specializzazione in Ortognatodonzia, Presidente: Prof. G. Farronato
[1]Odontoiatra, specializzando in Ortognatodonzia
[2]Igienista dentale

[3]Odontoiatra, specialista in Ortognatodonzia

Aim: Dentofacial traumas are often registered to be common in emergency care units all over Italy and are relatively frequent after accidents occurred during sport practitising. Soccer is well known to be very popular and counts lots of players all over the country, expecially among young people. Is the use of a custom made sport bite recommended for soccer players? is the use of sport bite well tolerated? Can a sport bite improve performance? We present a clinical trial study on a soccer society and young soccer players to try to answer to these questions.
Methods: We proposed for the study to the directors of a young amatorial soccer team to build for 35 young soccer players from 9 to 14 years old a custom made bite previous consensus of parents and anamnesys. and k7 kinesiographic and postural analisys. Of each subject were performed impressions and a build-up position taken after tens. The bites were used during training sessions and match. Then interwiews were made and data taken regarding comfort, improving performance, trauma protection. Postural analisys with stabilometric device was performed after two months of use.
Results: 29 subjects experienced improvement in sport performance, consisting in a better muscolar activity and more strenght . 3 subject were unable to wear the bite for discomfort reason. 3 of them left the study. The expected goal of protection during match fight was demonstrated in four episodes, where game contacts interested teeth and severe problems were not reported. Postural analisys showed a better posture in 19 subjects on 27. The study is still going on and definitive data will be avaliable in summer.
Conclusions: the use of a custom made sport bite can be useful for the protection for soccer players. Breathing poblems during activity seem not affecting subjects examined. The device seems to be well tolerated in a large part of subjects, even if can create problems of communication of the team. Long term results are going to be taken in future.

Case report: TMD gnathological treatment using polaris spectra protocol

S. Magistro[3], F. Zanoni[1], F. Ghielmi[1], M. La Rovere[2], M. Festa[1]

University of Milan, Italy - IRCSS Cà Granda, UOC Chirurgia Maxillo-facciale e Odontostomatologia, Direttore Prof. A.B. Giannì, Scuola di Specializzazione in Ortognatodonzia, Presidente: Prof. G. Farronato
[1]Specializzando in Ortognatodonzia
[2] Igienista dentale
[3] Specialista in Ortognatodonzia

Aim: In this case report, we applied polaris spectra protocol in a pace maker patient where usual gnathological protocol was not possible.
Methods: Patient MS, 53 years old, pace maker patient, came to our attention for TMD (Temporomandibular disorders). Our usual gnathologic protocol has a magnetic resonance of tmj at open and closed mouth in order to evaluate temporomandibuar joint status, and a kinesiography using K7 protocol, before and after tens. In order to evaluate masticatory muscles activity. Due to pacemaker presence, magnetic resonance and tens were not possible. Moreover, the patient still weared a bite with poor results. According to patient's needs, we decided to apply new polaris spectra protocol, that has no need of MR or tens to reach therapeutical goal. According to guidelines, we started with a CBCT of skull and lower jaw and we took impressions of both archs. The impressions were developed and digitized with a lab digital scanner. We took photos and documentation was sent to the lab in digital streaming that produced the holder for sensors . meanwhile both CBCT and models were processed with mimics software in order to separate the mandibula from the skull and match digital impressions rispectively with upper and lower jaw. We continued with the recording of open close movements, protrusion, laterality and masticatory cycle and analyzed the data with ndi tracking and 3dface sotware. We choosed and visualized a position where the condyles excursion was optimal, and gave back the results with digital workflow.to lab. A distraction bite built with 3d printer was created and given to the patient. We mad anothe recording of movements with bite inserted and we compared with the first recording.
Results: compared with standard gnathological bite, the precision and contact points of the bite built after polaris spectra protocol seem to be improved. The patient referred immediate remission of sintomatology.
Conclusions: Polaris spectra protocol seems to be useful in gnathologic treatment,expecially in case of the inability to perform usual treatments due to pacemaker, cronic headache, epilessy etc. the advantage of this technique is its precision, is faster than other techniques,non invasive, can be completely digital.

Full-arch rehabilitation in parafunctional patient with loss of vertical dimension: case report, clinical approach and instrumental integrations

F. Ghielmi[1], M. Festa[1], D. Lucarelli[1], S. Magistro[3], A. Nanussi[2]

University of Milan, Italy - IRCSS Cà Granda, UOC Chirurgia Maxillo-facciale e Odontostomatologia, Direttore Prof. A.B. Giannì, Scuola di

Specializzazione in Ortognatodonzia, Presidente: Prof. G. Farronato
[1]Specializzando in Ortognatodonzia
[2] Dipartimento di Chirurgia e Medicina Traslazionale, Ospedale San Gerardo, Monza, Università degli studi di Milano Bicocca
[3] specialista in Ortognatodonzia

Aim: The aim of the present work was the management of the increase of the original vertical dimension in an asymptomatic parafunctional patient with left deviation in protrusion and insufficient vertical dimension, to be increased for prosthetic and, secondarily, aesthetic reasons.
We have combined the function of the superior periodontal surgery, necessary to restore the correct dento-periodontal relationships, to the use of an upward (orthotic) device applied to the patient's natural dentition, then to its usual vertical dimension. Specific instrumental tests have been used to find the tolerated and correct vertical dimension, transferring it in the first and second provisional, and finally in the definitive work.
Methods: Without altering the patient's vertical dimension from the beginning, and without performing any prosthetic procedure, we initially acted by performing instrumental evaluations such as surface electromyography, to evaluate the response of the lifting muscles to the set vertical dimension, the barometodometric stabilometry, to verify possible relations with the postural attitude and the strategies of control of the balance, and the kinesiography, for the registration of the Posselt, of the free space, of the paths of disclusion along the guides, of the repeatability of the centric and of vectors and speed of the mandibular movement in opening, closing, release and swallowing. A light-curing device Easy Bite was used for the detection of occlusion in the pre-prosthetic phase, facilitating clinical, instrumental and radiological analysis.
Results: To be sure of the tolerance of the new mandibular position, a retraction plate has been applied and monitored for three months (in the course of conservative and surgical treatments not to lengthen the time of the therapy), which over time has managed to detect a certain and repeatable position. of intercuspidation, with an increase in vertical dimension tested with surface electromyography and well accepted both subjectively by the patient, both clinically by the operator and instrumentally.
Conclusions: The movements of the jaw were monitored with Kinesiography, which shows improvement of the traces, in particular the sharp reduction of the left deviation in protrusion and the harmonization of the swallowing movement. The bite was then used as a device for the relief of the madibular position and the assembly of the models, aimed at the execution of temporary elements in the position thus registered. The same device, separated into two parts, was used to verify correct assembly in the mouth. The final result, clinically and aesthetically favorable, is supported by the electromyographic evaluation of the balanced response of the elevating muscles to the occlusal stress in maximum intercuspidation.

Cognitive-behavioral approach: case-report of patient with myalgia, condylo-meniscal incoordination, parafunction, on disharmonic occlusal determinants

F. Ghielmi[1], M. Festa[1], A. Mezzadri[1], S. Magistro[3], A. Nanussi[2]

University of Milan, Italy - IRCSS Cà Granda, UOC Chirurgia Maxillo-facciale e Odontostomatologia, Direttore Prof. A.B. Giannì, Scuola di Specializzazione in Ortognatodonzia, Presidente: Prof. G. Farronato
[1]Specializzando in Ortognatodonzia
[2]Dipartimento di Chirurgia e Medicina Traslazionale, Ospedale San Gerardo, Monza, Università degli Studi di Milano Bicocca
[3]Specialista in Ortognatodonzia

Aim: The aim of this work was to illustrate a cognitive approach for rehabilitation purposes, in a female patient, 40 years old, already treated orthodontically at a young age for correction of second class deep, which reported symptoms pertaining to Axis I (nuchal myositic tension pain). and masseterino) and of Axis II (anxiety and occasional panic attacks, subjective perception of incoordination and fragility in the mandibular movements). Given the presence of emotional stress that justifies the exacerbation of symptoms, we investigated the actual presence of co-factors of incoordination and the possibility of correcting them.
Methods: The clinical evaluation shows opening of the physiological mouth, protrusion and right laterotransplantation conducted without limitations, left laterotrusion performed only partially and with great difficulty and muscle tremor, associated with pain in the genital area and the ipsilateral zygomatic, and reciprocal initial right soft pelvis of mild intensity but a source of concern for the patient. Absence of signs of parafunction. On palpation it reports a lateral doled to the right ATM and pain in the right and left masseters, at the nape and in the left temporal muscle. Opening the mouth to the maximum highlights a strong tendency to counter-rotation of the head with an important recruitment of local musculature. The electromyographic evaluation shows a recruitment scheme with prevalent front load (functionally class II) with anomalous response of m. left temporal, and with initial difficulty of calibration by tightening on cotton rolls with inconstant pattern. Recruitment is not globally high. The condylographic evaluation shows steep eminence planes and very reduced Bennet

angles, particularly on the right, compatible with the dentoskeletal class corrected by the patient at the time but not congruent with the current inclination of the guides, lateral and front, less steep.
Results: The diagnosis is of myogenic pain associated with joint stress and consequent right condyle-meniscal incoordination, in the context of emotional stress that amplifies the effect of the disharmony existing between articular determinants, particularly on the right, and guides, particularly on the left side: the difficulty objective to perform the left laterotrusion against the canine guide and the appearance of articular noise in the movement contribute to accentuate the patient's sense of insecurity. The placement of a provisional thickness between 23 and 33, aimed at providing, with a more inclined plane, a more adequate guide to the patient's function, causes immediate disappearance of the right articular noise and of the muscular thrill in the execution of the movement itself. it is also perceived by the patient as reassuring. The treatment plan involves an approach to the function of the lifting muscles with Alifix contraction training device, and left laterotrusion exercises with Kois gig.
Conclusions: The symptomatology disappears in four weeks, together with the improved perception of function by the patient. The possible hypothesis of anatomical correction of the left lateral guide, with the intention to confirm the setting of the guide, is not supported by the sufficient effect of the functional approach. The need to assign to the patient's emotional component the right and non-exclusive relevance in the etiopathogenesis of the dysfunctional syndrome remains: the anatomical occlusal and articular component can not be underestimated and can be included among the co-factors responsible for the symptomatology.

Occlusal sensitivity in subjects with different levels of anxiety and somatosensory amplification

R. Bucci[1], D. Aiello[2], F. Rende[2], L. Barbara[2], A. Michelotti[1]

[1]Department of Neuroscience, Reproductive Sciences and Oral Sciences, Section of Orthodontic and Temporomandibular Disorders, University of Naples Federico II, Naples, Italy
[2]Department of Health Science, Magna Græcia University of Catanzaro, Italy

Aim: The occlusal sensitivity (OS) is the ability to detect small objects among antagonist teeth during intercuspation. The aim of this study was to compare the OS in subjects with high and low degree of somatosensory amplification state and anxiety.
Methods: Three-hundreds and sixty (360) volunteers (169 man, mean age:19.4 years)volunteers were recruited among dental and medical students at the Magna Graecia University of Catanzaro. The participants were included if they presented good general health and full permanent dentition (excluding third molars). The following conditions were considered exclusion criteria: presence of removable prosthesis, presence of severe malocclusions, ongoing orthodontic treatment, presence of extensive conservative restorations, endodontic treatment, fixed prosthesis or implant on the upper first molars, use of drugs active on the central nervous system.
The participants were instructed to fill-in the Somatosensory Amplification Scale and the General Anxiety Disorder questionnaire. Those reporting level of anxiety and somatosensory amplification below the 10th percentile (LASA) and above the 90th percentile (HASA) were invited to the clinic to measure their OS. The OS was tested used 10 different thicknesses: 9 aluminum foils (range 8µm-72µm) and one sham-test (no foil). The thicknesses were placed in the area of the first permanent molars and were presented 10 times in random order (100 tests total). The participants were asked whether felt the foil between their teeth or not. In order to avoid any further information, the cheek mucosa was displaced with a buccal mirror and headphones were used to conceal foil noises. During the experiment the participants were asked to keep their eyes closed and the researchers noted the participants' responses on a table. A t-test for unpaired data was conducted to compare the percentage of correct answers for each tested thickness between the two groups. Significance was set at $p<0.05$.
Results: LASA group included 30 subjects (20 man, means age 20.4 years) and HASA group included 24 volunteers (6 man, means age: 19.6 years).
The between-group comparison (HASA vs. LASA) showed no statistically significant differences in any of the analyzed thicknesses.
Conclusions: The OS seems to be not influenced by anxiety and somatosensory amplification state in healthy young volunteers.

Clinical correlation between bruxism and enamel wear

E. Sommadossi, E. Rivarossa, C. Foglia, E.A. Vergano, A. Baldi, N. Scotti, T. Castroflorio, A. Deregibus

Aim: Dental wear is one of the biggest problems in patients today, especially for bruxist patients. Prevention of dental wear is essential if problems such as sensitivity and poor structural strength are to be avoided. The aim of this in vitro study was to evaluate the possible connection between dental abrasion and bruxism, showing the changes in the tooth surfaces over time in patients with healthy teeth. The null

hypothesis is the absence of enamel wear in healthy teeth in vivo in bruxist patients.
Methods: A group of ten young bruxist women and men was selected. Bruxoff Technology was used for the diagnosis for a total of three nights. At the beginning the machine needs to be set and adapted to the individual patient recording three maximum contractions that will be taken as a reference point.
The system is based on the joint analysis of the EMG of the masseter muscles and the ECG for the heart rhythm, by means of special electrodes, and allowed us to identify bruxist patients by calculating the bruxism index, which shows the number of episodes per hour of sleep, with the software Bruxmeter. The criteria for inclusion were: physiological occlusion, healthy teeth, absence of systemic disorders and absence of orthodontic therapy in the active phase. Each participant, once informed of the content and nature of the study, was enrolled. Intraoral scans of the dental arches with Cerec Omnicam (Dentsply Sirona USA) were made in order to record an individual initial condition (t=0). The patients were then recalled after one year to undergo a new oral scan (t=1). The STL files thus obtained were processed and superimposed with Geomagic Qualify to divide the analysis of the complete arch into anterior and posterior sectors. The degree of wear was then calculated between the initial scan and the one-year interval scan using Geomagic Control X. The data were statistically analyzed with a one-way anova test with established significance for p less than 0.05.
Results: The average wear expressed in Micron was 15.18 for the upper arch and 12.25 for the lower arch, in particular for the front sector of 26.7 and 16.2 respectively, while for the rear sector of 13.87 and 10.64. The wear was therefore greater for the anterior sectors than for the posterior sectors in both arches, with values greater than those reported in the literature of physiological occlusal wear. 3D volumetric maps showed the areas of enamel that were most affected by wear.
Conclusions: The obtained results led to reject the initial null hypothesis, since enamel wear occurred in selected patients. The anterior teeth, due to the eccentric mandibular movement of bruxits patients, showed the greatest enamel wear. Furthers studies are necessary to confirm the results.

Local vibration therapy for the treatment of facial pain

Giordano Scialanca, Emanuela Serritella, Paola Di Giacomo, Chiara Vompi, Carlo Di Paolo

Department of Oral and Maxillofacial Sciences, Unit of Gnatology, Dir. Carlo Di Paolo, Sapienza University of Rome, Italy

Aim: As an alternative to conservative and surgical treatments different methods of electrostimulation, laser and vibratory treatment are currently used for the management of pain related to temporomandibular disorders. The purpose of this study is to evaluate the effectiveness and efficiency of Local Vibration Therapy for the treatment of facial pain in subjects affected by temporomandibular disorders, and to assess the results of its appliance prior to conservative treatment.
Methods: Twenty eight patients were included in the study, all with at least a depth of 3 out of 10 on the Numeric Rating Scale (NRS) for muscular pain. The study sample was composed by 28 patients, 6 of which were men (21,5%) and 22 women(78,5%), with an average age of 39,29 years (range between 16-57). 26 of these (92,9%) showed an articular pain and 16 (57%) a cefalic pain. The sample was randomly divided into active vibratory (20) and placebo groups (8) and both were evaluated during the first examination (T0) and after 7 days at the end of vibratory treatment (T1). The vibratory device used (Novafon Pro Sk2) was applied at pre-established points once a day for 15 minutes for a week, with frequencies of 100 and 50Hz. At the end of the 7-day treatment, 16 patients (88,88%) among the starting 28 were given an occlusal splint chosen based on individual needs and characteristics of the temporomandibular disorder: these 16 were then re-evaluated and compared to a similar sample of 16 patients treated with occlusal splint with no previous local vibratory treatment. Data analysis were performed with the Statistical Package for Social Science Software(SPSS). Comparisons between groups were conducted using the student's t-test.
Results: The level of muscular, cephalic and articular pain were measured in patients treated with a local vibration device at the start of therapy and after one week. Data analysis showed that there was a significant decrease in articular pain scores ($t = 2.455$; $p = .021$), muscle pain ($t = 3.605$; $p = .004$) and cephalic pain ($t = 3.074$; $p = .007$) in these patients, unlike placebo group in which there were no significant decreases in the average pain scores. The results obtained between the sample treated with local vibration and occlusal splint and the sample treated with occlusal splint only highlighted significant differences between the two groups with reference to muscle pain ($t = -5.042$; $p = .000$): specifically, the analysis of the average scores allowed to establish that patients who used local vibration therapy prior to occlusal splint reported lower scores in muscle pain.
Conclusion: In this preliminary study Local Vibration seems to be an effective therapy to forego conservative treatments for the management of pain related to temporomandibular disorders. Despite the promising data collected so far, the sample of patients examined is still too limited to obtain scientifically reliable and significant results. The goal for the future is to broaden the study by including more patients, and

evaluate them over a longer period of time beyond the end of therapy.

Dental treatment in adult patients with OSAS: indications and limits

A. Sedran[1], G. Borio[1], A. Sedran[2], G. Gassino[3]

University of Turin Department of Surgical Sciences, Dean Prof. Stefano Carossa, C.I.R. Dental School Lingotto. Dean: Prof Elio Berutti, Torino, Italy
[1]D.D.S. Resident
[2]M.D. D.D.S. Resident
[3]M.D. D.D.S. Ph.D. Aggregate Professor

Aim: OSAS is linked to a partial or total collapse of the upper airway, caused by the relaxation of the muscles that control the soft palate and the tongue, with the appearance of apneas, hypopneas, and airflow limitation, resulting in hypoxia. Consequently, fragmentation of sleep triggers, transforming it into chronic stress for the body with daytime sleepiness and road accidents. For decades, this disorder has seen neurologists and psychiatrists on the one hand, who studied sleep, did not consider breathing, on the other pulmonologists and otolaryngologists, who studied breathing, did not consider sleep; finally, generations of dentists have studied and treated the oral cavity of millions of patients suffering from sleep disorders, the most well known being bruxism. This is characterized by repetitive mandibular movements that occur predominantly in phase II of non-REM sleep, last about 10-20 seconds and are associated with microarousal. Many bruxist patients also suffer from snoring and OSAS. A reliable diagnosis with polysomnography (PSG) is necessary because two of the therapeutic options indicated in simple bruxism are contraindicated in sleep respiratory disorders because they can worsen the respiratory picture. The aim is to contrast the chronic inflammatory condition due to intermittent hypoxia, which can alter metabolic processes, favor endothelial dysfunction for the genesis of atherosclerosis and cellular atypia. The mandibular repositioning devices (MRD) represent an effective solution in the treatment of roncopathy and obstructive sleep apnea syndrome in patients with OSAS of medium-mild grade, but also of high grade who do not tolerate CPAP.
Methods: As the MRD, the certified Narval CC ™ is used and sold by prescription. The patient should not have periodontal disease, active temporomandibular dysfunction and must have an adequate number of dental elements. It is made on measure using CAD / CAM technology. It repositions the mandible forward to keep the airway open during sleep. 18 adult patients enrolled in the study have different degrees of OSAS documented by the clinic and polysomnography (PSG). 8 patients with disturbing bruxism had a bite with occlusal protection. After signing the informed consent, the dental impressions are recorded and the mandibular advancement recorded at 60% of the maximum protrusion. Upon delivery of the device, we proceed with adaptation and titration. After about 4 weeks, the new PSG is recorded up to an acceptable correction of obstructive apneas. Patients initially monitored after 6 months will need annual controls together with oral health.
Results: 11 patients had 5 <AHI <14, 4 patients 15 <AHI <30, 3 AHI patients> 30 (in the course of non-tolerated CPAP therapy). Two patients with nocturnal bruxism presented PSG with bite plane aggravating AHI from baseline. With the properly titled Narval CC ™, 15 patients achieved an AHI <5 and 3 an AHI≤10; no drop-out.
Conclusion: The preliminary data in possession allow us to state that the Narval CC ™ device allows reaching the expected improvement target AHI <5. Three patients unable to tolerate CPAP achieved satisfactory nighttime oxygenation and AHI≤10 index. Good compliance and a high degree of adherence to therapy are also reported.

Multi-wavelength laser therapy in TMD

A. Sedran[1], A. Sedran[2], V. Sedran[2]

University of Turin Department of Surgical Sciences, Dean Prof. Stefano Carossa, C.I.R. Dental School Lingotto. Dean: Prof Elio Berutti, Torino, Italy
[1]D.D.S. Resident
[2]M.D. D.D.S. Resident

Aim: The TMD is characterized by pains in facial muscles and/or near the ear, difficulty in opening the mouth, noises in the articulation of the jaw. They are usually associated with headache or neuralgia and others disease, as teeth grinding, OSAS, sleep disorders, which cause discomfort to the patient and increase social and health costs. However, teeth grinding and emotional tension can have negative effects over implant-prosthetic rehabilitation, promote muscular or articular pain, dental sensitivity and dental exposition. The diagnostic and therapeutic procedure for TMD, melting pot of competences from a different branch of medicine, is a fundamental requirement for an approach to these diseases that avoids worse consequences on teeth and even more on rehabilitation. Along with measures aimed at modifying behavioral and lifestyles, are recommended medical, physiotherapeutic and therapeutic therapies and bite. In this context, Low-level laser therapy (LLLT) is a non-invasive treatment that does not cause side effects. In the literature it has

already been shown that LLLT produces a biomodulator effect on cells and tissues, promoting an analgesic, anti-inflammatory, and muscle relaxant effect. The preliminary study adopts an LLLT with three different wavelengths in combined and amplified synergy, as they are synchronized in TMD patients with limited opening mouth and pain.
Methods: So far in the preliminary case study, 11 patients have been treated (8 female and 3 male), 6 of them with muscle TMD (M) and 5 with articular TMD (OA). They are further subdivided into acute or chronic phase and evaluated with the criteria of the folder EACD simplified at the beginning and the end of treatment. Three sessions were performed (one per day). We used a diode laser (Fisioline) 650nm 300mW in CW mode, 810nm 300mW in CW mode and 910nm 1W CCW (pulsed emission and average power of 60mW in pulses at 200 ns with a repetition rate of 10.000 Hz in free space). 650 + 810 + 910 nm in the chronic phases and 810 + 910nm in the acute phases. 0,5 cm^2 defocalized tip to the tissue surface through multimode optical fibers equipped with a microlens. A 5' application, in continuous movement and not in contact, per side, in the ATM and deep masseter muscles area. The pain was measured with the VAS at the beginning and the end of each application during the three days of the examination. In the same way, measurements of maximum mouth opening were recorded with a millimeter ruler at the level of the central incisors. The patient was asked to open as much as possible, even if it was painful. The value obtained was added to the length of the vertical overlap of the front teeth.
Results: Multi-wavelength LLLT with Diodes uses pure light sources, of every single wavelength whose clinical effect is not thermal, but correlated to photochemical reactions in cells. LLLT has introduced as an alternative non-invasive therapy in OA about 30 years ago. Its effectiveness is also examined in the treatment of M. In both groups, there was a lowering of pain on the VAS scale with a better opening of the mouth.
Conclusion: Multiwavelength LLLT with Diodes seems to achieve an analgesic, anti-inflammatory and bio-stimulating effects in patients with TMD.

Acupoints for the treatment of temporo-mandibular disorders: a literature review

Emanuela Serritella, Paola Di Giacomo, Chiara Vompi, Giordano Scialanca, Giacomo Ferrato, Carlo Di Paolo

Unit of Clinical Gnathology, Department of Oral and Maxillofacial Sciences, Sapienza University of Rome

Aim: Acupuncture is successfully used for the treatment of Temporomandibular Disorders (TMDs), especially for pain of articular or muscular origin. The scientific literature shows a great number of usable acupoints and techniques of stimulation. This review aims to analyze the acupoints and the techniques most used in the treatment of TMDs symptoms and compare its effectiveness.
Methods: Computer retrieval was performed with Medline, PubMed, Scopus. The dates of the articles surveyed ranged from 2009 to February 2019. Terms used for the search were "Acupuncture points" AND "TMD" OR "TMJ". The inclusion criteria were: (1) publications in English; (2) controlled clinical trials; (3) patients with TMD of muscular or articular origin; and (4) studies that used acupuncture only for treatment.
Results: Out of 83 titles retrieved, 41 abstracts were read and 21 full articles were selected and categorized according to the following classes: TMDs, acupoints location, techniques of stimulation, effectiveness of therapy. TMDs of muscle origin are absolutely the most treated diseases (18 papers: 85.7%). Out of a total of 49 selected acupoints, the most used were: "Hegu" (LI4) (16 papers: 76,2%); "Jiache" (ST6) (13 papers: 62%); "Xiaguan" (ST7) (10 papers: 47,6%); "Fengchi" (GB20) (8 papers: 38%); "Quanjiao" SI18 (6 papers: 28,6%) and Ashi points (6 papers: 28,6%). According to points location, the combination of local and distal points was used in most cases (11 papers: 50%). Distal points only were used in some cases (5 papers: 23.8%), while local points only were never used. Other locations (ashi/trigger points, microsystems) were used in 28,6% of cases (6 papers). Concerning the techniques of stimulation, the somatic acupuncture was the most used (12 papers: 57,1%), followed by dry needling and laser acupuncture (4 papers: 19%). Acupuncture therapies were effective in 90,5% of cases, regardless of the technique used.
Conclusion: Acupuncture treatments for TMDs are effective, regardless of the technique of stimulation used, but extremely varied. In the clinical practice there are some acupoints most used but there is no evidence of standardized protocols. The acupoints selection based on the diagnosis of TMD is not clear in literature. There is a need for well-designed randomized controlled trials (RCT) including the use of acupuncture points on a diagnostic basis. This could allow a better evaluation of the additional benefit of acupuncture for managing TMD.

Symmetry of condylar long axis and articular eminence in panoramic radiographs and MRI in patients with temporomandibular disorders

M. Tepedino[1], F. Cavarra[2], E. Madiai[3], M. Zerbino[3], G. Matacena[3], L. di Benedetto[3], C.[1] Chimenti, V. Crincoli[4], A. Deregibus[3], T. Castroflorio[3], M.G. Piancino[3]

[1]Department of Biotechnological and Applied Clinical Sciences,

University of L'Aquila, L'Aquila, Italy
[2]Private practice, Turin, Italy
[3]Department of Surgical Sciences, C.I.R. Dental School, University of Turin, Turin, Italy
[4]Department of Interdisciplinary Medicine, University of Bari Aldo Moro, Bari, Italy

Aim: To evaluate in Magnetic Resonance Images (MRI), the condylar major axis angulation, the slope of the articular eminence, the anterior disk displacement, and the skeletal divergence in a group of subjects with temporomandibular joint disorders (TMD) and symmetric or asymmetric condyles as evaluated on panoramic radiographs. The null hypothesis was that no difference in condylar and fossa morphology and severity of disk displacement exists between symmetric and asymmetric patients with temporomandibular joint disorders.
Methods: Fifty-nine adult patients (26.7 ± 4.4 years) with TMD were retrospectively recruited. Condylar height symmetry was evaluated by orthopantomography (following the method proposed and validated by Habets) and used to divide patients into Symmetric and Asymmetric groups; skeletal divergence was assessed on lateral cephalograms. MRI was used to evaluate the angle of the condylar long axis, the glenoid fossa morphology, and the degree of disk displacement. An element of novelty in the present study was the use of the transporionic axis for the measurement of the angle of the condylar long axis: this reference plane is clearly visible on the same MRI axial slices where the condyles are displayed, it is easy to detect in a repeatable manner, it is also used in other types of instrumental evaluations such as axiography or articulator registration. This methodological choice has a great advantage over the use of the midsagittal plane used by previous studies on the same topic. For bilateral measurements in MRI, two variables were calculated for each measurement: the difference between the right and left measurement and the highest value between the right and left measurement. A Shapiro-Wilk normality test was used to assess data distribution ($p < 0.05$). Then an independent samples T-test or a Mann-Whitney U-test, depending on data distribution, was used to compare each variable between the Symmetric and Asymmetric groups ($p < 0.05$).
Results: The null hypothesis was rejected, since patients with asymmetric condylar heights evaluated on panoramic radiographs also showed a hyperdivergent skeletal pattern ($p = 0.036$), asymmetric condylar long axis ($p = 0.018$), and deeper ($p = 0.025$) and asymmetric ($p = 0.001$) glenoid fossa compared to symmetric subjects.
Conclusion: Patients with TMD are more likely to show a hyperdivergent skull, condylar asymmetry of both height and major axis, and a steeper glenoid fossa. Since condylar asymmetry can predispose to internal joint derangement or to temporomandibular joint disorders, a first screening of condylar asymmetry with orthopantomography could be recommended, followed when advisable by a deeper diagnostic evaluation with MRI considering not only the disk displacement but also the condylar axis and the slope of the articular eminence.

Vision defects in dysfunctional and orthodontic patients: clinical evaluation

Chiara Vompi, Emanuela Serritella, Paola Di Giacomo, Giordano Scialanca, Gabriella Galluccio, Carlo Di Paolo

Department of Oral and Maxillofacial Sciences Unit of Gnatology, Dir. Carlo Di Paolo, COU of Orthodontics, Dir. Ersilia Barbato Sapienza University of Rome, Italy

Aim: In literature little interest has been shown in the relationship between temporomandibular disorders (TMD) and vision defects, although both diseases are very widespread in the Italian population. According to recent studies, temporomandibular disorders, orthodontic diseases and vision defects are strictly related. There are no studies on large sample that can establish the report with scientific certainty. The correlation between each individual temporomandibular disorder based on a possible diagnostic classification of TMDs and each individual vision defect is not specified. The low quality of the works, their heterogeneity, the difficulty of making valid comparisons, requires great caution in considering these connections scientifically sustainable, both in diagnostic phase and in therapeutic phase. Therefore, the purpose of this study is to prove and describe the relationship; to evaluate the incidence, prevalence and distribution of vision defects in dysfunctional and orthodontic patients.
Methods: 334 patients were selected from the Unit of Gnathology and the COU of Orthodontics of Policlinico Umberto I of Sapienza University of Rome. A prospective experimental observational cohort study has been conducted. All of them were analyzed through a complete gnathological and/or orthodontic specialist examination by the same calibrated personnel. TMDs were classified with the international diagnostic criteria (DC/TMD). According to specific gnathological, orthodontic and orthoptic inclusion and exclusion criteria, 100 patients were recruited. At the COU of Ophthalmology of the same hospital they were analysed by performing specific evaluation tests (visus exam, cover test, corneal reflex, ocular motility, convergence test). A descriptive and statistical analysis of the data was carried out with the SPSS software by IBM system.
Results : The comparison with the Italian population

has revealed a higher frequency of refractive defects in the study sample: myopia is increased from 26.5% to 38%; astigmatism in increased from 16.7% to 40%; hypermetropia is increased from 6.9% to 22% (P <. 001). Significant is the increased frequency of ocular convergence reduction in the presence of reducible disk dislocation (RDD) (n = 28; 60%; P <. 05). Patients with asymmetry, show high frequencies of motor ocular deviations (n = 59; 100%) (P <. 05).
Conclusion: From the data of this preliminary research, a positive correlation seems to emerge between some of the variables analyzed. As results, the single most interesting associations have been resulted between functional disease (RDD) and skeletal alteration (asymmetry) with oculomotor alterations like convergence reduction and motor ocular deviations. Despite the significant association between the two anomalies, no gnathological or orthodontic treatment is justified when vision defects are present. It is, however, appropriate to evaluate the presence of vision defects in dysfunctional and orthodontic patients.

Implantology

A successful treatment of implant periapical lesion: surgical re-entry after 12 years from the reconstructive approach

Marco Montevecchi, Alberto Acquati, Giovanni D'Alessandro, Gabriela Piana, Giuseppe Corinaledesi

Alma Mater Studiorum - University of Bologna, Italy
Unit of Odontostomatological Sciences - Department of Biomedical and Neuromotor Sciences

Aim: This poster describes a 12 years follow up case-report of reconstructive bone surgery on Implant Periapical Lesion (IPL).
Methods: A 49 woman, at 3-month control after #4.6 implant placement, manifested a fistula at the vestibular side of the area. Clinical and radiographic exams led to active IPL diagnosis. The aim was to preserve the entire fixture, eliminating the acute infection at the apical portion of the implant and creating the biological conditions for osseointegration. The surgical-pharmacological treatment was performed in October 2005 at the Department of Periodontology and Implantology of Bologna University. After intrasulcular incision a vestibular full-thickness flap was raised and a careful soft tissue curettage of the defect was carried out. Confirmed the primary stability of the fixture, decontamination of the bone cavity and of the exposed implant portion was performed with a chlorhexidine irrigant. Finally, the area was filled with a particulate allograft added with tetracycline and the flap sutured. Chlorhexidine rinse and antibiotic-analgesic therapy were prescribed. The healing was uneventful and a complete resolution of the lesion was clinically and radiographically recorded. The minimally invasive approach and the definitive prosthetic finalization led to a full patient satisfaction.Stability of the result was confirmed for several years until a new periimplantitis scenario manifested. Another surgical approach was consequently planned to treat the periimplantitis.
Results: This surgery allowed a direct observation of the vestibular cortical area confirming a complete resolution of the previous IPL bone lesion.
Conclusion: In conclusion this case-report shows that active IPL, even for extensive implant involvement, can be successfully resolved with a "preserving approach". More clinical confirmations of this observation are anyway demanded.

Comparison of three osteotomy techniques: analysis of resonance frequency, insertion and removal torque. An in vitro study

F. Attanasio, A. Antonelli, F. Averta, Y. Brancaccio, F. Liborio, A. Giudice

School of Dentistry, Department of Health Sciences, Magna Graecia University of Catanzaro, Italy

Aim: Implant stability can be defined as the mechanical stability between the implant and the bone, or as the biological stability that is achieved by osseointegration. Primary implant stability (PS) is defined as dependent upon bone quality and quantity, implant fixture design, and surgical technique. The goal of PS is achieved when implant micromotion can be limited to less than 50- to 150-mm thresholds until osseointegration occurs. Our study aim to compare ISQ (Implant Stability Quotient) and insertion and removal torque value of 20 implants placed in implant sites prepared with conventional drills (CD) versus 20 implant sites prepared with Summers osteotomes (SO) and 20

implant sites prepared with B&B bone compactors (BC) placed in medullary bone (quality type III and type IV).
Method: A total of 60 Implants (B&B Dental, San Benedetto, BO, Italy) Ø 4.0x10 mm-long implants were placed in 10 fresh pig ribs. Each pig rib was fixed on a bench vice in order to avoid micro-movements during surgical procedures and measure recording. The location and preparation of each implant site on the pig ribs was randomly extracted using closed envelopes. Six implants were inserted in each pig rib. In the CD group the 20 implant site was prepared with surgical burs. In the SO group 20 implant sites were prepared by a pilot drill (1.7 mm) followed by consecutive Summers osteotomes (sizes I, II, III and IV) to perform implant site; in the BCgroup 20 implants sites were prepared as recommended by the manufacturer using bone compactor (B&B Dental, San Benedetto, BO, Italy)with increasing diameters. The measurements were recorded by an independent operator not aware of the method used.
- Peak insertion torque: Implants were inserted manually and placed using the MGT-12 digital torque gauge. The peak of insertion torque (PIT) was recorded in Ncm during this procedure.
- Resonance frequency analysis: ISQ was determined by resonance frequency analysis with the OSSTELL ISQTM device. The RF was measured using a customized Smart Peg with a no contacting technique.
- Peak removal torque: Both implants were unscrewed to measure the peak removal torque (PRT). It was measured using the MGT-12 applying a counter-clockwise gradual torque force (0.5 mm min-1) to the displacement of the implant.
Results: Mean of PIT were: 32,14 ± 8,27 Ncm CD, 36,94 ± 9,37 Ncm SO and 40,85 ± 9,64 Ncm BC. Mean of ISQ were: 69,65 ± 3,57 CD, 71,25 ± 4,66 SO and 74,9 ± 3,50 BC. Mean of PRT were: 29,84 ± 9,47 Ncm CD, 32,35 ± 11,57 Ncm SO and 37,83 ± 8,98 Ncm BC. Comparing our data (Tukey test α= 0,05),it was evidenced a statistically significant difference in the PIT between CD and BC groups (p= 0.01). Analyzing ISQ data there was a statistically significant difference between CD and BC groups (p= 0.0001) and between SO and BC groups (p= 0.014). The analysis of PRT evidenced a statistically significant difference between CD and BC groups (p= 0.038).
Conclusion: In the last few decades, an endless array of shapes, grooves, threads, tapers, platforms and designs have been tried, tested, and marketed. All in an effort to gain or increase PS. This study want to show that bone compactor preparation can influence PS, however further studies are necessary to determine if this statement would be the same in a larger sample in different clinical settings.

Implant-prosthetic rehabilitation using zygomatic implants and a carbon fiber framework

Francesco Bagnasco, Maria Menini, Paolo Pera, Tiziano Tealdo, Paolo Pesce

Department of Surgical Sciences (DISC), Implant and Prosthetic Dentistry Unit, University of Genoa, Ospedale S. Martino (pad. 4), Genoa (Italy)

Aim: Several protocols have been proposed to rehabilitate extremely resorbed maxillae avoiding bone-grafting. Zygomatic implants represent a feasible treatment option. Two zygomatic implants can be placed in the posterior areas of the maxilla and traditional implants in the anterior areas or, in case of extreme maxillary atrophy, 4 zygomatic implants can be used (two for each hemiarch). The aim of this study was to evaluate clinical outcomes of immediately loaded zygomatic implants using a full-arch fixed prostheses provided with CFRC frameworks.
Methods: Between March 2017 and September 2017, 18 patients (13 women, 5 men) with severely edentulous resorbed maxillae or patients with failed GBR augmentation were identified for this study. Patients presented with a mean age of 62 years (range: 53 – 78) and were treated with fixed screw-retained prostheses supported by zygomatic implants in the posterior areas and traditional implants in the anterior areas (n= 3) or four zygomatic implants, two for each hemiarch (n= 6) or four zygomatic implants and traditional implants in the anterior areas (n= 2). A plaster impression was taken after surgery, and prostheses were delivered within 24/48 hours. The prosthesis presented a carbon fiber framework, veenered with composite resin occlusal material. The carbon-fiber reinforced composite (CFRC) (Bio Carbon Bridge system Micromedica) is composed of unidirectional fibers that has good basic mechanical properties and moreover can be adapted to the framework shape without the necessity of cutting the fibers to incorporate the implant cylinders, that may increase the mechanical characteristics of the final framework. All the prostheses were provided with balanced occlusion and nightguards were delivered to the patients.Patients were evaluated at the 1-year follow-up and cumulative survival rate (CSR) as well as periodontal parameters were evaluated (BoP, PI, PD). Technical and biological complications were also recorded.
Results: 80 implants have been inserted (45 zygomatic and 35 classic implants). At the 1-year follow-up, no patients dropped out. One implant was removed 4 months after implant placement due to an infection in a heavy smoker patient. Despite the removal of the implant, the prosthesis was kept in place maintaining the remaining implants as support. Implant CSR was of 98,8% and prosthetic CSR was 100%. The values of BOP and PD of peri-implant soft tissues never

exceeded the physiological levels.
Conclusions: On the base of the present study, implant rehabilitation with zygomatic implants and fixed prostheses provided with a carbon framework appears to be a valid treatment option in case of severely atrophic maxillae, with high success rate in the short term period.

The differences that influence the risk of onset and progression of peri-implantitis compared to periodontitis: review of the literature.

G. Reale, E. Crupi, I. Cefalà, G. Pingitore, N. Russo, D. Barbuto

University "Magna Graecia" of Catanzaro, CdL Odontoiatria e protesi dentaria, Direttore: Prof. L. Fortunato - Catanzaro, Italy

Aim: The aim of the present research is to revise the recent and past literature about difference between the progression of bacterial invasion on parodonatal and peri-implant tissues. Inflammatory process involving the tissues of the natural tooth is called gingivitis, which untreated evolves into periodontitis. Periodontitis (or pyorrhea) is a chronic and degenerative inflammatory disease. It causes the progressive destruction of the entire deep periodontium attachment system, with the formation of a pocket and mobility of the dental elements. If not treated, it cuold cause the loss of the dental elements. In case of implant rehabilitation, it may fail due to the onset of peri-implantitis. It is a poorly encapsulated lesion that directly involves the marginal bone which, if left untreated, leads to implant loss. The diagnosis of peri-implantitis can be carried out exclusively by interpolating different parameters that must be periodically recorded. It also has to be compared with a baseline to establish its progression. Clinitian must necessarily use a combination of repeated surveys over time: assessment of the inflammatory state of the mucosa, bleeding to a delicate probe, changes in the radiographic bone level and possibly of plaque or peri-implantar crevicular fluid samples, in order to reach an accurate diagnosis of periimplantitis. Parameters that must be recorded for the evaluation of the health status of the peri-implant tissues are: evaluation of marginal tissues, Peri-implant (GI, mPI, mBI, PD, BOP / suppuration, amplitude of keratinized tissue), Evaluation of mobility, X-ray evaluation.
Methods: For systematic review a PubMed database research has been performed. Combinations of the following key words were used as search terms: [perimplatitis], [parodontitis], [diagnosis], [bon loss], [Peri-implant health], [biological complications with dental implant].
Results: Literature review shows that periodontal tissues and the peri-implant tissues respond differently to the progression of the bacterial attack, despite having an onset and a similar etiology. The soft tissues surrounding the implant have some common characteristics with the teeth, such as the presence of a junctional epithelium and a component of the connective tissue. The main difference is the relationship between the connective tissue and the implant surface so that there is an "adaptation" of the collagen fiber in a parallel orientation compared to the implant, but, the orientation of the collagen fiber onto the natural teeth's cement is perpendicular. This, combined with cellularity and vascularization in peri-implant connective tissue, can make implants more susceptible to initiation and disease progression. Characteristics of the design, such as the surface characteristics of the secondary material and the implants, influence the maintenance of the influence of the soft materials around the implants.
Conclusions: Peri-implantitis is a disease that must be diagnosed at an early stage. Regular monitoring of patients is important for treatment and implant success. Progression of inflammation is faster in peri-implantitis than periodontitis, because the plaque associated lesions in periodontitis is confined to the connective tissue Instead the peri-implantitis also involve the bone tissue.

Single implant placement after removal radicular cyst: a 48-month follow-up

G. Bellantoni, C. Ruscica, M. Minoli, A. Bianco, F. Ferrini, P. Capparé

Department of Dentistry, IRCCS San Raffaele Hospital, Milan, Italy
Dental School, Vita-Salute San Raffaele University, Milan, Italy

Aim: The purpose of the present study is to report a clinical case of an extended radicular cyst associated with a permanent first molar. Considering the poor prognosis of the element and the high size of the cystic lesion, therapeutic plan included the minimal invasive extraction of tooth, followed by an accurate dry socket management in order to completely remove the radicular cyst and, in a later stage, the placing of a dental implant with immediate loading.
Methods: A no-smoker 44-year-old male was referred to the Dental Clinic of the Department of Dentistry of San Raffaele Hospital, Milan, Italy. Radiographic exams (Orthopantomography and Cone Beam Computed Tomography) revealed an extended well-defined unilocular radiolucency associated with the roots of the element 4.6 which was previously endodontically treated. The above-mentioned characteristics suggested the diagnosis of radicular cyst, but a definitive diagnosis was left to histopathologic report. After local anesthesia, an atraumatic extraction of 4.6 and removal of the lesion with a crestal access were

performed, paying attention to the buccal and lingual walls to get an optimal bone healing. Three months later, when an effective healing of soft and hard tissues was obtained, a dental implant fixture (CSR-DAT, Sweden & Martina, Padua, Italy) with 4.2 mm diameter and 13 mm length was inserted in the edentulous site, according to the surgical protocol of the manufacturer. The implant had a final insertion torque of at least 35 N/cm, obtained thanks to the macro-structure of the implant characterized by tapered apex, cylindrical central portion and a conical coronal segment. Therefore, immediate loading protocol was followed: a straight abutment (PADSystem, Sweden & Martina, Padua, Italy) was screwed up to 35 N/cm and the provisional prosthesis was positioned. After 2 weeks from implant placement, for the precise determination of the implant position with intraoral scanners, an implant-specific scan body (for CSR, Sweden & Martina, Padua, Italy) was applied on implant. The definitive prosthesis was fabricated after taking 3D digital impression with an intraoral scanner (Carestream CS 3600, Carestream Dental, Atlanta, GA, USA). A definitive zirconia-ceramic crown was delivered after 24 hours. Marginal bone levels, measured comparing intraoral digital x-rays, and clinical parameters were evaluated at 6, 12, 24 and 48 months after implant placement.

Results: Six months after implantology surgery, radiological examination revealed optimal peri-implant bone levels, with good tissue stability. Radiological images at 18 months and 4 years showed excellent long-term hard- and soft-tissue outcomes, whose levels are even increased in the 4-year follow-up thanks to the morphology of this implant which provides a double-conical connection (Double Action Tight, DAT, Sweden & Martina, Padua, Italy).

Conclusions: Within the limitations of this study, considering the high survival rate and stable marginal bone levels after 4 years, immediate loading implant in single edentulous site, previously infected, seems to be a well-accepted treatment modality. Moreover, mature peri-implant tissues seem to outline the prosthesis in an absolutely natural and physiological way, without complications and recessions 4 years later.

Implant-prosthetic rehabilitation in diabetic patients according to the "all-on-four" technique: a preliminary study with 1-year follow-up

G. Bellantoni, C. Ruscica, A. Busa, F. Pirani, M. C. Francia, R. Vinci

Department of Dentistry, IRCCS San Raffaele Hospital, Milan, Italy; Dental School, Vita-Salute San Raffaele University, Milan, Italy

Aim: The term diabetes indicates a set of metabolic disorders characterized by hyperglycemia. This disease has a series of impacts, some of which affect the oral cavity. Indeed, diabetes causes alteration of the resident bacterial flora and, more important thing, alteration of the blood microcirculation. Local vasoconstriction therefore hinders wound healing. The aim of the present study was to evaluate the survival rate of "All-on-four" rehabilitation in diabetic patients, treated at Dental Clinic, I.R.C.C.S. San Raffaele Hospital, Milan, Italy.

Methods: Thirty-eight patients with completely edentulous jaws or with a severely compromised natural dentition, as a consequence of deep caries or periodontitis, were selected for an implant supported rehabilitation of one or both the jaws. In preoperative evaluation, both clinical and radiological examinations were acquired. Hopeless teeth were extracted and four post-extraction immediate implants were placed in the same time according to the "All-on-four" concept treatment (2 mesial axial implants and 2 distal tilted implants to minimize the cantilever length). Immediate loading protocol was achieved in order to obtain immediate function and aesthetic on the same day of the surgery. After a 6-month healing period, definitive prosthetisis were delivered.

Results: A total amount of 200 implants were placed in 38 patients. 12 patients received rehabilitation of both jaws, 9 patients were rehabilitated only in the mandible and 17 patients were rehabilitated in the maxilla. At 1 year follow-up, overall survival rate was 94.5% with 11 implant failures. Considering the full arch rehabilitation group (12 patients), survival rate was higher, with a 96,87% with 3 implant failure out of 96. Intraoral X-rays analysis revealed a mean marginal bone loss of 0,86 ± 0,45 mm at 12 months follow-up. Procedure was well tolerated, good healing of surgical wound was observed in all patients and no further complications were encountered at over time. Soft tissues around the implant sites developed mild inflammation due to surgical trauma and no infections occurred over time.

Conclusions: Within its limitations, this study suggests that the "All-on-four" treatment concept can be considered a safety and predictable procedure for full-arch rehabilitation in diabetic patients. The immediate loading protocol guarantees a greater comfort for the patient, increasing the psychological predisposition to the new rehabilitation for an immediate function and aesthetic. Moreover, diabetic patients should be included in a strict follow-up protocol, monitoring modifiable risk factors for implant failure (such as smoking, poor oral hygiene, lacking good glycemic control), mostly during the early phase of implant healing. These findings must be viewed as preliminary, because they include relatively small numbers of patients. However, there is still a lack in long-term data in literature, therefore,

more studies with a larger sample size are needed to reach definitive results for clinical based evidence.

Posterior jaws rehabilitated with partial prostheses supported by 4.0 X 4.0 Mm or by longer implants: 3-year post-loading results from a multicenter randomised controlled trial

Francesco Bentivogli[1], Lorenzo Breschi[1], Carlo Barausse[1], Roberto Pistilli[2], Pietro Felice[1]

[1]Department of Biomedical and Neuromotor Sciences, University of Bologna, Bologna, Italy
[2]Oral and Maxillofacial Unit, San Camillo Hospital, Rome, Italy

Aim: To evaluate whether 4.0 x 4.0 mm dental implants could be an alternative to implants at least 8.5 mm-long, which were placed in posterior jaws, in the presence of adequate bone volumes.
Methods: One-hundred-fifty patients with posterior (premolar and molar areas) jaws having at least 12.5 mm bone height above the mandibular canal or 11.5 mm below the maxillary sinus, were randomised according to a parallel group design, in order to receive one to three 4.0 mm-long implants or one to three implants which were at least 8.5 mm-long, at three centres. All implants had a diameter of 4.0 mm. Implants were loaded after 4 months with definitive screw-retained prostheses. Patients were followed up to 3-year post-loading and outcome measures were prosthesis and implant failures, any complications and peri-implant marginal bone level changes.
Results: Seventy-five patients were randomly allocated to each group. At the 3-year post-loading evaluation five patients dropped-out from the long implant group and three from the short implant group. Up to 3-year post-loading, three patients lost one 4.0 mm-long implant each in comparison to two patients who lost one long implant each (difference in proportion=-0.013; 95% CI: -0.079 to 0.054; P=1). All failures occurred before loading, the failed implants were replaced and the delivery of two prostheses in each group was delayed of some months (difference in proportion=0; 95% CI: -0.061 to 0.062; P=1). Five short implant patients experienced six complications versus three complications in three long implant patients (difference in proportion=-0.026; 95% CI: -0.103 to 0.053; P=0.719). There were no statistically significant differences in prosthesis failures, implant failures and complications. Patients with short implants lost on average 0.55 mm of peri-implant bone and patients with longer implants lost 0.61 mm. There were not statistically significant differences in bone level changes up to 3 years between short and long implants (mean difference=0.051 mm; 95% CI: -0.052 to 0.156; P=0.221).
Conclusion: Three-year after loading 4.0 x 4.0 mm-long implants achieved similar results as 8.5 x 4.0 mm-long or longer implants in posterior jaws in the presence of adequate bone volumes, however 5 to 10 years post-loading data are necessary before reliable recommendations can be made.

Year outcomes of high C/I ratio in splinted and nonsplinted implant restorations

A. Bianchi[1], S. Bortolini[2], M. Nanni[3], M.A. Giavatto[4], T.M. Goncalves[5], U. Consolo[6]

University of Modena and Reggio Emilia, Italy
[1]DDS, MSc, PhD, Assistant Professor,
[2] DDS, Associate Professor, Chairs of Prosthodontics and Dental Materials
[3]MD, DDS, Assistant Professor
[4]DDS
[5]DDS, MSc, PhD, Associate Professor, Universidade Federal de Santa Catarina
[6] MD, ChM, Full Professor, Chair of Oral and Maxillofacial Surgery

Aim: The aim of this study is to evaluate retrospectively the effects of high crown-to-implant (C/I) ratio on 241 short (6- to 8-mm long), delayed loading dental implants in splinted and nonsplinted implant restorations.
Methods: One expert operator performed implant surgery in 78 non-consecutive patients, successfully placing a total amount of 241 short (6- to 8-mm) implants. All implants supported fixed rehabilitations and shared a high C/I ratio (radiographically measured from 1.5 to 3.10), but 208 were splinted, while 33 retained a single crown at the end of therapy. In all cases, the final restorations were opposed to fixed prostheses or natural dentition. The sample size was investigated in terms of implant survival rate (ISR) and prosthetic success rate (PSR) after a mean observation period of at least 5 years, distinguishing between splinted (SI) and nonsplinted (NSI) short implants.
Results: In the SI group, the ISR was 97.6% because 5 implants were lost due to perimplantitis over time, while the PSR was steady at 100% since all prostheses remained functional. In the NSI group, both ISR and PSR settled at 97% because one implant was removed after 6 years of function due to perimplantitis.
Conclusion: Within the limits of this study, we could affirm that once we achieve osseointegration we should not fear a high C/I ratio. In fact, it seems to affect similarly splinted and nonsplinted short implants over a mean observation period of at least 5 years.

Total approach concept for atrophic maxilla treatment: nasal and zygomatic implants using a minimally invasive technique with piezoelectric instrumentation

Andrea Tedesco, Duccio Bisordi, Marco Nisi, Mario Gabriele

Unit of Dentistry and Oral Surgery, University of Pisa, Director: Prof. Mario Gabriele. Department of Surgical, Medical and Molecular Pathology and Critical Care Medicine, University of Pisa, Italy

Aim: A moderately to severely resorbed maxilla represents a challenge to functional occlusal rehabilitation in presence of insufficient alveolar bone, which impedes the retention of a conventional prosthesis. To resolve this impasse, several techniques have been developed, such as bone grafting and sinus lifting. Treatment of severely resorbed edentulous maxillae can also include the utilization of the zygomatic process for immediate implant fixation and stabilization with immediate function. The classic surgical technique include the use of round or fissured burrs to make a bony window through the anterior wall of the maxillary sinus with or without the preservation of the schneidrian membrane. Aim of the present study is to present and evaluate a new minimally invasive technique using piezoelectric dedicated inserts and an extrasinusal approach.
Methods: Our study includes 27 patients, who were clinically examined and radiologically evaluated with panoramic radiography and computer tomographic scanning including the zygomatic arch and the floor and the external wall of the orbit. The localization of the implants was planned before surgery using a three-dimensional reconstruction model. A single experienced operator carried out all the surgeries under general anaesthesia: two or four zygomatic implants were placed in the malar bone and two or four straight implants were placed in the premaxillae in each patient. All bone surgeries were performed using ultrasound technique for both the bony window osteotomy and the implant site preparation; the alveolar stabilization of the fixture was performed involving a groove in the lateral wall of the maxillae and the zygomatic implants were placed outside the sinus, contacting the lateral wall of the maxillary sinus itself. The patients were recalled for the clinical follow-up after 1 week, 1 month, 6 months, 12 months and 24 months.
Results: A total of 27 patients (17 males, 63%) were included. Exclusion criteria were patients with uncontrolled coagulation disorders, uncontrolled metabolic diseases and history of radiotherapy. A total of 55 zygomatic implants and 64 conventional implants were placed and after 6 months all of them were used for functional loading. No infection, no nasal bleeding periorbital hematoma were registered during the follow-up period. No zygomatic implants were lost, providing a 100% survival rate, while two conventional implants (3,1%) were lost during the observation period.
Conclusion: Our findings suggest that nasal and zygomatic implants are a valid alternative to grafting procedure for the rehabilitation of the atrophic upper maxillae. This new surgical approach, introducing the use of ultrasonic device, also showed interesting positive results in terms of low incidence of post-operative complications.

Bone grafts reabsorption in the maxilla after onlay and veneer graft procedures considering the total graft volume associated with implant placement in these areas

Alberto Borsi, Paola Virzì, Costanza Da Rin, Lisa Merlino, Luciano Malchiodi

Aim: The purpose of this study is to evaluate the volumetric reabsorption after performing the onlay and the veneer graft techniques over time, underlining in particular the differences among areas that have been rehabilitated with implants and areas in which no implant has been placed.
Methods:

- Surgery: Veneer-onlay graft procedures have been carried out in a 45 year-old edentulous woman's upper jaw
- Implant placement: implants have been positioned, three months after the grafting, in order to achieve the prosthetic rehabilitation of the previously edentulous maxillary areas treated with bone graft. Implants have been loaded after 6 months.
- Radiographic analysis: A volumetric CT study is conducted, first focusing on the two-dimension views of the individual CT slices and then summing up all of the slices in order to obtain a three-dimension analysis. Throughout the axial slices, It has been evaluated the bone reabsorption volume in implant-treated areas over time, comparing them with areas that haven't been rehabilitated with implants instead.
- Charts: the reabsorption values obtained have been translated into column charts that illustrate the total bone graft volume percentages during the 3 months, 19 months and 11 years follow-up. The level of axial reabsorption of the grafted portion has been reported into charts that compare the areas rehabilitated with implants and those that were not.

Results: It can be observed that the total amount of the graft decreases mostly during the first year and a half, reaching a percentage that remains stable

during the following 10 years. Furthermore, we can also notice differences among the reabsorption trend in implant-treated areas and those in which implants have not been placed in.
Conclusions: Veneer-onlay graft procedures show a trend in the percentage of volumetric reabsorption characterized by an inversed proportionality over time, that shows a major reabsorption during the first months, which instead is reduced during the following 10 years. In particular, there is a greater volumetric reabsorption especially in the regions that haven't been treated with implants, compared to those in which implants have been placed in. It seems clear that where implants are not positioned there is an almost complete bone reabsorption because of a physiologic process. Meanwhile, It can be assessed that implant-rehabilitated areas show the maintenance of a sufficient amount of functional bone nearby the implants, because they are subjected to the mastication function over time.

Treatment of severe atrophic edentulous jaws using guided bone regeneration technique: a retrospective study

E. Brauner, E. Grasso, P. Lomelo, F. Barile, A. Ciolfi, A. Quarato, F. Catinari, A. Visca, F. De Angelis, S. Di Carlo

Department of Oral and Maxillo-Facial Sciences, Sapienza University of Rome, Italy

Aim: Severely atrophic alveolar ridges represent a great challenge for implant-prosthetic rehabilitations. The aim of this study was to clinically and histologically evaluate horizontal and vertical bone gain, as well as implant survival/success rate after reconstruction of the deficiencies performed by guided bone regeneration (GBR) technique.
Methods: Fourteen subjects (7 males and 7 females; mean age, 48 years; age range: 25 to 71 years) were enrolled in the study. They met specific inclusion criteria and requiring GBR procedures for placing implants in severe atrophic jaws (bone height ≤ 6mm). GBR was accomplished using dense polytetrafluoroethylene (d-PTFE) non-resorbable titanium reinforced membranes associated with particulate heterologous bone grafts. Implant placement was performed 6 months after surgery simultaneously with the removal of the membrane. Furthermore, a biopsy sample from the grafted sites was collected to conduct a histological analysis of the regenerated bone. Forty-seven dental implants were placed and followed up after prosthetic loading. Implants were evaluated for thread exposure and soft tissue health and were considered successful if the following criteria were met: absence of mobility and pain, lack of peri-implant radiolucency, marginal bone loss (MBL) lower than 50% after prosthetic loading and healthy peri-implant soft tissue.
Results: 17 sites, 8 in the maxilla and 9 in the mandible, were suitable for GBR procedure. The healing period was uneventful in 13 sites, nevertheless the bone defects were satisfactory filled with a newly formed hard tissue in all cases, as confirmed by histological analysis. The average value of vertical bone regeneration was 5,9 mm. The thickness V-O was equal or greater than 8 mm. Post-loading follow-up ranged from 2 to 34 months. Clinical and radiographic exams showed no significant resorption and the implant survival was 100% with no complications. Histological analysis of the bone biopsy samples revealed residual graft particulate in close contact with newly formed bone.
Conclusion: GBR is a reliable technique for reconstruction of severe atrophic ridges and provides an adequate bone graft volume and stability for implant insertion. Larger long-term follow-up studies will help to evaluate the condition of the bone grafted over time and its ability to support functional loading of the implants.

Impression accuracy evaluation of a telescopic transfer with highly non axially oriented implants at 35 degrees

Veronica Campana, Elena Cerisara, Jessica Spinnato

University of Insubria, Department of Medicine and Surgery, Italy

Aim: An essential prerequisite such to achieve a long term prosthesis is to obtain a passive fit between the implants and the superstructure. A crucial phase is represented by an accurate impression making which is influenced by the presence of angulated implants that may lead to increased distortion of impression material. The aim of this in vitro study is meant to compare the accuracy of 3 different transfer devices and to analyze their impression's accuracy in an high implant angulation at 35°. In addition to the classic transfers for the open tray (COT) and closed-tray impression techniques (CT), it is tested also a telescopic open tray transfer (TOT). This last one is characterized by an inner hexagon that can sweep inside the outer body such to eliminate any extension of the connection under the conical interface. Moreover this study is meant to verify the incidence of the relative angulations between the transfer as well as if a 35° angulation prepone a favorite choice depending on this angle. Another aim is to clarify the role of the internal hexagon at creating undercuts in not parallel implants and the impact of this component. The telescopic transfer are created in order to eliminate the impact of this antirational deep component of the connection and reduce the impression material

deformation when the internal hexagon is retracted inside the transfer body. The null hypothesis to validate was that there would be no differences in 3D accuracy between 3 different transfers when tested at 35°.
Methods: A resin master model with 4 implant analogues placed at 0 and 35 degrees towards the horizontal plan was used. 27 polyvinyl siloxane impressions were made using acrylic resin individual impression trays with the aim of evaluating 3 different types of transfers: COT, CT and TOT. The impressions were poured with type IV stone. After matching each analogue with a digital scan body a STL file of the impressions was achieved with"3SHAPE D2000" scanner. An implant bar was projected from all the STL files with "3 Shape Dental System" software. These bars indicate the implant positions referred by the transfer under analysis. A comparison between this bars and the one projected on the master model was obtained with "Magic Materialise 13.0" software. Both a linear and angular measurement for every type of transfer, valuated in different angulation, was achieved.
Results: All the measurements collected have been processed by the statistical software "IBM SPSS Statistics". The not parametric Jonckheere-Terpstra test was performed and a statistically significant difference between the transfer types at 35° inclination was found (p=0,023) when considering the angular displacement between them.
Conclusion: Within the limitations of this study it can be concluded that, even if the presence in the telescopic transfer of an inner hexagon that can sweep inside the outer body such to eliminate any extension of the connection under the conical interface represents one more element of tolerance between the transfer body and the internal retractile hexagon and even if a previous study revealed less accuracy of the telescopic transfer towards the classic pick up technique, when the same telescopic transfer is tested at 35° it shows a greater precision and so the advantage to use a telescopic transfer in presence of tilted implants at high angulations seems the ideal solution, nevertheless the introduction of one more tolerance between the transfer body and the internal retractile hexagon it's itself a cause of minor accuracy.

Three-dimensional impression accuracy evaluation of three different transfer types with different implant placement angulation

Veronica Campana, Jessica Spinnato, Elena Cerisara

University of Insubria, Department of Medicine and Surgery, Italy

Aim: Accurate impression making is a fundamental prerequisite such to achieve a passive fit between the implant and the prosthetic structures. The aim of this in-vitro-study is to evaluate if there are differences in the accuracy of the impression using four different types of transfer and to critically analyze their efficiency in comparative situations given by different angles of implant placement.
Methods: An acrylic resin master model with four implant analogues placed at 0, 15 and 35 degrees towards the horizontal plan was used. Twenty-seven polyvinyl siloxane impressions of the model were made using acrylic resin individual impression trays with the aim of evaluating three different types of transfer: a closed tray technique transfer, a classic open tray technique transfer and a telescopic open tray transfer. The impressions were poured with type IV die stone. After matching each analogue with a digital scan body and checking an accepted position's error ≤ 40 micron, a STL file of the impressions was achieved with the scanner "3SHAPE D2000" (documented 5 micron accuracy ISO 12836,4 x 5.0 MP cameras). An implant bar was projected from all the different STL files with "3 Shape Dental System" software. Each project is originated from each different impression in order to gain the implant position referred by the transfer under analysis. A comparison between this bars and the one projected on the master model was obtained with "Magic Materialise 13.0" software. Both a linear and angular measurement (heads in each dimension: x, y and z axes) for every type of transfer, valuated in different angulation, was achieved. The collected data have been processed by the statistical software "IBM SPSS Statistics, Armonk, New York, United States" and analyzed with student's T test and Kruskal-Wallis not parametric test.
Results: Even if the student's T test revealed a statistical significance of the different linear and angular measurements in Δx, Δy, Δz changing the transfer's type, more restrictive tests have highlighted a not statistical significance related to the transfer's type. However, when considering a variation of the implant positioning angle, the same tests revealed a statistically significant difference.
Conclusion: Considering the limitations of this study, it could be concluded that the type of transfer used is not a significant parameter rather than the implant positioning showed a significant key role in the precision success of impressions.

Implant-prosthetic rehabilitations in HIV patients related to serological parameters and to different surface roughness: three-years follow-up

Omar Capelli, Maria Chiara Francia, Francesco Bova, Stefano Ferrari Parabita, Stefano Bianchi, Paolo Capparé, Raffaele Vinci

[1]Department of Dentistry, IRCCS San Raffaele Hospital, Milan, Italy

[2]Dental School, Vita-Salute San Raffaele University, Milan, Italy

Aim: The aim of the present study was to examine the success of implant-prosthetic rehabilitations in controlled HIV+ patients in relation to serological parameters and to different implant surface roughness.
Methods: This mono-centric study included HIV+ patients that could benefit from implant-prosthetic rehabilitations with a stable disease, showing adherence to antiretroviral drug regimen. Single implants or full-arch rehabilitations (according to All-on-4® protocol) were performed. Each patient received at least one dental implant. Implant and prosthetic failures, marginal bone level change (MBLC), serological parameters (CD4+ cell count, CD4+/CD8+ ratio and HIV-RNA), biological and mechanical complications were recorded at 6 (T2), 12 (T3) and 36 (T4) months after implant insertion. Two different types of implant surfaces were compared: one group of implants had a higher surface roughness (Microrough surface-MRS) and the other one had a lower surface roughness (Full Contact Covering Surface-FCC). Implant failures (loss of implant stability, presence of radiolucent zone around implants, mucosal suppuration and fracture) were related to CD4+ cell count, CD4+/CD8+ ratio and HIV-RNA.
Results: Implants were placed in 83 patients and the overall number of fixture was 284. Thirty-one All-on-4® rehabilitations (124 fixtures) and 160 single implants were achieved.
High survival rates (95,77%) were recorded after three years of follow-up.
Mean Marginal Bone Level Change (MBLC) in single implants measured at T2 were 0.46 ± 0.28 mm for MRS implant surface and 0.49 ± 0.27 mm for FCC implant surface, at T3 were 0.89 ± 0.31 mm for MRS implant surface and 0.88 ± 0.32 mm for FCC implant surface and at T4 were 1.33 ± 0.32 mm for MRS implant surface and 1.05 ± 0.21 mm for FCC implant surface.
Mean Marginal Bone Level Change (MBLC) in All-on-4® rehabilitations measured at T2 were 0.41 ± 0.17 mm for MRS implant surface and 0.59 ± 0.27 mm for FCC implant surface, at T3 were 0.81 ± 0.25 mm for MRS implant surface and 0.83 ± 0.30 mm for FCC implant surface and at T4 were 1.15 ± 0.21 mm for MRS implant surface and 1.10 ± 0.28 mm for FCC implant surface. The implant survival rate was 95,08% for MRS implants and 97,03% for FCC implants. Slightly better results were found in the group of implants with a lower surface roughness. Implant failure occurred in 9 patients (12 fixtures out of 284: 4,22%). They were implant failures due to early primary infection and failure in the osseointegration process (6 fixtures out of 284: 2,11%), to perimplantitis (5 fixtures out of 284: 1,76%), and to fracture (1 fixture out of 284: 0,35%).
A statistically significant direct correlation was found between HIV-viral load and implant failures: 83,33% of all implant failures occurred in subjects with HIV-RNA higher than 0,9 UI/ml. Inverse correlation was found between implant failures and CD4+ levels and CD4+/CD8+ ratio: 66,67% of all implant failures occurred in patients with CD4+ levels lower than 707 cells/mm3 and 75% in patients with CD4+/CD8+ ratio lower than 0,81.
Conclusion: Within the limitations of the present study, HIV-RNA, CD4+ levels and CD4+/CD8+ ratio showed to be very important parameters as they may represent important markers for implant success. Moreover, a lower roughness surface seems to be less likely to develop implant failure compared to an higher roughness surface.

Use of mini-implants in totally edentulous patients: a systematic review

A. Caputo, M. Peditto, A. Barresi, G. Picciolo, A. Marcianò, G. Oteri

Department of Biomedical and Dental Sciences and Morphofunctional Imaging, School of Dentistry, University of Messina, Messina, Italy

Aim: Narrow-diameter implants (NDIs) have been introduced as an alternative treatment option in single-tooth gaps or edentulous ridges with limited width. The advantages of using narrow implants include the following: 1) avoidance of advanced bone grafting; 2) reduced bleeding; 3) minimal postoperative discomfort; and 4) less healing time. However, narrow implants present also some disadvantages: 1) reduced bone-to-implant contact (BIC) and osseointegration; 2) increased risk of implant fracture due to reduced mechanical properties; 3) increased risk of implant overloading. The objective of the present review was to evaluate the rehabilitation of edentulous patients through removable and fixed full-arch dentures supported by narrow implants with a diameter inferior to 2.5 mm (mini-implants).
Methods: A systematic literature search with predetermined inclusion criteria was performed using the PubMed, Cochrane Library and Google Scholar database to find relevant articles on clinical studies published in English up to December 2017. The search strategy was defined via preliminary assessment of patients, intervention, comparison and outcome (PICO process). Papers selected for the review included randomized clinical trials and retrospective/prospective cohort studies involving mini-implants (diameter <2.5 mm) placed in edentulous patients. Six months or more follow up following implant placement was required. Data were extracted by three review authors using data collection forms. Acquired data were used to calculate the estimated survival rate at five years (%) with a

standard Poisson regression analysis. For each study, the estimated marginal bone loss (MBL) at five years was calculated by dividing the MBL reported by years of follow-up and multiplying for five.
Results: Thirteen clinical studies were included. The overdenture was the rehabilitation of choice for every included study. Overall, 316 patients received 1133 mini-implants. The identified narrow diameter implants had a diameter inferior to 2.5 mm. Follow-up ranged from one to 7 years. Eleven studies reported the type of surgical protocol, either flapped (5), flapless (5), or both (1). Reported survival rates ranged from 84.7% to 100%.
Conclusion: Clinical data, from this systematic review, suggest that mini-implants (diameter <2.5 mm) represent a valid alternative treatment option to bone augmentation procedures in the rehabilitation of edentulous jaw with limited width. Moreover, the quality and level of evidence are limited and present a high risk of bias, so caution is advised when interpreting these data. Further studies are required to determine predictability and possible applicability for mini-implants also in supported fixed full-arch restorations.

Dental implant rehabilitation in patients affected by cardiovascular disease: a prospective longitudinal study

C. Caravetta, G. Scavella, C. Ruscica, M. Todaro, P. Capparé

Department of Dentistry, IRCCS San Raffaele Hospital, Milan, Italy; Dental School, Vita-Salute San Raffaele University, Milan, Italy

Aim: The aim of the study was to analyze the frequency and the risk of bleeding episodes following dental implant surgery in patients with temporarily non-altered oral anticoagulant therapy. Do not interrupt the anticoagulation therapy is important to minimize morbidity risk for the patient. In addition, there is scientific evidence that embolic complications may occur in case of suspension, change or reduction of the anticoagulant therapy.
Methods: In this study were selected 70 patients with controlled cardiovascular disease, assessed by the cardiac care unit of the San Raffaele Hospital, which gave consent to the surgery. Patients included in the study had to be treated with oral anticoagulant therapy (WARFARIN) and had to present international normalized ratio (INR) between 2.5 and 3.5. Treatment consisted in the extraction of one or more teeth and the replacement of them through an implant-prosthetic rehabilitation. Hemorrhagic events were scheduled for each patient according to a classification that varied from mild, moderate and severe. A total of 252 teeth were extracted and 133 dental implants (CSR, Sweden & Martina) were positioned. Immediate prosthetic loading was applied after the surgery in 50 patients. Patients were placed in a postoperative care program that included professional oral hygiene sessions and home instructions. Implant osseointegration was evaluated by clinical examinations and the bone-implant level was evaluated with digital intraoral X-rays at 6, 12 and 24 months over time.
Results: Moderate intraoperative bleeding occurred in 15 patients. The slight postoperative bleeding detected were 8: three within 12 hours and two within 24 hours of surgery. Hospitalization was not necessary under any circumstances. Local agents such as bone wax and collagen sponge application, sterile gauze compression, and tranexamic acid mouthwash to stop all bleeding complications were used for each patient. The 2-year follow-up showed a 97.92% survival rate with 2 implants lost. The bone implant level was stable over time with an average crestal resorption value of 0.71 ± 0.42 mm at 2 years.
Conclusion: Nowadays there is no evidence in literature about the risk of hemorrhagic events related to dental implants surgery. Based to the results of this study, implant surgery can be performed safely in patients treated with oral anticoagulants if a minimally invasive approach, a specific implant design, anti-hemorrhagic agents and post-operative rigid recommendations are adopted.

Spiderimplant for treatment of atrophic maxilla: a retrospective clinical study after 5 years

Erminia Coccia[1], Marco Mascitti[1], Andrea Santarelli[1], Luca Aquilanti[1], Giorgio Rappelli[1], Maurizio Procaccini[1], Lorenzo Lo Muzio[2], Massimo Zanna[3]

[1]Department of Clinical Specialistic and Dental Sciences, Marche Polytechnic University, Ancona, Italy
[2]Department of Clinical and Experimental Medicine, University of Foggia, Foggia, Italy
[3]"Casa di cura E. Montanari" Private Hospital, Morciano di Romagna, Italy

Aim: Spiderimplant is a new minimally-invasive implant methodology for the treatment of atrophic maxilla without the need of any reconstructive surgical procedures (such as sinus augmentation, bone graft, and guide bone regeneration). This system consists of primary fixtures fixed in the bone with the additional of customized maxillofacial plates and screws or secondary fixtures. The aim of this study is to evaluate the safety of the Spiderimplant technique with regard to implant-related complications, prosthetic-related complications, immediate and long-term complications.
Methods: This is a retrospective case series of 5 patients (3 males and 2 females) with vertical and/or transverse atrophic maxilla. For each patient, medical history,

drugs, and smoking habit were collected. One patient (54 years-old, male) received 1 primary fixture, 1 customized plate (length 18 mm) and 2 secondary fixtures. One patient (71 years-old, female) received 2 primary fixture, 2 customized plates (length 18 mm) and 4 secondary fixtures. One patient (64 years-old, male) received 2 primay fixtures, 2 customized plates (length 24 mm) and 6 secondary fixtures. One patient (60 years-old, female) receives 2 primary fixtures, 2 customized plates (length 42 mm) and 6 secondary fixtures. The last patient (67 years-old, male) receives 2 primary fixture, one 3D-customized plate (12 mm x 12 mm) and 2 secondary fixtures. All primary fixtures have the following characteristics: length 6 mm and diameter 2.9 mm. All secondary fixtures are length 6 mm with a diameter 2.9 except for two secondary fixtures having a length of 11 mm with a diameter 2.7. All patients have been followed from 53 to 62 months (mean 58.8 months). Clinical data have been collected to evaluate immediate and long-term complications of implants or prostheses. Moreover, 3D CT images are used to verify the correct position of implants and to verify the long-term success of the Spiderimplant systems.

Results: The patients were scheduled for follow-up every 3 months. All patients did not have any implant and prosthetic short-term complication and 3 of them did not have any long-term complication. 2 patients had partial exposure of plate; one of these two patients are a heavy smoker. Nevertheless, all patients maintain good aesthetic and functional results. 3D CT images confirm the correct formation of bone both on primary and secondary fixtures.

Conclusion.This new surgical technique seems to be safe and accurate, confirmed by absence of clinical or radiographic changes and the maintenance of good aesthetic and functional results after a 5-year follow-up. Future prospective studies are needed to verify the excellent performances of this new implant system.

A minimally invasive approach using an immediate loaded 4-mm-short implant without extraction of an impacted maxillary canine: 1-year results

Carlotta Del Principe, Lorenzo Breschi, Carlo Barausse, Salvatore Di Simone, Pietro Felice

Department of Biomedical and Neuromotor Sciences, University of Bologna, Bologna, Italy

Aim: To describe a successfully minimally invasive approach to rehabilitate a site with a residual deciduous tooth along with an impacted canine by using a 4-mm-short implant.

Methods: A 46 years-old systemically healthy female patient was referred requiring the rehabilitation of her maxillary left canine. The patient suffered from pain in the area of her deciduous left maxillary canine. Clinical and radiographic baseline data revealed the presence of a fixed bridge between left canine and left second premolar, the impaction of the permanent canine and a resorption of the deciduous canine root. The cone beam computed tomography preoperative scans showed a palatal position of the impacted canine with about 5 mm of residual bone height. All possible treatments were explained to the patient.The orthodontic solution was denied due to long treatment times and to the possibility of an ankylosis. Also the extraction of the canine, the grafting of the area in order to place a standard-length implant were refused. Considering the available bone below the impacted canine, the suggested approach was to extract the residual deciduous canine, to place in the same surgical session a 4-mm-short implant and to immediately load it. The implant insertion torque was about 55 Ncm allowing for an immediate loading procedure. Sutures were removed after 14 days. The patient was examined clinically every month for the first 6 months, when a definitive crown was delivered.

Results: This kind of approach provided a successful rehabilitation with uneventful healing, from an aesthetic and functional points of view with stable results till 1 year after immediate loading.

Conclusion: Within all the limitations of this case report, a 4-mm-short implant associated with an immediate loading protocol may represent an alternative treatment for a fixed rehabilitation in cases of edentulous sites due to upper canine impactions in adult patients. This approach could reduce operative times, possible complications and postsurgical morbidity with respect to conventional rehabilitations, which can include orthodontic procedures or more invasive surgeries. Accurate case selection and good maintenance programs could be key factors for long-term success. However, randomised controlled clinical trials with longer follow-ups are required to assess whether this simplified approach can be predictable and to evaluate the long-term behavior of the impacted canine left untouched below the short implant.

Observational study on the preparation of the implant site with piezosurgery vs drill: comparison between the two methods in terms of post-operative pain, surgical times and operational advantages

Federica Dotto, Michele Maglione, Lorenzo Bevilacqua, Fulvia Costantinides

Department of Medical, Surgical and Health Sciences, University of Trieste, Trieste, Italy

Aim: Piezosurgery has long been applied in implantology

for the preparation of the implant site thanks to its selective cut, to the cavitational effect and to the preservation of soft tissues. The main objective of this study was to verify, if there were differences, between the traditional method with micromotor and dedicated drills and piezoelectric technique.
Methods: The following study took into account adult patients undergoing implant therapy with insertion of two contralateral conical implants (diameter 3.8-4.5 mm). One site was prepared with micromotor and dedicated drills (G1) while the contralateral was prepared with Piezodevice (G2). 75 patients, with a bilateral loss of teeth in the maxillary or mandible and bone type D2 or D3 (Misch classification), were enrolled in the study. The final sample of the implants inserted was 150 (75 per technique). Each patient included in the study was therefore in possession of two questionnaires, one per technique, for the evaluation of the treatment: symptoms experienced during the surgery, after 8 hours, from the 1st to the 7th day, using the Visual Analogue Scale (VAS); was also asked to indicate the possible intake of painkillers and the related dose, after surgery and in the following six days. The preparation times of the implant site were measured from the preparation of the flap up to the insertion of the implant. A questionnaire on the operative difficulty was compiled by the operator, considering two factors: the easiness in obtaining a correct axis of implants insertion and the quality of visibility. Furthermore, a cumulative judgement has been done for the whole procedure, as "simple", "of medium difficulty", "difficult".
Results: From the analysis carried out on the comparison of the VAS scale of the statistical units treated with drill and piezoelectric methodology, a statistically significant difference was found in regard to the intraoperative symptomatology within each group over time (Friedman test: G1, $p<0.001$; G2, $p<0.001$). A statistically significant difference of VAS value was found between groups at each time point ($p<0.001$ intraop., after 1 day, 2 days, 3 days, and 5 days). The differences in the frequency of intake of painkillers within each group over time showed a statistic significance (Cochran test; G1, $p<0.001$; G2, $p<0.00$). It was found that the average surgical time in the G1 was 5 minutes ($\pm$ 4.7) whereas in G2 was 8 minutes ($\pm$ 6.2). Considering the different bone types, no differences were found in preparation times within studies groups (Mann-Whitney test, p=NS) whereas a significant difference has been found between groups both for D2 and D3 densities (Wilcoxon test: D2, $p<0.05$; D3, $p<0,001$). Answers given by the oral surgeon to the questionnaires showed a significant difference between G1 and G2 only for the quality of visibility (Mc Nemar test, $p<0.05$). Easiness in reaching the correct axis of insertion and the global judgement on the difficulty of the surgery did not show significant differences (Mc Nemar test, p=NS).
Conclusions: The implantology has now reached levels of reliability and predictability of success over time that, associated with a high rate of safety, making it a daily surgical practice. Traditional surgery undoubtedly maintains the record for the speed of execution. However, the ultrasounds applied to the implant site preparation are a method of bone surgery that presents fewer risks related to operative maneuvres and greater comfort for the patient.

The evolution of ceramic implantology: the two-piece zirconia implant

Dino Re[2], Andrea Enrico Borgonovo[1 2], Andrea Emanuele Luca[2], Susanna Ferrario[2], Sammy Noumbissi[1], Virna Vavassori[2], Cesare Lacaita[2]

[1]Presidente della Accademia Internazionale di Implantologia Ceramica, Silver Spring ,Maryland USA - ZIRG: Zirconia Implant Research Group
[2]Reparto Universitario di estetica dentale, ISI, Università degli Studi di Milano, Italy

Aim: The aim of this work is to describe the peculiarities of two-piece zirconia implants, based on scientific literature in order to understand current success rate of these implants, indications, morphological characteristics, consequent advantages and disadvantages as well as clinical indications such as full-arch rehabilitations.
Methods: After careful analysis of literature it was possible to collect scientific data concerning the advantages and disadvantages of mono and bi-component zirconia implants.
Results: One-piece zirconia implants are particularly indicated in the anterior areas, especially in thin biotypes, in mono-edentulous rehabilitations and in patients with optimal bone support. However, such systems have several limitations. Surgical placement of the implant may not always meet the prosthodontic requirements, and angled abutments to correct misalignment are unavailable. Secondary corrections of the shape by grinding must be avoided as this severely affects the fracture strength of zirconia. Moreover, one-piece implants are immediately exposed to forces from the tongue or as a result of mastication. Loading forces are applied on the implant, regardless of the temporization system. This may be unfavorable for the osseointegration processes. This occurs not only in situations where the bone does not have a density suitable for immediate loading, but also where regenerative procedures have been performed. On the other hand, two-piece implants have a greater versatility thanks to the fact that the clinician can prefer the submerged healing of the implant in cases where this situation is

indicated and can choose between different types of abutments. However, the two-component implant system component involves problems that were already partially present with titanium implants. These limits are expressed precisely at the implant-abutment interface and are linked in particular to greater risk of bacterial colonization due to the presence of a micro-gap at the abutment-implant interface level. However, it is good to consider that zirconia has intrinsic characteristics that entail minor contamination risk compared to titanium given by the lack of fundamental components in bacteria for adhesion to the ceramic material. Two-piece zirconia implants are available in both cylindrical and conical versions and have a thread along the entire surface. Cementation is the only option for connecting prosthodontic elements to one-piece implants. In the two-piece system, the connection can be screwed or cemented. The implants with screwed connection foresee the use of a connection screw between implant and abutment that can be in titanium, gold, peek or carbon-peek. Concerning the cemented connections, they foresee the use of a dedicated cement. Those recommended are glass ionomer cements and resinous cements.

Conclusions: The evolution of ceramic implantology has led to the introduction of bi-component implants, in response to the growing demand for metal-free rehabilitations and to the request for an alternative that would allow its use in cases where single-phase forms were not indicated in zirconia.

Increase in bone volume due to the use of a titanium grid fixed to the implant

Susanna Ferrario, Paola Beretta, Chiara Ceratti, Cesare Lacaita, Salvatore Batia, Davide Cavagnetto

IRCCS Cà Granda Ospedale maggiore Policlinico, Università degli Studi di Milano, Milano, Italy

Aim: Lack of appropriate bone volume for the insertion of an implant fixture to this day remains a challenge in oral surgery. Furthermore, dehiscence or fenestration may occur despite the achievement of good primary stability of the implant during the intra-operative phase. This case report supports the possibility of the aid of a shield titanium barrier fixed to the implant, thanks to a predisposed engagement to the healing screw. This method can be considered an alternative to the use of vestibular or palatal fixing screws. It provides a less invasive and more easily manageable surgical technique than the traditional techniques.

Methods: The 54-year-old patient came under our observation by requesting an implant-prosthetic rehabilitation in zone 1.4. After evaluating the extension of the vertical defect, a treatment plan which included the use of a regenerative bone technique (GBR) with the aid of biomaterial of bovine origin, a resorbable membrane in collagen and a titanium grid fixed to the implant fixture inserted at the same time as surgery was chosen. The surgical site was anesthetized using articaine-epinephrine 1:100,000. A full thickness muco-periosteal flap up to the exposure of the bone defect was performed. Granulation tissue was removed with a curette. The surgical area was rinsed with sterile saline solution. Periosteal releasing incision was performed so as to release the fibers and subsequently allow the graft, the grid and its components to be closed by first intention. Surgical suturing technique with 4-0 monofilament suture materials was performed for optimal wound closure of the surgical area. A Magagen Anyridge implant (4x8.5 mm) was inserted in seat 1.4 with an insertion torque of 45 N. In the housing normally used for the cover screw a modified healing abutment was inserted that could support the dedicated I-GEN grid (Megagen). With this unique operation the grid is stabilized and does not require additional fixing screws. Below the I-GEN Grid the defect was filled with deproteinized bovine bone, so that the set of the grid and the biomaterial could be identified as a scaffold of the defect. Contamination with blood or saliva was prevented during biomaterial application. To aid in correct cell differentiation, the titanium grid was also covered with a resorbable membrane. The aim of this procedure is to prevent epithelial and connective cells from invading the clot in formation. A healing period of 5 months was expected before the removal of the grid which, as the only mechanical maneuver, required the unscrewing of the modified healing abutment, after a small access flap which did not require vertical release incisions. As a last step, the prosthetic device was made.

Results: At the two-year follow-up it was possible to evaluate the real bone augmentation obtained thanks to the use of this surgical technique. A 3 mm horizontal and 4 mm vertical bone augmentation was recorded.

Conclusions: A titanium barrier fixed to the implant itself allows a bone augmentation given by a bovine and autologous bone graft, without having to use accessory vestibular anchoring screws. Removal of the grid itself results to be minimally invasive.

Abstract postextractive implants in aesthetic areas: evaluation of perimplant bone remodeling over time

Michele M. Figliuzzi[1], Maria Altilia As[1], Simone Altilla As[2], Amerigo Giudice[1], Carlo Rengo[3], Leonzio Fortunato[1]

[1]School of Dentistry, Department of Periodontics and Oral Sciences, Magna Graecia University, Catanzaro, Italy
[2]Dentistry Schoolo of University of Tor Vergata Roma, Italy
[3]Department of neurosciens,riproductive and odontostomatological

sciences, University of Naples Federico II, Italy

Aim: The aim of this research was to assess periimplant bone remodeling of post-extractive implants over 2 years.
Methods: 30 patients meeting pre-established inclusion criteria were enrolled for the study. One implant for each patient was inserted in the post-extraction sockets according to a defined surgical protocol (atramautic extraction, curettage of extraction socket, implant insertion, grafting with collagenated cortico-cancellous porcine bone, and a trimmed collagen membrane to completely cover the socket, suture). A temporary adhesive bridge, with an adequate profile, was bonded to the adjacent teeth. X-ray evaluation with a standardized stent was carried out at different times. Measurements were obtained from the implant edge to the bone peak. The values obtained at time 0 and at 2 years were compared by t-student test
Result: Our results showed that after one year 73% of patient had 0 mm of bone reabsorption, 20% of patient had 0 mm ≤ x ≤ 0.5mm, 7% of patient had 0.5 mm ≤ x ≤ 2 mm of bone reabsorption. After two years 62% of patient had 0 mm of bone reabsorption, 24% had 0 mm ≤ x ≤ 0.5mm, 14% had 0.5 mm ≤ x ≤ 2 mm.
Conclusions: The results showed no significant differences in bone reabsorption in most patients over 2 years.

Use of ot bridge system in fixed, implant-supported, full-arch prosthetic rehabilitation: a case-report

G. Garbelli, F. Tomasoni, S. Bertoli

Department of Clinical-Surgical, Diagnostic and Pediatric Sciences, Section of Dentistry, University of Pavia, Pavia, Italy

Aim: Currently implant-supported fixed restorations can be fastened to implants with screws or they can be cemented to abutments that are connected to implants with screws. The relevant literature highlights that both types of restorations are characterized by advantages and disadvantages. Often, the choice for screw or cement retention appears largely to depend on the clinician's personal preference rather than on scientific basis. The aim of this report is to present a new retention system that employs an interchangeable acetal ring housed in a groove inside the dedicated cylindrical connection. During the insertion of the prosthesis the abutments, with seegers on the inside, meet the hemispheres of the OT equator attachments. As the seegers are slightly elastic, they tend to both widen in some points and flatten at some other point of the interface. The elastic memory allows the seegers to regain their shape in a short time and complete the seal. The seegers can be used in association with prosthetic screws or alone without any other retention device.
Methods: A male patient of 64 years of age, non smoker, referred to the Department of Clinical-Surgical, Diagnostic and Pediatric Sciences, Section of Dentistry of University of Pavia, for rehabilitation of partially edentulous upper maxilla. The patient wore a partial removable denture (Valplast) and asked for fixed solution. Clinical and x-rays evaluation of the upper jaw strictly indicated the extraction of all the residual teeth. Four WINSIX® K implants were positioned: two implants in the premolar area and two implants in lateral incisors area. OT Equator TiN coated titanium abutments (RHEIN83, Bologna, Italy) were chosen based on transmucosal path height evaluation. A Cr-Co bar was prepared using a selective laser melting technique (SLM), while the prosthesis was made with polymethylmethacrylate resin (PMMA). Periapical x-rays and one-screw test have been used to assess implant framework fit.
Results: This protocol allowed to manage a difficult case of implant-prosthetic rehabilitation reducing the number of laboratory steps and economical costs. Passive fit of implant-supported–prosthesis frameworks has been suggested as a prerequisite for successful long-term osseointegration: the seeger ring allowed to offset the gap between framework and attachments guaranteeing the passivation and the locking of the prosthesis at the same time. Esthetic advantage is related to the possibility to reduce the number of prosthetic screw holes. Moreover, if the loss of implant occurs, the same abutments can be used to carry out a removable prosthesis.
Conclusion: The use of OT Bridge system (Rhein83) seems to be a valid alternative to traditional cementation and screw retention. Future investigations on this procedure, supported by a careful follow-up, can confirm the long-term success of the rehabilitation.

Minimally invasive fixed rehabilitation of a totally edentulous severely atrophic mandible with 4-mm-ultrashort immediately loaded implants: a case report

R. Gasparro[1], L. Breschi[2], R. Pistilli[3], C. Barausse [2], P. Sammartino[4], P. Felice[2]

[1]University of Naples Federico II, Department of Neuroscience, Reproductive Science and Dental Science, Italy
[2]University of Bologna, Department of Biomedical and Neuromotor Sciences, Bologna, Italy
[3]Oral and Maxillofacial Unit, San Camillo Hospital, Rome, Italy
[4] University of Naples "Luigi Vanvitelli"

Aim: Bone augmentation procedures can be associated with significant patient morbidity, can be more

expensive and may require longer times (up to 1 year) before patients are rehabilitated with implant supported prostheses. Moreover complications, especially for vertical augmentation techniques, are common This case report describes the full rehabilitation of a totally edentulous mandible (class VI, Cawood and Howell) with immediately loaded 4-mm-long implants, avoiding the need for any bone augmentation.

Methods: A 55 years old systemically healthy woman was referred, requiring for a fixed prosthetic rehabilitation of her fully edentulous mandible. Clinical and radiographic (Orthopantomography, OPG) baseline data revealed a totally edentulous mandible with an advanced alveolar bone resorption. The pre-operative CBCT scans confirmed the severe mandibular atrophy (Class VI, Cawood and Howell) with no usable bone volumes to place any implants in the posterior areas and with about 4.3-5 mm of vertical available bone in the interforaminal zone. The patient refused to undergo any augmentation procedure and the possibility to realize a new mobile prosthesis was denied by the progressive superficialization of IAN occurred during time. In agreement with the patient, a minimally invasive rehabilitation on 4-mm ultra-short implants placed straight into the interforaminal region was planned. The surgical procedure was performed under local anaesthesia. Four 4-mm-length and 4-mm-diameter short implants (Twinkon 4, Global D, France) were placed with an insertion torque > 50 Ncm. Flaps were sutured with 4.0 sutures and an impression with the pick-up copings was then taken to immediately load the implants. An acrylic screw-retained reinforced prosthesis was delivered after 24 hours. Only five crowns have been planned for the provisional in order to guarantee a minimal aesthetics as requested by the patient and to minimize the length of the cantilevers during the osseointegration period. A cold and soft diet was recommended for 2 weeks and sutures were removed 7 days after surgical procedure.

Results: The healing process and the post-operative recovery were uneventful and the patient was clinically and radiographically (OPG and CBCT) examined just after implant placement and eight months after. Eight months after immediate loading, a definitive metal-ceramic screw-retained prosthesis replaced the provisional one. The prosthesis was made avoiding cuspid guidance and lateral loading trying to reach a balanced and mutually protected occlusion. The final follow-up is at 2 years after immediate implant loading. Peri-implant marginal bone levels and the clinical prosthetic result appear to be quite stable at 1 and 2 years after loading and a slight bone growth is appreciable above mental nerves 2 years after loading. The patient up now is satisfied from both the aesthetic and functional points of view and is grateful for the fast and minimally invasive rehabilitation.

Conclusion: Within the limitations of this case report, 4-mm-length ultrashort implants placed in the interforaminal area used to immediately rehabilitate a fully edentulous and severely atrophic mandible could reduce operative times, costs, complications and post-surgical morbidity with respect to bone augmentation procedures with a similar final esthetic result. Of course RCTs with long follow-ups are needed to evaluate if this could be a preferable option compared to bone augmentation techniques in patients with severely atrophic and fully edentulous mandibles.

Socket shield technique, a solution for immediate implant in esthetic zone: a case report

Giulio Grisolia, Denys Bergamini

Department of Neurosciences, Section of Dentistry, University of Padova, Padova, Italy

Aim: This case report presents the benefits of the Socket Shield Technique in the rehabilitation with post extractive implant in the esthetic zone. It also presents a classification of the SST.

Methods: The 34-year-old, nonsmoker, female patient presented a severely decayed maxillary left first premolar. The chosen treatment was immediate implant placement with Socket Shield Technique. First the crown was cut horizontally, at the gingival level; then the root was bisected vertically so that the palatal half could be removed along with the apex. The thus created shield's length was kept at two-third of the root length. The buccal part was then remodeled to make the shield's width about 1.5-2 mm. Afterwards the shield was trimmed to the bone level. To help the fitting of the restorative components it was given a bevel profile to the shield on its inner side. The placement of the implant in correct three-dimensional (3D) position was carried out according to the traditional method. Between the shield and the implant was left approximately a 1.5 mm space. After the implant placement a provisional crown was positioned in order to help preserving the soft-tissue contours. For the final restoration a screw-retained crown was the prothesis of choice. Kumar PR et al. proposes a classification of Socket Shield Technique according to the position of the shield in the socket. This classification helps understanding the preparation design and the role of shield. It also is fundamental in maximizing the usage of the shield allowing to achieve the best possible esthetics results in immediate implant placement.

Results: The SST is an innovative approach that allows clinicians to restrain remodeling and resorption of the buccal bone by maintaining the facial part of the root during tooth extraction. The SST gives patients

lots of benefits: it preserves their tissue and doesn't cause traumas, if not insignificant ones. Moreover, the SST reduces the number of surgical and prosthetic interventions required both before the operation and after the rehabilitation.
Conclusions: The Socket Shield Technique is a minimally invasive implantological approach and offers patients and clinicians multiple benefits. The Socket Shield Technique represents an alternative approach to intervene remodeling and resorption processes by the retention of the facial part of the root during tooth extraction. The immediate placement of an implant supports the facial root fragment, preventing the collapse of the buccal wall. The Socket Shield Technique also guarantees the achievement of the best possible esthetic results.

Guided bone regeneration of the pre-maxilla: case report

C. Iasevoli[1], C. Madonna[1], O. Trosino[1], M. Cacciola[1], P. Sammartino[2]
[1]Department of Neuroscience, Reproductive Science and Odontostomatology. Program of Oral and Reconstructive Surgery. Head Professor Gilberto Sammartino University of Naples Federico II, Italy
[2]University of Naples Luigi Vanvitelli, Italy

Aim: The oral rehabilitation of partially edentulous patients with the use of endosseous implants is a widespread method ables to guaranteeing predictable and reliable long-term results. Unfavorable conditions of alveolar ridges due to atrophy, periodontal disease or trauma bring to an insufficient vertical and/or horizontal bone volume. Different methods are used to treat the bone deficiency in the jaws as bone growth factors, bone grafts, guided bone regeneration and others. The GBR is a surgical technique that involves the use of reabsorbable or non-reabsorbable membranes in association with filling material to find an adequate bone regeneration able to insert endosseous implants. In this way the GBR brings also a correct volume of bone that completely surrounds the entire implant's surface, as well as an optimal position for the following prosthetic rehabilitation. The aim of this report is to describe the use of guided bone regeneration (GBR) to regenerate the premaxilla with the simultaneous placement of implants.
Methods: The patient comes to our attention due to the mobility of the four upper incisors and tells of having undergone repeated orthodontic treatments that had not taken effect due to the patient's poor collaboration and periodontal disease. After a thorough analysis of orthopantomography (OPG) and cone beam computed tomography (CBCT) is clear the loss of 60% premaxilla's bone. The patient, with a thin biotype, will be subjected to avulsion of the four upper incisors and subsequently to the placement of four simultaneously implants with GBR of premaxilla. After the extractions and the positioning of equine collagen in the alveolus with coronal repositioning of the flap to have a greater quantity of attached gingiva, we proceed to the preparation of the upper canines and placement of a temporary resin bridge. It was necessary to proceed with a vestibular frenectomy because of a long frenulum. After waiting forty days to have the complete epithelialization of the post-extraction site we proceed to place four implants in the premaxilla. To do this is used a surgical guide that helps us to place the implants and to quantify the bone augmentation. The GBR is realized with the use of deproteinized bovine bone combined with autologous bone, harvested from the branch of the mandible that is made with precise and accurate movements beacuse of we can have the particulate and the bone block; in this way the particulate and the bone block can be both covered with a non-resorbable titanium-reinforced membrane. The implants have been ideally positioned and then submerged. After four and half months the implants were discovered doing osteoplasty and we notice that between them there is the correct amount of bone to have an excellent inter-implant papilla. In the end, single crowns are placed on both upper canines while a bridge will be placed from 12 to 22.
Results: An orthopantomography (OPG) and CONE BEAM were made immediately after surgical procedure demonstrating there are no perimplant resorption. The patient was satisfied from an aesthetic and functional point of view.
Conclusions: The case demonstrates how an adequate approach to hard tissues as well as soft tissues allows a bone regeneration that is both aesthetic and functional; with the possibility to change the thin phenotype into a thick phenotype and therefore respectful of the functionally and the aesthetics during medium and long-term.

The implant's surface: a crucial issue for the osseointegration

Cesare Antonio Lacaita, Susanna Ferrario, Paola Beretta, Chiara Ceratti, Matteo Landi, Jessica Citriniti, Davide Cavagnetto, Gionata Bellucci

Dipartimento di scienze biomediche, chirurgiche e odontoiatriche, Fondazione IRCCS Ca' Granda - Ospedale Maggiore Policlinico, Università degli Studi di Milano, Italy

Aim: In the modern implantology, there are many factors affecting osseointegration. One of these is the type of implant's surface and topography, which include the production material and the surface's treatment. In order to reach the highest possible

of osseointegration, the gold standard surface is represented by rough surfaces on titanium implants, in particular the SLA surface which involves a chemical etching followed by a coarsely sandblasting. Nowadays, there are others types of surfaces and topographies able to produce the osseointegration. The aim of this study is to show off the current state of knowledge concerning different types of dental implants' surfaces and topographies related to their ability to produce the osseointegration, with a particular focus on new entries such as zirconia and laser treated surfaces.
Methods: This study was carried out looking for literature articles written using English language in the PubMed and Cochrane Library databases during the last 10 years, period full of several innovations in implantology. Words such as "titanium implants", "SLA surfaces", "zirconia implants", "laser treated surfaces" were used for the research.
Results: All titanium and zirconia implants achieved the osseointegration with great bone-to-implant contact, especially for the titanium SLA surface ones. Furthermore, titanium implants showed a marginal bone loss occurred in 1-2% of implants affected by peri-implantitis after a 10 years follow up. According to a systematic review, the survival rate and MBL of zirconia dental implants supporting SCs and FDPs after 1 year are increasing and comparable to the two-pieces titanium implants' data. Moreover, short-term cumulative survival rates and marginal bone loss of zirconia implants are promising and improving. Few relevant results were found about laser treated surfaces, because of their short clinical follow up, but it seems that laboratory's study highlight the controlled treatment of their surfaces, avoiding thermic and structural alterations of the bulk, and the precisions of their topography's roughness.
Conclusions: The results confirm the titanium implant and the SLA surface as the gold standards in implant rehabilitations, but a new approach should be taken when dealing with zirconia. In spite of unavailability of sufficient long term evidence to justify the use of zirconia implants, they have several good qualities such as biocompatibility, aesthetic and low percentages of bacteria colonization. They seem to have only a defect: the low fracture resistance, but with new materials and manufacturing processes this is increasing, so zirconia implant could be a real alternative to titanium ones for a non-metallic implant solution. Finally, laser treated surfaces are poor in clinical evidences but the surface's treatment is very controlled and accurate, creating a specific topography.

Two-piece zirconia implant in crestal sinus lift: a case series

Andrea Enrico Borgonovo, Sammy Noumbissi, Cesare Antonio Lacaita, Luca Andrea Emanuele, Massimiliano Bruschi, Andrea Nelken, Luigi Parzzoli, Dino Re

Università degli studi di Milano, Reparto Universitario di Estetica Dentale, Istituto Stomatologico Italiano, Milan, Italy

Aim: The aim of this study is to describe 3 clinical cases of crestal sinus lift technique rehabilitated with a metal-free implant-prosthetic solution with two-piece zirconia implants.
Methods: Three clinical cases of partial edentulism of atrophic posterior maxilla were treated with a crestal sinus lift and the simultaneous insertion of two-piece zirconia implants. The sinus lift was performed with SinCrest device. The operative protocol involved the execution of an incision along the middle of alveolar ridge and the elevation of a full-thickness flap. The crestal sinus lift was performed with SinCrest technique with the elevation of the membrane and the addition of heterologous bone chips graft. The two-piece zirconia implants were positioned immediately. The prosthetic solution was a zirconia crown in order to realize a metal-free implant-prosthetic solution. Radiographic controls were performed at 0, 6, 12 months.
Results: The continuous research of biocompatible materials, as an alternative to titanium implants, led to the study and use of innovative materials such as zirconia, which allow to overcome problems related to titanium, such as patients with immunological reactions to titanium. The success and survival rates of zirconia implants are comparable to titanium implants. Different author compared zirconia and titanium implants in order to evaluate their clinical reliability. Zirconia implants were initially available only in the one-piece variant, which did not allow submerged healing. The introduction of the two-piece version simplified the use of zirconia implants. Indeed, thanks to the introduction of the two-piece variant, it is possible to obtain the submerged healing of implants when patients present poor bone quality or regenerative procedures are needed (sinus lift and GBR). Regenerative technique such as sinus floor elevation has been proposed to overcome the lack of bone height. The need of a wound healing for primary intention, the absence of masticatory forces and the shortage of an unwanted shift of the implant axis due to poor primary stability are factors that influence implant success in regenerative cases. Zirconia implants have shown excellent results from the osseointegration point of view of, allowing the clinician to obtain, after the prosthesis, a completely metal free rehabilitation.
Conclusions: The introduction of the two-piece zirconia implants responds to the growing demand of metal-free rehabilitations and to the request of an alternative that allows its use in cases where the single-phase zirconia forms are not indicated. The two-piece zirconia

implants are a valid alternative to titanium implants in rehabilitation with maxillary sinus lift.

Treatment of peri-implantitis: current surgical protocols

Matteo Landi, Cesare Lacaita, Susanna Ferrario, Chiara Ceratti, Paola Beretta, Davide Cavagnetto, Salvatore Batia, Bellucci Gionata, Occhipinti Chiara

Dipartimento di scienze biomediche, chirurgiche e odontoiatriche, Fondazione IRCCS Ca' Granda - Ospedale Maggiore Policlinico. Università degli Studi di Milano, Italy

Aim: Peri-implantitis is a state defined as an inflammatory reaction around osseointegrated implants, leading to progressive loss of supporting bone. The purpose of the present study was to systematically review the literature on the surgical regenerative treatment of the peri-implantitis.
Methods: A search of four electronic databases from 1990 to 2018 was performed. Studies included were human clinical trials published in English that applied surgeries for treating peri- implantitis. Parameters evaluated included probing depth (PD) reduction, clinical attachment level gain, bleeding on probing (BOP) reduction, radiographic bone fill (RBF), and mucosal recession. Key words used were: Anti-infective agents; debridement; guided tissue regeneration; osseointegration; peri-implantitis; treatment outcome. The initial search obtained 883 citations. After screening and determination of eligibility, 21 articles were included in the review. Four surgical treatment groups have been identified: 1) access flap and debridement only; 2) resective approach; 3) application of bone grafting material; 4) guided bone regeneration (GBR) with non-resorbable or resorbable membranes. The contaminated implant surfaces were primarily treated with mechanical means, including air abrasives, curettes made of different materials, and implantoplasty. Chemotherapy was commonly accompanied with mechanical debridement. Implantoplasty with resective surgery was associated with a higher implant survival rate, more PD reduction, and reduced bone loss compared with resective surgery alone. Precaution should be exercised when performing implantoplasty on narrower implants because of weakening the implant structure, which could potentially lead to fracture of the fixture. The CO2, diode, and Er:YAG lasers were applied in some studies.
Results: No statistically significant differences in all assessed parameters could be found. Therefore, the limited evidence suggested that these lasers generated similar treatment outcomes as hand curettes. The majority of surgical protocols include pre-operative or post-operative systemic antibiotics followed by post- operative chlorhexidine rinse. Maintenance phase after surgery is also important which include oral hygiene instructions and surface biofilm removal.
Conclusion: Currently available surgical approaches execute some clinical benefits, measured with surrogate endpoints in a short term. The treatment effects on implant survival and patient-centered outcomes are not known. The results provided an estimated PD reduction, among other parameters, that might be used to project treatment outcomes. Regenerative procedures using bone grafts and membranes seemed to generate greater PD reduction; however, comparative studies with low risk of bias that can substantiate this statement were lacking. The systemic condition of the patients, defect features, and types of materials could influence outcomes and should be assessed prudently.

Periodontal patients rehabilitated with short and ultrashort single-crown locking-taper implants in association with internal sinus lift technique: a 3-year retrospective study

G. Lombardo[1], A. Signoriello[1], D. Fiorio[1], G. Corrocher[1], M. Simancas-Pallares[2], M. Marincola[2], P. F. Nocini[1]

[1]Dentistry and Maxillo-facial Surgery Section, Department of Surgery, Dentistry, Paediatrics and Gynaecology (DIPSCOMI), University of Verona, Verona, Italy
[2]Dental Implant Unit, University of Cartagena, Cartagena, Colombia

Aim: It has been demonstrated that short (6 mm ≤ length <8 mm) and ultrashort (length < 6mm) implants, associated with a simultaneous internal sinus lift elevation of 2-3 mm, constitute a successful atraumatic solution in the rehabilitation of atrophic maxillary alveolar ridges with residual height less than 5 mm. The aim of the study was to evaluate cumulative survival rate, bone levels stability and peri-implant soft tissues conditions in plateau-design locking-taper implants placed in the posterior maxillary regions using the internal sinus lift technique.
Methods: The University of Verona Institutional Review Board approved the study (Protocol Sinuslift): thirty-one patients partially edentulous in the posterior upper maxilla, and with a residual bone height of at least 3-4 mm, were included. The implants placed were all restored with porcelain single crowns. Soft tissues and bone height gain were clinically and radiographically evaluated at 36-month follow-up. The statistical significance level was set at 0.05.
Results: Fifty-one implants were placed in thirty-one patients (aged between 33 and 75 years): thirty-seven in 20 patients with history of periodontitis and

fourteen in 11 non-periodontal patients. 64.51% of the patients were females, non-smokers (83.9%), ASA status I (48.38%). 41.18% of the implants were 5 mm-length, 45.1% were 6 mm-length and 13.73% were 8 mm-length. 74.51% of the implants were placed in the molar area. Two implants were lost for peri-implantitis in two patients (one with history of periodontitis) at 3-year follow-up. The overall cumulative survival rate (CSR) at 36 months after loading time was 96.08%, without any statistically significant differences ($p>0.05$) either between periodontal (CSR=97.3%) and non-periodontal patients (CSR=92.86%), or among length-groups (CSR=100% for 8 mm-length implants; CSR=91.3% for 6 mm-length implants; CSR=100% for 5 mm-length implants). Bone height gain (BHG) and final crest height (FCREST) were assessed immediately after surgery procedures, at restoration time and at 36-month recall appointment. Average BHG and FCREST were respectively 4.84±1.38 mm and 10.27±2.15 mm after placement; 3.96±1.25 mm and 8.88±2.35 mm at loading time, 3.17±1.13 mm and 7.59±1.97 mm at follow-up. No correlations were found for any of the covariates and BHG or FCREST between placement and 3-year evaluation. Keratinized tissue (KT), modified plaque index (mPLI), modified bleeding index (mBI), and peri-implant probing depths (PPD) were registered: mean KT was 1.85±1.84 mm; mean mPLI was 0.53±0.76; mean mBI was 0.93±0.62; mean PPD was 3.3±0.71 mm. Only mBI showed a statistically significant ($p<0.05$) distribution between periodontal and non periodontal patients. Four peri-implant mucositis were detected, 3 of them in periodontal and 1 in a non-periodontal patient. The prevalence of mucositis among perio-groups was not statistically significant ($p>0.05$) and none of the covariates demonstrated to statistically increase mucositis risk.

Conclusions: Short and ultrashort implants associated with a simultaneous internal sinus lift elevation showed stable clinical and radiographic outcomes at 3-year follow-up.

Effects of air powder abrasive treatment on dental implant surface characteristics and on microbiological behaviour: a literature review.

Enrico Lotta, Michele Stocchero, Andrea Cattozzo, Edoardo Stellini, Stefano Sivolella

University of Padova, Department of Neurosciences, Section of Dentistry, Padova, Italy

Aim: The purpose of this review was to evaluate the efficacy of air powder abrasive treatment for the cleaning of dental implant surfaces. Some aspects were considered such as the efficacy as a mechanical debridement method, the effect on dental implant surface characteristics modification, the microbiological behavior of dental implant surface after treatment and the capability of reosseointegration.

Methods: A Pubmed search was conducted as following:(((((((((Search (((dental implants[MeSH Terms]) OR dental implantation[MeSH Terms]) OR abutment))) AND powders[MeSH Terms]) OR air abrasive powders) OR air abrasive powder.)) OR air abrasive treatment)) OR air abrasive powder decontamination) OR air abrasive powder debridement. All reference lists were manually searched for additional papers that met the eligibility criteria. The inclusion criteria were two: articles that reported mechanical debridement with at least one of the following air abrasive powders: sodium bicarbonate, amino acid glycine and erythritol; studies that aimed to evaluate at least one of the three aspects we aimed to evaluate. The exclusion criteria were as follow: no working group and other reviews.

Results: The Pubmed search resulted in 216 articles. After reading their title and abstract 22 articles were selected. All reference lists of these were manually searched for additional papers that met the eligibility criteria. A total of 27 articles was selected for the aim of this study.

Conclusions: The in vivo data on air powder abrasive treatment as an implant surface cleaning method is not sufficient to draw definitive conclusions. However, in vitro results allow the clinician to consider the method as a promising option for implant surface cleaning in peri-implantitis treatment for the following reasons. The first aspect is that air powder abrasive treatment is an efficient cleaning method, even more if compared with other mechanical debridement. Some studies reported a minor cleaning timing with same results, other studies reported better cleaning efficacy than other methods. The second aspect is that air powder abrasive treatment does not alter significantly the implant surface, especially if compared with other mechanical debridement. Generally, we could assert that the implant surface is more affected by sodium bicarbonate, amino acid glycine and erythritol in this order. The cause is probably the particle size of powders: the bigger the powder, the more it affects the surface. The third aspect is that air powder abrasive treatment is a valid method for mechanical debridement compared with other as stainless steel or plastic curettes, ultrasonic debridement with steel or plastic tips and laser. In fact, bacterial adhesion on a treated implant surface is minor or at least equal than other ones. Regarding the capability of reosseointegration after mechanical debridement with air abrasive powder treatment the evidence is scarce, however some studies reported promising results. Further studies are needed in order to draw definitive conclusions.

A new implant design for immediate placement in post-extractive sites

Simone Magnolo, Salvatore Batia, Davide Cavagnetto, Susanna Ferrario, Paola Beretta, Chiara Ceratti, Cesare Lacaita, Gionata Bellucci, Matteo Landi

Dipartimento di scienze biomediche, chirurgiche e odontoiatriche, Fondazione IRCCS Ca' Granda - Ospedale Maggiore Policlinico. Università degli Studi di Milano, Italy

Aim: It has become common practice to insert implants immediately after the removal of teeth that were scheduled for extraction for various reasons. Over the years, many claims have been made regarding the advantages of immediate implant placement. These advantages include easier definition of the implant position, reduced number of visits to the dental office, reduced overall treatment time and costs, preservation of bone at the site of implantation, optimal soft tissue esthetics, and enhanced patient acceptance. Primary stability (mechanical stability) of the implants is a key factor with high correlation to implant survival rate. Micro movements that exceed 200µm may result in implant failure. Insertion and specially loading of an implant placed in a fresh socket requires adequate primary stability. The purpose of this work is to describe the use of the Cortical Implant (Noris Medical®) which has a design characterized by sharp and deep threads, orthogonal to the occlusion load, that provide primary stability and bi-cortical anchoring. Moreover, in the last years growing of infective and inflammatory problems around implants became a problem for many dentists: Cortical Implants are designed to have a smooth surface at their "Neck" followed by a non-threaded, RBM treated surface. The smooth neck surface reduces the adherence of Perio-Pathogens thus reducing the development of inflammatory process around the neck area (mucositis and peri-implantitis) and the RBM treated surface increases the BIC.
Methods: The case report concerns a 43-year-old patient. Only after a non-surgical periodontal treatment which included oral hygiene, scaling and root planing was it possible to proceed with the surgical phase. After atraumatic extraction of the 1.6 element for root decay, a 5x11,5 Cortical Implant (Noris Medical®) was placed immediately. Atrophy of the edentulous ridge will occur following tooth loss. This contraction of the ridge cannot be prevented by placing an implant in the fresh extraction socket. The atrophy includes a marked reduction of the width and height of both the buccal and lingual bone plates; in particular, the buccal bone plate will undergo marked change. To some extent the problem with buccal bone resorption can be overcome by placing the implant deeper into the fresh socket and in the lingual/palatal portion of the socket. As a consequence of the above described healing, bone regeneration procedures may be required to improve or retain bone volume and the buccal contour at a fresh extraction site. In post-extraction sites of limited size, a bone allograft is able to maintain the dimensional stability of the alveolar ridge. In this clinical case, deproteinized bovine bone (Geistlich Bio-Oss®) was used. The patient performed post-operative analgesic therapy and antibiotic therapy (amoxicillin 1 gr three times a day for a week). The sutures were removed 14 days after surgery.
Results: The recorded insertion torque value was 50 Newton and ISQ value 72. The controls were performed after one week, one month and three months ,with pictures and X-rays every time.
Conclusion: The present report suggests the use of a new implant design, characterized by sharp and deep threads which provide remarkable primary stability even in large post-extractive sockets.

Platform switching versus regular platform implants: 5-year post-loading results from a randomised controlled trial

F. Maucione, G. Chessa, A. Lumbau, E. Baldoni, B. Piunti, R. Nammour, S. Meloni

Univerity of Sassari, Italy

Aim: To test the hypothesis that platform switching (PS) and regular platform (RP) implants would have different outcomes in single-tooth replacement against the alternative hypothesis of no difference.
Methods: This study was designed as a randomised controlled split-mouth trial. Eighteen patients with bilaterally missing single premolars or molars to be restored with implant- supported single crowns, were consecutively enrolled. Implant sites were randomly assigned to be treated according to the PS concept (PS group), or with matching implant–abutment diameters (RP group). A total of 36 implants were installed in healed bone, with an insertion torque between 35 and 45 Ncm, according to a one-stage protocol. All the implants were loaded with a screw-retained temporary crown three months after implant insertion. Definitive screw-retained single crowns were delivered two months later. Outcome measures were implant and prosthetic survival rates, biological and prosthetic complications, marginal bone level (MBL) changes, pocket probing depth (PPD) and bleeding on probing (BOP). Clinical data was collected at implant placement (baseline), implant loading (three months later), and at nine, 36 and 60 months after loading.
Results: One patient dropped out after four years of follow-up. No implant failed and no prosthetic complications were recorded during the study period.

One patient experienced mucosal inflammation with positive BOP (RP group) after three months and three patients had bilateral peri-implant mucosal inflammation with positive BOP at six, 24 and 36 months respectively. No other biologic complications were recorded up to 60 months of follow-up. There were no statistically significant differences between groups for complications (3/18 versus 4/18; P = 1.0). Nine months after loading, the mean MBL was (0.93 ± 0.26 mm CI 0.81 to 1.05) in the RP group and (0.84 ± 0.23 mm CI 0.73to 0.95) in the PS group, with no statistically significant differences between groups (P = 0.18). At the three years follow-up examination, the mean MBL was (1.09 ± 0.31 mm CI 0.85 to 1.13) in the RP group and (1.06 ± 0.24 mm CI 0.93 to 1.15) in the PS group, with no statistically significant differences between groups (P = 0.70). Five years after loading, the mean MBL was (1.24 ± 0.39 mm CI 1.05 to 1.43) in the RP group and 1(.20 ± 0.21 mm CI 1.01 to 1.39) in the PS group, with no statistically significant differences between groups (P = 0.85). The mean PPD was (2.58±0.58 mm CI 2.32 to 2.84) in the RP group and (2.40±0.72 mm CI 2.21 to 2.59) in the PS group at 60 months follow-up, with no statistically significant differences between the groups (P = 0.49). The mean BOP was (0.90 ± 0.88 CI 0.58 to 1.22) in the RP group and (0.93 ± 0.97 CI 0.51 to 1.35) in the PS group at 60 months of follow-up with no statistically significant differences between the groups (P = 0.85).

Conclusions: Implants restored according to platform switching concept and matching implant–abutment diameters showed comparable clinical and radiographic results up to five years after loading.

Immediate definitive loading on single implants with functional ceramic crown: a retrospective evaluation up to 8 years

Luca Boschini[2], Michele Melillo[1], Rossella Battaglia[1], Domenico Bulzacchelli[1], Lorenzo Lo Muzio[1], Filiberto Mastrangelo[1]

[1]Department of Clinical and Experimental Medicine - University of Foggia, Italy
[2]Private practice, Rimini, Italy

Aim: Today in dental therapies the trend is to reduce discomfort, rehabilitation time and costs. Many analogical passages have been digitized thanks to the new technologies. So, in selected clinical cases, we can reduce the manufacturing time skipping some working phases and this allows to produce a definitive crown in a single session. To improve patients comfort and reduce the rehabilitation time the current protocols provide the insertion of a provisional crown immediately after the surgery also using chair-side systems. The aim of this work is the retrospective evaluation of 59 single implants immediately loaded with a definitive functional crown in patients who, due to special needs, were not able to undergo a conventional timing for the rehabilitation and required an implant solution with an immediate prosthesis.

Methods: 59 cases of single implants immediately loaded with definitive ceramic crowns performed at two italian private clinics by two different operators were retrospectively analyzed. The implants used were all Megagen Anyridge because their design with wide thread can immediately provide a high stability. The insertion torque in all cases has always been between 50 to 70 N/cm2, taking care to prepare the implant site with burs with a diameter equal to or greater than the implant core to avoid compression on the bone surface and to delegate the support to the coils. All implants received a definitive crown within 72 hours; sometime chair-side system was used reducing the operative time to only one session.

Results: The patients were 31 females and 28 males with an average age of 50,5 years. The observation period ranges from 6 months to 8 years with an average of 4.3 years. Among the 59 cases 28 were post-extractive implants. The survival rate and the success rate were assessed. The implant rehabilitations that retained the characteristics of bone and gingival tissue trophism were considered successful. The survival rate was 98,3%, while the success rate was 94.9%. 1 implant was lost after 1 month; 2 implants healed with a small marginal bone loss. The implant lost was in a male, while the 2 surviving implants without success were in females.

Conclusions: Although prospective studies are needed on a larger number of cases, these results suggest that a protocol with immediate definitive loading can be a reliable solution in single implants. Even the post-extractive implants have shown good results when loaded immediately with a final prosthesis.

An observational study on bone grafts in maxillary sinus lift: autogenous block bone graft versus particulate bone graft with 11 years of follow-up

Lisa Merlino, Costanza Da Rin, Alberto Borsi, Paola Virzì, Luciano Malchiodi

Aim: The aim of this study is to evaluate the volumetric reabsorption of two different bone graft techniques with materials both derived from the patient's iliac crest during a certain period of time in the maxillary sinus augmentation surgery.

Methods: A 45 year-old woman, partially edentulous both in upper and lower jaw, affected by severe expulsive periodontitis is selected for a sinus

augmentation surgery: two types of bone grafts are performed in the maxillary right and left areas, following these steps:
- Autogenous cortico-cancellous micronized bone graft derived from iliac crest has been placed in the left maxillary area in order to achieve maxillary sinus elevation. It has been carried out a relocation of Schneider's membrane throughout a wide pre-antral window, and after that the graft has been placed.
- Autogenous block cortical bone graft derived also from iliac crest has been placed in the right maxillary area for the same purpose as above, anticipated by the creation of a pre-antral window and relocation of Schneider's membrane. The graft is stabilized thanks to transcortical screws.
- Implant placement: after six months in both situations osseointegrated implants have been placed in order to achieve the prosthetic rehabilitation in the previous edentulous areas. Implants have been loaded six months later.
- Radiographic analysis: at first It has been evaluated the pneumatization of the maxillary sinus, which is the same both in right and left area, and afterwards It has been conducted a volumetric CT study, first focusing on the two-dimension views of the radial CT slices and then summing up all of the slices in order to obtain a three-dimension analysis. During the radiographic analysis, It has also been evaluated the bone reabsorption volume in implant-treated areas over time.
- Charts: the reabsorption values obtained have been translated into column charts that illustrate the bone graft volume percentages during the 3 months, 19 months and 11 years follow-up. It has also been realized a chart that shows the slope representing the trend of the graft reabsorptions.

Results: The autogenous cortico-cancellous micronized bone graft shows a level of reabsorption that is inversely proportional as the time passes, with a great amount of bone reabsorption initially and a relative stability over time. On the other hand, the autogenous block bone graft registered a linear trend, with a similar grade of bone reabsorption in the earlier phases after implant placement and over time at the 11-years follow up. The total amount of reabsorption after 11 years, meaning the remaining alveolar bone volume compared to the graft, is analogous for the two surgery procedures.

Conclusions: According to the results of this case report, although there can be detected differences among the two reabsorption patterns, both methods can be considered equally effective for the clinical application.

Peri-implantitis and implantoplasty: a literature review

Filippo Michelon[1], Stefano Sivolella[1], Stefano Rosso[2], Giulia Brunello[1 2], Roberto Meneghello [2]

[1] Department of Neurosciences, Section of Dentistry, University of Padova, Padova, Italy
[2] Department of Management and Engineering, University of Padova, Vicenza, Italy

Aim: The aim of the present work is to perform a literature review on implantoplasty as a treatment option for peri-implantitis (P-I), discussing the current knowledge on methods and clinical outcomes of this procedure, and its effects on dental implants and peri-implant tissues.

Methods: A search was conducted on Pubmed and Scopus up to January 2019 using the following research strategies: implantoplasty[All Fields]; "titanium"[MeSH Terms] AND "dental implants"[MeSH Terms] AND "peri-implantitis"[MeSH Terms]. In vitro, in vivo animal studies, randomised control trials (RCT), and large case series were considered.

Results: 113 articles were found. After reading and analysing each available study, 16 articles were selected: 11 in vitro studies, 3 human studies and 2 in vivo animal studies. Several methods have been described for smoothing implant surfaces. In vitro studies have demonstrated that, considering the treatment duration, the production of debris and the final surface roughness, the best solution is to use a sequence of diamond burs followed by torpedo shaped Arkansas stones. Furthermore, it has been found that piezoelectric devices produce smoother surfaces in single or sequence procedures in comparison to burs alone. Mechanical studies have been performed to evaluate the effect of implantoplasty on strength, fracture and bending resistance of titanium implants. It has been shown that the diameter and the exposure level of implant threads seem to be directly and inversely related to implant resistance, respectively. Internal conical connection implants seem to be more resistant than other types. Implantoplasty induces surface smoothness, titanium alloy purity and hydrophily, provoking a reduced bacterial recolonization compared to other cleaning procedures, without altering osteoblast proliferation and titanium surface biocompatibility. Regarding clinical outcomes, resective therapy in combination with implantoplasty seems to positively influence the survival, the clinical parameters and the marginal bone loss of dental implants affected by P-I. Some authors have raised concerns about the heat generated during implantoplasty, but it has been widely stated that implantoplasty under proper water spray cooling conditions can be considered a safe procedure. Many clinical studies have reported a higher concentration of titanium particles around P-I sites when compared with healthy ones. Micro and nano scale particles released into the surrounding tissues could have a cytotoxic

potential, stimulating inflammatory reactions and subsequently bone resorption. Therefore, the use of a rubber dam during implantoplasty to avoid particle release has been recommended. Finally, it should be noted that this procedure can lead to unfavourable outcomes from the aesthetic point of view, therefore it has a limited applicability in the anterior maxilla.
Conclusion: Implantoplasty has been introduced in order to change macro and micro surface characteristics of dental implants in case of P-I and marginal bone loss. This procedure can effectively eliminate the biofilm attached to the exposed implant surface, reduce mucositis and facilitate hygiene procedures. As drawbacks, some loss of mechanical resistance should be expected; moreover, the effect of debris accumulation in the soft and hard tissues is still debatable.

Radiographic outcomes of transcrestal and lateral sinus floor elevation: a randomized trial

Caterina Migliari[1], Roberto Farina[2,3], Giovanni Franceschetti[2,3], Domenico Travaglini[4,5], Ugo Consolo[4,5], Luigi Minenna[3], Gian Pietro Schincaglia[3,6], Orio Riccardi[3,7], Alberto Bandieri[4,5], Elisa Maietti[8], Leonardo Trombelli[2,3]

[1] School of Dentistry, University of Ferrara, Italy
[2] Operative Unit of Dentistry, University-Hospital of Ferrara, Italy
[3] Research Centre for the Study of Periodontal and Peri-implant Diseases, University of Ferrara, Italy
[4] Operative Unit of Dentistry and Maxillofacial Surgery, Department Integrated Activity - Specialist Surgeries, University-Hospital of Modena, Italy
[5] Department of Specialistic Surgeries Head-Neck, University of Modena and Reggio Emilia, Italy
[6] Department of Periodontics, School of Dentistry, West Virginia University, Morgantown WV, (USA)
[7] Private practice Torre Pedrera, Rimini, Italy
[8] Center of Clinical Epidemiology, University of Ferrara, Italy

Aim: To comparatively evaluate the extent of bone augmentation obtained at 1 year following either transcrestal or lateral sinus floor elevation (tSFE and lSFE, respectively) when applied concomitantly with implant placement.
Methods: Patients with at least 1 site with residual bone height (RBH) of 3-6 mm were enrolled in a bi-center, parallel-arm, randomized trial. Both tSFE (Smart Lift technique; Trombelli et al. 2008, 2010) and lSFE were associated with a bovine-derived xenograft, and implants were inserted concomitantly. In lSFE group, the antrostomy was covered with a resorbable collagen membrane. On digitized periapical radiographs taken at 6- and 12-month visit, the peri-implant bone level at the mesial (mPBL) and distal (dPBL) aspects of the implant and the maturation of the grafted space (as assessed using the sinus grafting remodeling index, SGRI) were evaluated. On CT/CBCT scans performed at 12-month visit, the percentage ratio between the linear length of the implant surface in direct contact with the peri-implant radiopaque area (native bone + newly formed bone) and the linear length of implant surface (CON%) was assessed. CON% measurements were performed on each of 179 CT/CBCT sections (with a 1° difference in angle between adjacent sections) parallel to the long axis of the implant and passing through the mid portion of the implant, and were averaged (totCON%). On 12-month CT/CBCT, the height of the radiopaque area apical to the implant apex (aGH) was also measured.
Results: The per protocol study population consisted of 26 patients in the tSFE group and 28 patients in the lSFE group. At 12 months, median totCON% was 100% in both groups, with no significant inter-group difference (p= 0.580). totCON% was lower than 100% in 3 patients (13.0%) in tSFE group, with totCON% values ranging between 71.1% and 86.3%, and 1 patient (3.6%) in lSFE group (totCON%= 77.6%). aGH was significantly higher in lSFE group (6.2 mm; IR: 3.3 – 8.3) compared to tSFE group (0.6 mm; IR: 0.5 – 1.6) (p< 0.0001). At 6 and 12 months post-surgery, mPBL and dPBL were 0 mm (IR: 0 – 0), with no significant intra- and inter-group differences. Median SGRI was significantly higher in lSFE group compared to tSFE group at either 6 months (lSFE: 3.0, IR: 2.0 - 3.0; tSFE: 2.0, IR 2.0 – 3.0; p= 0.006) or 12 months (lSFE: 3.0; IR: 3.0 - 3.0; tSFE: 3.0, IR: 2.0 – 3.0) (p= 0.026). The variation in SGRI between 6 and 12-month visit was significant only in tSFE group (p= 0.043).
Conclusions: At sites with RBH of 3-6 mm, tSFE and lSFE can similarly result in a substantial increase in peri-implant bone support at 12 months.

Surgical and prosthetic implant management of soft and hard tissues in the esthetic area

Livia Nastri[1], Gennaro Miraldi[2], Roberto Della Neve[3]

[1] DDS, PhD, Unit of Periodontology and Implantology (Head: Prof. L. Guida), Multidisciplinary Department of Medical-Surgical and Dental Specialties, University of Campania "Luigi Vanvitelli", Naples, Italy
[2] DMD, Private Practice- Naples, Italy
[3] Dental Technician – Naples, Italy

Aim: The replacement of a hopeless tooth in the aesthetic area is always a challenge. The choice of the perfect timing, especially with a young, aesthetic demanding patient is an extremely important step for the final result. An irregular gingival frame, even if healthy, may create an unpleasant smile. According

to a systematic review, the results of post extraction, immediately loaded implants are superior to delayed insertion or restoration. Aim of this poster is to illustrate the treatment phases to obtain a stable, healthy and esthetically satisfying result in the management of soft and hard tissues surrounding a large periapical lesion of two upper central incisors, when an immediate post-extractive implant placement is a high risk for recession and failure.

Methods: A 22 years old non smoking healthy female patient came for the complete crown fracture of the left central maxillary incisor (2.1).There was a story of trauma for the two central incisors at the age of 8 and recurrent swelling during the last 2 years. The patient asked for the resolution of the infection, but also for an immediate solution of the fracture. A temporary post and crown was immediately realized. The diagnosis included large periapical endodontic defects of the 2 upper central incisors with partially resorbed apex, subgingival crown fracture of 2.1 without enough root sound structure, gummy smile. The patient disclosed all her esthetic concerns. Tooth 2.1 was judged as not restorable. An implant was planned, with several concerns about the maintenance of the soft tissues in terms of volumes, contour, health and appearance. The insertion of a post extractive implant was judged as too risky/not possible, taking into account bone thickness, biotype, infection, esthetic demands. The first provisional was able to maintain the appearance and keep soft tissues healthy. A GBR, with a concomitant apicectomy, was performed in order to solve the infection and regenerate the apical bone. At 9 months, tooth was extracted and a socket preservation procedure was performed. The 1st provisional was substituted by a Maryland bridge, adapted to the wounded site without compression and shaped according to the aim of keeping the papillae. After 6 months of healing an implant was inserted and a minor GBR was performed for the vestibular and coronal residual bone defect. A fixed provisional was inserted and modified according to soft tissue modeling intents.

Results: When the final soft tissues contour was reached, the final impression was taken and a definite crown was delivered together with a veneer on 1.1.

Conclusions: When we cannot save a tooth in the aesthetic area, immediate implant and provisional offer potential advantages. This procedure may lead to complications and suboptimal esthetics. When tooth loss is accompanied by a severe bone defect and bacterial contamination, a delayed approach may be indicated. In this case, it is mandatory to preserve and improve soft and hard tissues, with a skillful surgery and management of provisionals.

Peri-implant tissue stability of subcrestally placed dental implants: 5-year results of a cross-sectional study

A. Palazzolo, D. Lops, N. Cea, E. Romeo

Reparto di Implantoprotesi, Unità Complessa di Odontostomatologia 1 c/o Dental Building Ospedale Santi Paolo e Carlo, University of Milan, Italy

Aim: To the best of our knowledge, whether subcrestal implant positioning might be deleterious for the maintainance of peri-implant health is still a matter of debate and research efforts are currently under way to shed light on this important topic for every-day clinical practice. Indeed, it has been widely recognized that during bone remodeling some crestal bone height is lost and this process seems to vary among brands and implant designs. At the same time, although conclusive evidence concerning the influence of implant-abutment interface upon peri-implant bone loss is currently lacking, it might be considered a strategic area both for biological and technical complications. The main outcome of the present cross-sectional study was the medium-long term evaluation of subcrestally-placed dental implants with internal connection and platform shifting. Hence, marginal bone loss, peri-implant probing depth and bleeding on probing were considered as surrogate outcomes.

Materials: In the present cross-sectional study 93 patients requiring implant-supported or implant-retained dental prostheses between 2008 and 2018 were considered. Patients were selected from high-care setting private dental offices after signing a specifically designed consent form for scientific purposes. On the contrary, patients presenting with uncertain or incomplete documentation were excluded. Only Megagen dental implants, namely, AnyRidge, AnyOne, EZ or Exfeel were taken into account. On the whole 438 dental implants were considered in the statistical analysis. The implant lenght varied between 7 and 15 mm while the implant diameter varied between 3,3 and 6,5 mm. Overall, 234 implants were placed in the upper arch whereas 195 dental implants were placed in the lower arch. The whole observational period ranged between 2 and 8 years from the prosthetic loading. Most patients were in good general health at the time of implant positioning. On the other hand, 4 patients suffered from diabetes while 15 patients reported to smoke more than 15 cigarettes a day. Every implant underwent intraoral radiographs in order to evaluate peri-implant marginal bone loss over time. Such measurements were performed by means of the ImageJ software (National Institute of Health) via the evaluation of the distance between the implant shoulder and the bone peak both measially and distally.

Results: Through the evaluation of 438 dental implants

a 100% cumulative implant survival rate is reported after a mean 5 year follow-up. The mean marginal bone loss at baseline amounted to 0,05±0,03 mm. Otherwise, concerning peri-implant probing pocket depth, a mean value of 2,7±1,3 mm is reported in the present study. Additionally, based on our findings, 14 out of 438 (3,2%) examined dental implants suffered from peri-implant mucositis while no implant was diagnosed with peri-implantitis.
Conclusion: Subcrestally-placed dental implants with internal connection and platform shifting seem to be a reliable clinical solution in the medium-term. On the basis of the current knowledge, further well-conducted long-term studies with adequate sample size and follow-up are required to address the clinical validity of subcrestally placed dental implants

Comparison of marginal bone loss around axial and tilted implants: a retrospective CBCT analysis of up to 24 months.

Laura Papetti[1], Paolo Francesco Manicone[1], Ernesto Bruschi[2], Antonio D'Addona[1]

[1]DDS Università Cattolica del Sacro Cuore, Roma, Italy
Private Practice, Roma, Italy
[2]De Angelis Paolo DDS Università Cattolica del Sacro Cuore, Roma, Italy

Aim: Dental implants, compared to teeth, are less tolerant of traumatic occlusal forces and they should be placed in line with the direction of the loading. However, the proximity of anatomical structures often preclude standard implants from being placed axially. The use of tilted implants could provide several clinical advantages. However, the stability of peri-implant tissues and, especially, the marginal bone level for these tilted implants has not been extensively studied. This clinical study retrospectively analyzed cone beam computed tomography (CBCT) images to determine potential influence of implant inclination on peri-implant marginal bone loss after 18 to 24 months of functional loading.
Methods: Twenty-five consecutive patients presenting with an edentulous or partially edentulous upper or lower jaw and adequate bone volume for receiving oral implants were selected for analysis of the marginal bone loss around tilted and/or axial implants. The study population included patients rehabilitated with Toronto bridges (TBs), fixed partial dentures (FPDs), or single crowns (SCs) on axial and/or tilted implants. The primary outcome was the CBCT analysis of peri-implant marginal bone level change, depending on inclination of implants and type of prostheses. The secondary outcome was analysis of survival and success rate of tilted and axial implants.
Results: A significant difference was observed for peri-implant buccal bone loss (mean of axials 0.42 +/- 0.06; mean of tilted 0.70 +/- 0.09) (p value = 0.009). The difference in peri-implant lingual/palatal/mesial/distal bone loss was not significant between axial and tilted implants (p >0.05). No significant difference was observed between the marginal bone level and the type of prostheses for both tilted and axial implants in all the assessed sites (p >0.05). The success rate for both tilted and axial implants was 100%, and no complications were observed for all the prosthetic rehabilitations, with 100% survival rate.
Conclusion: Tilted implants demonstrated favorable shortterm outcomes even for immediate loading protocols. Future randomized, long-term trials investigating the impact of tilted implants on marginal bone loss and survival and success rates are desirable. Compared to axial implants, tilted implants showed a significant statistical difference for peri-implant buccal bone loss, but no other differences were observed for peri-implant bone loss or for implant survival and success rate. Fixed partial or total rehabilitation using tilted or axial implants, or with tilted and axial implants, could be a reliable technique with advantages to patients and operators.

.

Spectrophotometric analysis of immediate implant-supported rehabilitations: *in vitro* study

F. Pegoraro, L. Bevilacqua, G. Turco, D. Angerame, M. Maglione

[1]Clinical Department of Medical, Surgical and Health Sciences. Postgraduate Specialization in Oral Surgery. University of Trieste.

Aim: Temporary rehabilitation on implants, whether fixed or removable, requires resin thickness that makes it aesthetic, durable and comfortable for the patient. However, these requirements are not always clinically attainable mainly due to the limited dimensions of the final structure. For this reason, it is desirable to create a framework with, on one hand constrained dimensions and, on the other hand, sufficient resistance to cyclic stresses. In addition, other factors must be taken into account, such as the economic aspect and the timing required to finalize the rehabilitation, to name some. One possibile solution to these requests was found to be the use of intraoral welding technique. The aim of this in vitro pilot study is to establish the minimum thickness of resin required to mask the metal framework used into intraoral welding technique.
Methods: Three specimens were produced with three titanium bars of grade two (2 mm diameter) (Dentsply Implants Manufacturing; Germany): the first remained untreated, the second was sandblasted, the third was opacified; three specimens of dimensions of 12x6 mm were prepared of PMMA (BreCam Multicom, Bredent GmbH & Co.) of A3 color that differ in thickness 1, 2,

3 mm; three specimens were prepared of pink resin (Palapress, Kulzer dental) of the same size as the previous ones. These were then superimposed on each other and images of the different combinations were acquired with a spectrophotometer (Spectroshade Micro, MHT) evaluating the color difference (ΔE) at three points between the different specimens and their combinations on the basis of the application of the CIEL*a*b color space system. ANOVA test were used for statistical analysis.

Results: The study shows that at least 3 mm of A3 color resin is required to mask the untreated or sandblasted metal framework ($0<\Delta E<1$). None of examined pink resin's thicknesses allowed to mask the three type of metal framework ($\Delta E>1$). The two factors "thickness" and "metal condition" examined seem to influence the outcome ΔE significantly (p value <0.05).

Conclusion: The results obtained in this in vitro study showed that was possible to mask the opaque titanium framework with a combination of at least 3 mm of pink resin and 3 mm of A3 color resin. A clinical alternative to mask the titanium framework could be the palatally/lingually placement of welded bar, compatibly with the clearance available for prosthetic rehabilitation.

Rehabilitation of a missing lateral incisor: use of narrow-diameter implant with titanium-nitride and niobium biomimetic surface

Maria Giulia Pulcini, Matteo Basso, Arturo Dian, Juan Manuel Gone Benites, Luca Francetti

Università degli Studi di Milano, IRCCS Istituto Ortopedico Galeazzi, Clinica Odontoiatrica, Centro di Riabilitazione Orale Mininvasiva, Estetica e Digitale (CROMED), Milan, Italy

Aim: Rehabilitation of missing lateral incisors is a quite frequent clinical situation but sometimes it also represents a challenge for dental professionals. Even if the implant-supported option is considered the best choice, the age of the patient, the stability of soft tissues with the risk of implant exposure in time, type of occlusion and the lack of enough bone volume for the placement of a regular-size implant suggest clinicians to choose sometimes valid alternatives.

Methods: A 27 years old woman with agenesis of the upper left lateral incisor requested for an esthetic treatment of her smile, with bad alignment and deep bite. An orthodontic esthetic treatment with invisible aligners has been proposed and completed in 25 weeks. At the end of the treatment, a symmetric, 6 mm space has been created for the prosthetic rehabilitation of the missing element. Unfortunately, after volumetric analysis with digital 3D tomography, insufficient bone volume and an inadequate mesio-distal distance has been found for the placement of a regular-diameter implant. Due to this clinical conditions, the thin periodontal tissues with risk of future gingival recession and the expectative of the young patient, an implant supported rehabilitation with a narrow-diameter, tapered implant with a biomimetic and esthetic titanium-nitride and niobium surface (Exactive Bioloy, Permedica, Italy) has been chosen. After the opening of the gingival flap, the implant has been placed respecting correct distances between adjacent dental roots. An adequate bone volume has been obtained through guided bone regeneration with bovine-derived bone graft (Bio-Oss, Geistlich, Switzerland) and a resorbable membrane (Bio-Gide, Geistlich, Switzerland). After 6 months of healing, the surgical site has been reopened and a fixed provisional with functional contouring of the emergency profile has been placed. 4 months later, the final ceramic restoration has been delivered.

Results: The young patient definitely abandoned the mobile, esthetic prosthesis that she was wearing since the age of 13 years old. A fixed, stable, functioning and cleanable restoration represented the solution that the patient asked for, and the regenerated bone and gingival volumes overpassed the limits given by the lack of the tooth since many years. Patient was totally satisfied of the solution, both for functional and esthetic outcomes.

Conclusion: arrow implant with 3.3 mm or less diameter represent an ideal solution for implant rehabilitation of missing upper lateral incisors. However, the professional should carefully consider the age of the patient (very young in case of agenesis) and many local factors that could affect stability both of bone and gums, and the consequent possible complications. The use of a biomimetic surface like titanium-nitride/niobium demonstrated in literature to be a valid option to achieve stable osteointegration, better resistance to challenges of bacterial biofilm, and the golden aspect of the surface allow clinicians to avoid those awful dark opacities that sometimes occur in time through gingival tissues with titanium-grey, conventional dental implants, especially in case of thin gums.

Brånemark Novum® immediate loading rehabilitation of edentulous mandibles: 16-year retrospective study

Luca Repetto, Maria Menini, Francesco Bagnasco, Paolo Pera, Tiziano Tealdo, Paolo Pesce

Department of Surgical Sciences (DISC), Implant and Prosthetic Dentistry Unit, University of Genoa, Ospedale S. Martino (pad. 4), Genoa, Italy

Aim: Numerous studies have demonstrated the high

predictability of immediate loading rehabilitations over the medium term. However, there is a lack of long-term studies. The aim of this retrospective study is to evaluate the clinical outcomes of immediate loading rehabilitation of edentulous jaws following the Brånemark Novum protocol over a 16-year period. Proposed in the early 2000s, the Brånemark Novum (Nobel Biocare AB, Goteborg, Sweden) was the first codified immediate loading protocol to rehabilitate edentulous mandibles.

Methods: Between April 2001 and November 2001, 4 patients were rehabilitated following the Brånemark Novum protocol with fixed full-arch prostheses supported by 3 immediately loaded implants in the interforaminal region. Prostheses were delivered within a day. Cumulative implant and prosthetic survival rate (CSR), bleeding on probing (BoP), plaque index (PI), probing depth (PD), peri-implant bone resorption and implant stability (RFA expressed through implant stability quotient, ISQ) were evaluated at implant insertion, after 3, 6 and 12 months, and after 5, 11 and 16 years from surgery. Bone resorption, RFA, PI and PD were analyzed using a linear mixed model with random intercept; whilst a negative binomial mixed model was used in the BOP evaluation. A $p<0.05$ was considered statistically significant.

Results: During the 16-year follow-up, no implant failed (CSR of 100%) and the prosthetic CSR was 100%. The statistical analysis did not reveal differences in peri-implant health parameters (PI, BOP and PD) at the different stages of healing. One biological complication was detected in a central implant, which exhibited a crater-like bone resorption: for this reason, after 11 years, while small bone resorption was found next to distal implants (median 1 mm), central implants showed greater bone resorption (median 4 mm); then, between the 11th and the 16th year of follow-up, bone level remained stable without statistically significant differences. RFA values remained generally stable during the entire 16-year period.

Conclusion: This is the first description of the Brånemark Novum protocol rehabilitation with a 16-year follow-up. The results highlighted that the Brånemark System Novum protocol is a predictable technique with highly successful outcomes in the long term. This protocol had the merit of indicating the key factors for full-arch immediate loading rehabilitations, namely standardized surgical and prosthesis protocol, rigid metal framework splinting the implants, passive and screwed prosthetic structure, reduced number of implants, and occlusal material with high shock absorption capacity. Nevertheless, the rigidity of the protocol, which could be applied only to patients with specific anatomical characteristics of the lower jaw, caused the dismissal of its clinical application.

Dental implants in patients affected by systemic diseases: a 3-year prospective longitudinal study

C. Ruscica, G. Bellantoni, G. Scavella, C. Caravetta, P. Montemezzi, R. Vinci

Department of Dentistry, IRCCS San Raffaele Hospital, Milan, Italy; Dental School, Vita-Salute University, Milan, Italy

Aim: The objective of this study was to evaluate whether success and survival rates of dental implant rehabilitations are reduced in the medically compromised patient. The World Health Organization (WHO) considers edentulism to be a form of physical impairment because edentulous patients are impaired, to some degree, in their ability to perform essential life tasks. This condition that should be avoided to individuals who are already suffering from other diseases. According to The World Health Organization (WHO), the number of geriatric patients throughout the world is expected to increase in the coming decades. The treatment with a fixed implant-supported rehabilitation may provide benefits to edentulous patient, improving his physical, psychological and social well-being.

Methods: In the present study, fully or partially edentulous patients requiring implant-prosthetic rehabilitation were selected. Moreover, the subjects had to be affected by one of the following controlled systemic disease, as cardiovascular diseases, diabetes type I, SjögrenSjogren's syndrome, osteoporosis and rheumatoid arthritis. Patients under bisphosphonates therapy were not included in the study. Ninety patients selected for this study were divided into three groups based on surgical invasiveness: single implant rehabilitation, multiple implant rehabilitation and full arch rehabilitation. After 3 months from extracting of 298 hopless teeth, 190 dental implants (Winsix Implant System, Biosafin, Ancona, Italy) were placed in edentulous sites and a delayed loading protocol was followed. Marginal bone levels, measured comparing intraoral digital x-rays, and clinical parameters were evaluated at 6, 12, 24 and 36 months after implant placement.

Results: A total of 298 hopless teeth on 90 patients enrolled in this study. At 3 years follow-up, overall survival rate was 95,79 % with 8 implant failures. Considering the full arch rehabilitation group, survival rate was higher, 97,62 % with 2 implant failures out of 84. Intraoral x-rays analysis revealed a mean marginal bone loss of 1,5 ± 0,62 mm at 3-year follow-up. in cardiopathic patients under anticoagulation therapy the survival rate was 98% and no severe hemorragic events occurred. Even if diabetic patients have a higher risk of implant failure, a good metabolic control has improved bone healing making this group of patients

comparable to the healthy population.
Conclusion: The survival rate of dental implants placed in systemic patients does not indicate a total or partial contraindication for the placement of dental implants. It's important to identify and address modifiable risk factors for implant failure (such as smoking, poor oral hygiene) and adopt strict follow-up regimens. Moreover, the clinician must always balance the advantages and disadvantages of the surgical procedures and treatment modalities, communicate with the relevant physician / specialist. In broader terms, when dealing with patients suffering from systemic diseases, the monitoring of the medical conditions and of the related post-operative complications is of great importance in order to avoid risks which could jeopardize the health of the patient. Within the limitations of this study, placement of dental implants in systemic patients seems a predictable and safety treatment option.

Fixed rehabilitation of an atrophic posterior mandible using 4-mm-short implants with a concave trasmucosal neck: a 7-year follow-up case report

Filippo Semprini Cesari[1], Lorenzo Breschi[1], Roberto Pistilli[2], Carlo Barausse[1], Cesare Berti[1], Pietro Felice[1]

[1]Department of Biomedical and Neuromotor Sciences, University of Bologna, Bologna, Italy
[2]Oral and Maxillofacial Unit, San Camillo Hospital, Rome, Italy

Aim: To describe a successfully minimally invasive approach to rehabilitate a posterior atrophic mandible using 4-mm-short implants.
Methods: A 62-year-old systemically healthy man was referred for a fixed prosthetic rehabilitation of his right posterior mandible. Clinical and radiographic evaluations showed Seibert Class II posterior mandibular atrophy. Computed tomography scans showed that the average residual bone height above the mandibular canal was about 5 mm. Moreover, the patient asked for a fixed rehabilitation refusing to undergo to any kind of surgery to vertically augment the residual atrophic bone. Thus, in this clinical situation it was proposed by the authors to place 4-mm-short implants to provide a fixed prosthetic rehabilitation avoiding vertical reconstructive surgeries. The surgical procedure was performed under local anesthesia. Four implants (4 mm in length and 4 mm in diameter) were placed in the mandibular right second premolar and first, second, and third molar locations. The implants were transmucosal with a concave neck design and made of commercially pure titanium with a roughened surface.
Results: Sutures were removed 7 days after the surgical procedure and the postoperative recovery was uneventful. Four months after implant positioning, an acrylic screw-retained reinforced provisional prosthesis was placed; this was then replaced by a definitive one after another 4 months. This kind of approach provided a successful rehabilitation with very stable clinical and radiographic results till 7 years after loading probably due to the concave transmucosal implant design.
Conclusion: Within all the limitations of this case report, a fixed rehabilitation with 4-mm-short implants in the vertically atrophic posterior mandible could represent an alternative to bone reconstructive surgical procedures. This approach could reduce operative times, possible complications, postsurgical morbidities and costs. Accurate case selection and good maintenance programs could be key factors for long-term success. However, randomised controlled clinical trials with longer follow-ups are required to assess the predictability of this simplified procedure.

Correlation between thyroid hormones and peri-implantitis: state of the art

M. Senatore, F. De Angelis, A. Visca, G. Tassi, E. Marinaro, L. Piccoli, S. Di Carlo

Dipartimento di Scienze Odontostomatologiche e Maxillo Facciali Sapienza Università di Roma

Aim: The aim of the study is to evaluate the importance of the alteration of thyroid hormones as a risk factor for peri-implantitis, on the base of the literature present in PubMed, Scopus and Web of Science.
Methods: It was considered the scientific literature at 2019, in which compare a relationship between the alteration of thyroid hormones and the presence of peri-implantitis. A search on PubMed, Scopus and Web of Science was conducted using the following keywords: "hypothyroidism" OR "hyperthyroidism" OR "thyroid disease" AND "dental implant" OR "peri-implantitis". Twenty-seven studies were found. Only articles in English have been included in this study, excluding animal studies, case reports, reviews and studies on non-odontostomatological diseases and eliminating studies with few information regarding the sample of patients with thyroid diseases. The resulting 4 studies were analyzed. They all considered from 56 to 412 patients who had undergone prosthetic implant therapy and that were divided in two groups, with and without thyroid diseases (hypo- hyperthyroidism). The common end point observation was the evaluation of the bone level changes. The studies considered:
- the difference between periapical radiographs taken at the time of prosthesis insertion and at the reassessment visit;

• the measurement of clinical probing depth and of bleeding and/or suppuration on probing;
• the evaluation of addictional peri-implant bone loss (≥ 2 mm).
Data results in the two groups were compared.
Results: All the studies concluded that the authors did not find a significant correlation between peri-implant bone loss and thyroid dysfunction, even if more soft tissue complications were found in patients with thyroid diseases, infact a common complication is a delayed wound healing probably due to the influence of thyroid hormones on hard and soft tissues.
Conclusion: Thyroid hormones may affect the peri-implant status resulting in greater bone loss. The studies analyzed also show that the correlation between thyroid diseases and peri-implant tissues are present mostly in hypothyroid patients, especially if this disease is not controlled. Because of few data present in literature, it is not possible to establish whether thyroid disorders are a contraindication to implant treatment or a risk factor for implant failure. Further studies are needed to investigate the relationship between thyroid diseases and peri-implant status.

Sub-periosteal peri-implant augmented layer (SPAL) technique for peri-implant bone augmentation: a case series

Mattia Severi[1*], Mattia Pramstraller[1,2], Roberto Farina[1,2], Leonardo Trombelli[1,2]

[1]Research Centre for the Study of Periodontal and Peri-implant Diseases, University of Ferrara, Italy
[2] Operative Unit of Dentistry, Azienda Unità Sanitaria Locale (AUSL), Ferrara, Italy

Aim: To illustrate a novel minimally invasive approach, namely the Sub-Periosteal Peri-implant Augmented Layer (SPAL) technique, aimed at increasing hard and soft tissue dimension at the most coronal part of an implant.
Methods: Sixteen patients in need for implant-supported rehabilitation were consecutively treated. Twenty-seven implants presenting either a buccal bone dehiscence or a thin (< 1 mm) buccal cortical bone plate (BCBP) were placed. At implant placement, a split-thickness flap (i.e. the mucosal layer)was raised on the buccal aspect, taking care of leaving the periosteum intact. Then, the periosteum (i.e. the periosteal layer) was elevated from the bone crest. A full-thickness flap was elevated on the lingual/palatal aspect. Implant site preparation was prosthetically driven by surgical stents fabricated on a diagnostic wax-up. After implant site preparation, the space between the periosteal layer and the BCBP and/or exposed implant surface was filled with a xenograft. If a dehiscence was present, it was completely covered with the graft biomaterial. The periosteal layer was then sutured to the oral flap, and the mucosal layer was coronally advanced and sutured to submerge both the graft and the implants. Sutures were removed two weeks after surgery. At 3-6 months, a re-entry procedure for implant exposure was performed. After placement of the healing abutment, either an apically or laterally positioned flap or a free gingival graft were performed. The evaluation of SPAL procedure was focused on its potential to augment the horizontal dimension of the crest, assessed as the change in sub-periosteal tissue thickness (SPTT) at the most coronal portion of the implant from the time of implant placement to the re-entry procedure. Also, the increase in the vertical dimension of the bone crest was determined as the change in the depth of the buccal bone dehiscence (BBD), when present.
Results: Healing was uneventful, with no signs of infection in all cases. At the 2 weeks follow-up 3 implants presented a wound dehiscence. Patients with wound dehiscence were instructed to use a chlorhexidine-based mouthrinse until complete re-epithelization of the wound was obtained. At completion of the grafting of the sub-periosteal space, SPTT and BBD were 3.0 ± 0.9 mm and 0 mm, respectively. SPTT at re-entry amounted to 2.6 ± 0.9 mm. Fifteen implants presented a bone dehiscence at implant placement with a BBD of 2.5 ± 1.5 mm. Twelve implants (80%) showed a complete resolution, with a SPTT at the time of re-entry of 3.1 ± 1.0 mm. Three implants presented a residual dehiscence of 1 mm (2 implants) or 2 mm (1 implant), with a SPTT of at least 2 mm. Twelve implants presented a BCBP < 1 mm at implant placement. Out of these, 10 implants (90%) revealed a SPTT≥ 2 (2.2 ± 0.4 mm) at the time of re-entry whether two implants revealed a SPTT of 1 mm.
Conclusion: SPAL technique represents a valuable simplified surgical approach associated with a low rate of complications in the treatment of peri-implant bone dehiscence and in the horizontal augmentation of peri-implant tissue thickness.

Non-surgical therapy for peri-implant mucositis: a systematic review

M. Previ, G. Lombardo, J. Pighi, A. Signoriello, F. Zotti, A. Pardo, P. F. Nocini

Dentistry and Maxillo-facial Surgery Section, Department of Surgery, Dentistry, Paediatrics and Gynaecology (DIPSCOMI), University of Verona, Verona, Italy

Aim: Increasing evidence shows that the absence of periodic support therapy in patients diagnosed with peri-implant mucositis is increasingly associated with the risk of conversion of mucositis into peri-implantitis. The main aim is to analyze the most recent scientific literature reporting clinically and

qualitatively useful data concerning the treatment and maintenance of patients with peri-implant mucositis and to find a protocol of non-surgical therapy which has better clinical results concerning oral health and the regression of mucositis.

Methods: 433 initial articles were found on Pubmed. Applying the inclusion criteria (publication date in the last 10 years, follow-up greater than or equal to 3 months, clinical values expressed in the BoP index and the unit of measurement considered was the single implant), the final included articles were 9. The final articles were also analyzed using the Cochrane Risk of Bias Tool.

Results: The final articles were divided into 4 categories according to the type of treatment (group 1: mechanical therapy only; group 2: mechanical therapy associated with powder use; group 3: mechanical therapy associated with antiseptic therapy; group 4: other types of therapies). This way it was possible to compare through the difference in clinical values between baseline and final follow-up:

a. the efficacy between similar therapies;

b. the efficacy between different therapies categories.

The primary clinical variable considered was bleeding on probing (BoP); secondary variables, which can support the diagnosis with further clinical aspects, are: probing depth (PD) and plaque index (PI). The most common type of treatment was mechanical therapy associated with chemical therapy (221 treated implants), while the mechanical therapy alone (136 treated implants) was less numerous, generally applied in the control group and considered as the gold standard; the less common were mechanical therapy with the use of powders (45 treated implants) and other types of therapies (44 treated implants).

In group 1, the best result was obtained from two studies proposing treatment with titanium curettes (final BoP 18% and 17.5%). In group 2, the highest differences between baseline and 3 months were in two studies using air polishing and sodium carbonate (difference t0 and t-final: 68% and 64%) but the final best value was obtained in the treatment with glycine (final BoP 23%; difference between t0 and t-final -20%). In group 3 the treatments which show better results were the one with rubber cup and polishing and rinsing with CHX 0.2% and the one with ultrasonic tips and rinsing with CHX 0.2% (final BoP: 12.5% and 24.3%). Group 4 includes different therapies and all of these reported in the results that there is no significant relevance between the proposed treatment and the gold standard. It can therefore be said that, having no added benefits, this group is not relevant. Comparing the therapy groups' outcomes, there aren't significant differences: mechanical therapy with the use of powders such as glycine or calcium carbonate resulted as slightly better, (final BoP: 26.4%) followed by the mechanical treatment associated with antiseptic treatment (30.46%) and lastly the mechanical treatment only (34.83%).

Conclusions: Outcomes show there are benefits in a 3 months period with a better results for mechanical therapy with the use of powders; however these benefits do not lead to a complete resolution of the inflammation. Therefore the result of the treatment of peri-implant mucositis is not yet fully predictable.

Laser in Dentistry

Aid of laser method in decontamination of the sites affected by peri: implantitis

Sedran A.[1], Carossa M. [1], Sedran A. [2]

[1]D.D.S. Resident;
[2]M.D. D.D.S. Resident

There are a lot of causes both isolated and associated with other predisposing factors that increase the risk of developing peri-implant pathology. The presence of pathogenic bacterias, biomechanic occlusal overload, smoke, diabetes, and previous periodontitis are common risk factors. Peri-implant bone resorption and apical migration of the peri-implant soft tissue margin lead to the exposure of the implant surface and consequently to the bacterial colonization. Once that a peri-implant infection occurs, therapeutic intervention is required to decontaminate the site.

Aim: The Aim of this study was to test the aid of Laser methods in decontamination of the sites affected by peri-implantitis

Materials and methods: 6 patients with 12 implants affected by peri-implantitis have been enrolled in the study.

For each patient the following four phases therapeutic protocol was adopted:

1 visit with the assessment of implant sites;

2 motivation, re-instruction, instrumentation with evaluation of plaque indices (PI), bleeding on probing (BOP), probing depth (PPD≥3mm), the presence of suppuration with bone loss ≥2 mm, mobility, radiological images.

3 treatment of infected sites.

4 polishing with rubber cups and fluoride-free prophylactic pastes and follow-up.

All procedures were performed under local anesthesia (2% Mepivacaine with 1: 100,000 epinephrine).

The implant sites were treated with Air polishing and the US to remove the soft (plaque) and hard (tartar) bacterial deposits and with Er, Cr: YSGG laser (Biolase 2,780 nm; 2,5W, 30 Hz, 50% of water, 40% of air) with a Firing Perio Tip radial tip RFPT 5-14 (emits radial and tip photon energy) for the detoxification and to remove the granulation tissue. This is inserted vertically and parallel to the implant surface, from coronal to apical, on all sides. For deep decontamination with photodynamic therapy a Fisioline laser diode was used with 2 different wavelengths in combined and amplified synergy: 810 nm 300mW CW mode and 910nm 1W CCW. 0,5 cm2 non-contact tip (defocused with multimode optical fibers equipped with a microlens) after intra-sulcular washing with green Indocyanine. Protective eyewear and loupes systems were used.

Metal instruments and diamond or multi-blade burs were used only where the removal and/or finishing or polishing of the external implant surface were necessary;

Radiograph checks were programmed at regular intervals.

Results: The deepest PPD decreased from 6 ± 2 mm to 3.5 ± 0.5 mm vestibular and from 5.5 ± 2 mm to 3.5 ± 0.5 mm at lingual/palatal sites respectively. The% of implants with ≥1 site with BOP fell from 100% to 6% after 6 months. The % of implants with suppuration decreased from 75% to 0% after 6 months.

The soft peri-implant tissues were stabilized after an initial recession.

Conclusion: The mechanical therapy of PI with the additional application of an Er, Cr: YSGG laser and a diode 810/910 produced significant clinical improvements after an observation period of at least 6 months. These procedures are designed not only to control inflammation but also to provide biostimulation effects with photon energy.

The laser devices in excisional biopsy of oral squamous papilloma

D'Alessandro L.[1], Graniero F.[1], Montori A.[1], Tenore G.[1], Palaia G.[1], Romeo U.[1]

[1]DAI Head-Neck, Policlinic Umberto I, Chief Prof. A. Polimeni, Rome, Italy

Aim: Squamous Papilloma (SP) is the most common papillary lesion of the oral mucosa and it is a frequent benign oral epithelial lesion in adults. A lot of SP are associated with Human Papilloma Virus (HPV) infection, mostly in its genotypes 6 and 11. Topographically, SP is often localized on soft and hard palate, uvula, tongue and labial mucosa.
SP's clinical aspect is characterized by exophytic and usually pedunculated lesion, with both papillary and verruciformis projections, that look like a cauliflower, with a color range from white to pink, coated with healthy epithelium. The lesion is described as isolated-solitary type and generally not larger than 5 millimeters. The papillary architecture is also present in histological section, with fronds of richly vascular connective tissue and covered by epithelium.
SP is asymptomatic in most cases and it has a very slow growth, its critical issues are represented by a not aesthetic appearance and risk of chronic trauma. Due to these two aspects and to obtain a histological diagnosis, SP must be excised and subjected to histological examination and immunohistochemical tests for HPV detection.
The surgical approaches to this kind of lesion are several and they include traditional surgical approach with scalpel, electrocautery, cryosurgery, intralesional injections of interferon or laser ablation. The latter was usually applied with diode or CO2 laser and, in relation with its advantages, is considered one of the best therapeutic choices.
This works aims to evaluate the guaranteed benefits in the excision of SP with laser approach, including postoperative advantages, for what concerns healing and the possible presence of recurrences.
Methods: Data were collected through the retrospective evaluation of medical records, considering excisional laser biopsies with diode or CO2, made in 2017 and 2018. In all cases, diagnosis of SP was obtained based on clinical history, intra-oral objective examination and histological examination.
Surgery and postoperative healing have been photographically recorded.
After the excisional biopsy, the patients were visited one week, one month and three months later in order to check healing and possible recurrence of the lesion.
Results: A total of 10 laser biopsies of SP were done in the Department of Odontostomatological and Maxillofacial Sciences from Sapienza University of Rome from 2017 to 2018.
All the cases showed a postoperative course without complications at 7 days, complete healing at one month and no recurrence at 3 months.
Conclusions: According to the literature, laser surgery with its several advantages such as optimal hemostasis, very high precision in tissue ablation, wound sterilization, second intention healing without sutures, minimal post-operative pain and edema is a reliable, valid and tolerated treatment for SP.
Some studies showed that laser approach to this kind of lesion does not request postoperative analgesics and wound healing is fast and not painful, without dehiscence that extends healing.
The decrease of recurrences is related both to the complete excision obtained with laser approach and to a direct effect of photocoagulation on viral proteins.
The follow-up showed a complete healing due to successful removal of SP, thanks to the laser photo-thermal effect that kills the virus with a supposed complete removal of HPV without recurrences.

Effects of low-level laser therapy on benign migratory glossitis: a preliminary study

Eugenia D'Innella[1], Alessandra Lissoni[1], Chiara Moreschi[1], Benedetta Rebba[1], Francesca Cattoni[1], Elisabetta M. Polizzi[1], Silvio Abati[1]

[1]Università Vita-Salute San Raffaele - Dip. di Odontoiatria, Dental Clinic - IRCCS Ospedale San Raffaele - Milano

Aim: Low Level Laser Therapy (LLLT) is a relatively new technique based on light emissions at low intensity used for the treatment of dysfunctions in many medical fields. Its verified advantages include: cellular bio-stimulation, tissue regeneration without any morphological alterations, pain and inflammation reduction and prevention of tissues' death. No adverse effects have been observed so far.
Benign Migratory Glossitis (BMG), as known as geographic tongue, is an inflammatory condition of unknown etiology characterized by the presence of areas of denuded patches from the loss of filiform papillae with a surrounding thickened erythematous epithelium and/or hyperkeratosis. It has a prevalence of 1-3% in the general population, affecting both females and males. It can be asymptomatic or can present a burning and stinging sensation and pruritus.
The potential treatments are oral lubricants and mouthwashes or topical gels containing anesthetics, corticosteroids, vitamin A, antihistamines and zinc supplements. Abe et al. suggested the use of oral cyclosporine, and Ishibashi et al. the use of topical tacrolimus as treatment options.
The aim of this preliminary study was to describe the

use of LLLT in reducing pain and inflammation in a patient affected by BMG.

Methods: a 74 years old male patient presented to the Oral Pathology Unit of San Raffaele Hospital, Milan, reporting the typical symptoms of BMG that was immediately diagnosed. His past medical history was positive for a cell B lymphoma of the gastric body (maltoma).He was complaining about a constant bothering feeling of burning and tingling of his tongue affecting noticeably his quality of life.

The comprehensive objective examination evidenced oral candidiasis and BMG. The first traditional treatment with oral lubricants gels, antifungal agents and the use of non-irritating toothpaste were ineffective on BMG, but resolutive for the candidiasis.

For the treatment of BMG, even though there was no scientific evidence about the use of LLLT, it was proposed to set up the following clinical pathway: an application of diode laser in a strict time lapse of 0-1-3-7 days. The selected area was 4 cm^2, according to the tongue area to be treated, with a wave-length of 645 nm, continuous wave emission, total energy 20J, power 50 mW for 400 seconds following a scanning mode for the light emission (Raffaello® Egg Laser DMT)

Results: After only 24 hours the patient reported a huge benefit never reached before with any other topical drug or rinse. After 7 days he felt a reduction in pain and burning and the white areas of hyperkeratosis were noticeably reduced. During the 2 weeks' follow-up the patient reported a pain reduction using a VAS Scale from 10 to 2.

Conclusion: This preliminary study suggests that LLLT could be an effective treatment technique for pain relief and improvement of BMG, especially those that are difficult to treat with other methods or are not responsive to the conventional treatments. The promising positive results obtained will be further investigated in a clinical trial.

Which histopathological features are related to alterations of fluorescence induced by a 430nm-wavelenght? A clinical-histomorphometric analysis on 20 cases of oral carcinomas

Ilaria Giovannacci [1], Cristina Magnoni [2], Giuseppe Pedrazzi [3], Marco Meleti [4]

[1] Clinical and Experimental Medicine PhD Program, University of Modena and Reggio Emilia, Modena, Italy.
[2] Department of Dermatology, University of Modena and Reggio Emilia, Modena, Italy.
[3] Department of Medicine and Surgery, Unit of Neuroscience, University of Parma, Parma, Italy.
[4] Centro Universitario di Odontoiatria - Oral Medicine and Laser Surgery Unit, Department of Medicine and Surgery, University of Parma, Parma, Italy.

Aim: AutoFluorescence (AF) is a peculiar visual capacity of some tissues, directly associated to the concentration and distribution of specific fluorophores, the latter being defined as molecules that can absorb and re-emit specific light wavelenghts. It is widely accepted that some malignant and potentially malignant changes may induce AF variations (hypo- and hyper-fluorescence), such a feature theoretically being useful for diagnostic purposes. The aim of this study is to analyze a series of histopathological variables in relation to AF alterations.

Methods: Twenty oral lesions with histological diagnosis of squamous cell carcinoma (In situ SCC, 11 cases; infiltrative SCC, 6 cases; microinvasive SCC, 1 vase) or verrucous carcinoma (VC, 2 cases), from 15 patients (males: 5; females: 15; mean age: 69) were included in the present evaluation. All lesions were evaluated with regard to AF features before excisional or incisional biopsy. Target tissues were stimulated through irradiation with a blue-violet light (410-30 nm wavelength) and AF was recorded through the Velscope® system (LED Medical Diagnostics, Inc, Barnaby, BC, Canada). Eight histological categories were investigated, in order to identify which histopathological features are possibly related to the pattern of AF: a) mean length of the entire epithelium (MLE); b) mean length of the keratin layer (MLK); c) mean length of the epithelium without taking into account the overlying keratin; d) overall area of the epithelium (OAE); e) mean depth of inflammatory infiltration (MDI); f) overall area of blood vessels (OAV); g) mean area of blood vessels (MAV) and h) mean diameter of blood vessels (MDV). Data analysis was performed using IBM-SPSS statistical package version 22. For the comparisons between the groups relative to the continuous variables, both parametric tests (Student's t-test) and non-parametric tests (Mann-Whitney U-test) were used. The results were considered statistically significant for a p-value of less than 5% ($p < 0.05$).

Results: Mean MLE within the group of hypofluorescent lesions was 513 µm while it was 790 µm among hyperfluorescent lesions. A trend toward significance was observed through the Student's test (p: 0.079), indicating that hyperfluorescent carcinomas have a ticker epithelium. Among hypofluorescent lesions, mean MLK was 41.3 µm while it was 197 µm for hyperfluorescent cancers. Either parametric and non-parametric tests highlighted a strong statistical association between MLK and typology of AF ($p < 0.001$, for all tests). Correlation Matrix showed that MLE, MLK and OAV are not reciprocally influenced. Analysis of MLE, MLK and OAV through binomial logistic regression showed that, when the three variables are pooled, they have a prediction value of 100% with regard to the typology of fluorescence (accuracy, sensitivity and specificity of 1.00).

However, were analyzed singularly, no one of such variables has a statistic significant association as regard to the prediction of fluorence typology.
Conclusion: This study attempts to correlate the AF changes that occur in malignant lesions to histopathological variables. The strongest indicator of AF alteration seems to be keratin, A model which includes MLE, MLK and OAV may potentially be able to indicate the type of AF alteration in 100% of cases.

Auto-Fluorescence guided Nd:YAG laser surgical approach of squamous cell carcinoma of the tongue: a case report.

Chiara Manzoli[1], Ilaria Giovannacci[1], Marco Meleti[1], Luigi Corcione[1], Paolo Vescovi[1]

[1]Centro Universitario di Odontoiatria- Unit of Oral Medicine and Laser Surgery, Department of Medicine and Surgery, University of Parma, Italy.
[1]European Master Degree in Oral Laser Applications (EMDOLA) (Dir. Prof. P. Vescovi)

Aim: Oral squamous cell carcinoma (OSCC) is the fifteenth most common malignant tumour. Oral potentially malignant disorders (PMD, e.g. leukoplakia) might transform into carcinoma in a low percentage of cases (1-5%). Identification of PMDs may be important to try to prevent malignant transformation. The therapeutic management of OSCC is mainly based of surgical excision of the primary, radiotherapy and chemotherapy serving as adjuncts. The main purpose is the elimination of the lesion with complete healing. The aim of this work is to present a surgical approach for OSCC excision using autofluorescence (AF) for highlighting surgical margins.
Methods: A 65 year old Caucasian male with a ulcerate white plaque on the right margin of the tonguewas referred to the Unit of Oral Medicine an Laser Surgery of the Academic Hospital of Parma. The patient reported pain and burning at the site of lesion. He quit smoking 30 years before and he never drunk alcohol or used drugs. Reduced AF lesions (dark areas) are suspicious for epithelial dysplasia or OSCC, whereas normal mucosa appears bright green. The VELscopeTM (LED Medical Diagnostics Inc., Barnaby, Canada) system consists of a non-invasive device developed to visualize early mucosal changes using the principles of tissue AF. The lesion reported here, dysplaied an extensive hypo-fluorescent area with two hyper-fluorescent areas inside. The diagnostic hypothesis was compatible with leukoplakia with possible dysplasia. An incisional biopsy was performed under local anesthesia; two mucosal fragments were removed at the areas of more intense hypo-fluorescence and they resulted as dysplasic tissues on according to microscopic examination. After one month the lesion was completely removed through neodymium- doped yttrium aluminium garnet laser (Nd: YAG laser 1064 nm 3,5 W 70 Hz). No postoperative complications, as well as no swelling and/or pain were reported by the patient. No recurrence was observed after 22 months follow-up.
Results: Mucosal fragments of the incisional biopsy that appeared hypo-fluorescent with AF examination resulted as dysplastic tissues according to the histopathological evaluation. A diagnosis of lichenoid type high-grade squamous dysplasiawas rendered. The excisional biospy gave the same result.
Conclusion: This case report aims are to demonstrate the validity of the autofluorescence examination as a method for helping in the early diagnosis of OSCC, possibly distinguishing potentially malignant disorders from the malignant, defining the real extension of the lesion identifying the biopsy area and helping to highlight the margins of the lesion during surgical excision, that is the biggest limit of the surgical therapy of OSCC and PMDs.

Plasma cell chronic gingivitis: a case report

Porrini M, Rossi M, Bosotti M, Landi M, Bossi E, Marino S, Spadari F.

Department of Biological, Surgical and Dental Sciences – University of Milan – Unit of Oral Pathology and Medicine – U.O.C. – Maxillo-Facial and Odontostomatology Unit – Ospedale Maggiore Policlinico, Fondazione IRCCS Cà Granda Milano.

Aim: Plasma Cell Gingivitis (PCG) is a benign inflammatory condition whose aetiology is not well known yet. PCG usually affects the vestibular adherent gingival mucosa. The clinical features are typically represented by deep red erythematous macula, confluent and well-delimited by the adjacent mucosa that apparently seems healthy. The gingival lesions are usually asymptomatic, but sometimes they present burning sensations and a local tension symptomatology. The histopathologic picture are mainly characterised by a plasma cellular inflammatory infiltrate, that is particularly evident and band placed in the upper portion of the basal lamina. Treatments basically provide the utilisation of topical steroids which give apparent and non-lasting healing. We describe a clinical case of a male patient aged 64 affected by plasma cell gingivitis, followed in our department since April 2018. The patient has been treated with periodontal therapies associated with Low Level Laser Therapy (LLLT).
Material and Methods: The clinical exam shows a gingival mucosa well-defined area, from 15 to 25, with severe

erythema and oedema, only to the vestibular side. From periodontal charting, we understand that the areas affected by the pathology do not show pathological pockets (< 3 mm.), but they bleed hard. By multiple incisional biopsies, the microscopic response has shown a strong inflammatory and plasma cellular infiltrate against the areas adjacent the basal membrane. Furthermore, a deep intraepithelial spongiosis corresponds to the lamina propria oedema. The histopathologic diagnosis confirms the hypothesis of plasma cell gingivitis. Thus, it has been set up a LLLT treatment associated with a thorough periodontal therapy with scaling and root planing and instructions for an accurate oral hygiene. The LLLT treatment has been made with a Diode laser (Deka-Italy) with a 365 mn wave length, a 600 micron fiber and a hand piece with a 1cm2 diameter lens. It has been used a power of 300 mW in constant mode and for a period no longer than 1 minute per cm2, making grid-like scanning movements. The total length of the treatment has been of 10 minutes each session. The combined treatment, periodontal and LLLT, has been programmed on a 2 weekly sessions, making a total of 8 treatments. The periodontal treatments have been undertaken before the laser light applications.
Results: The parameters of the symptom subjectivity of the patient, with satisfaction survey VAS and NRS, have been taken into consideration for the clinical evaluation. In addition, erythema gradings and gingival bleeding have been found. We have noticed a gradual improvement of the clinical parameters we considered as well as the symptom subjectivity. At the end of the treatments and after a four month follow-up, we have not detected worth noting relapses. During a second histopathologic exam it has been observed a lesser presence of inflammatory elements and plasma cells in the peripheral area of the lamina propria.
Conclusions: It has been carried out a local treatment without evident collateral effects; a valid alternative to topical steroidal medicines. In addition, the periodontal treatments helped decontaminating and cleaning up the treated tissues, boosting the local effects of the light laser. Thus, we can state that the treatments that combine LLLT and periodontal therapies proved effective in controlling and reducing an intense inflammatory and erythematosus aspect as well as gingival bleeding.

Follow-up and lllt treatments in a miescher's cheilite

Porrini M, Rossi M, Bosotti M, Landi M, Bossi E, Marino S, Spadari F.

Department of Biological, Surgical and Dental Sciences – University of Milan – Unit of Oral Pathology and Medicine – U.O.C. – Maxillo-Facial and Odontostomatology Unit – Ospedale Maggiore Policlinico, Fondazione IRCCS Cà Granda Milano.

Miescher's granulomatous cheilitis is a rare chronic inflammatory disease, described by Alfred Guido Miescher in 1945. It can be part of the Melkersson-Rosenthal syndrome and it can occur at any age in both sexes. It is characterised by a labial swelling, usually on the upper lip, with hard non-tender gummy textured tumefaction. The histopathological confirmation of non flesh-eating granulomas is useful to validate the working diagnosis. We describe and analyse a clinical follow-up in a 68 year-old patient with a clinical and histological diagnosis of Miescher's granulomatous cheilitis, previously treated with Low Level Laser Therapy (LLLT).
Material and methods: We report the results of a 6 month follow-up related to the clinical case of a 68 year-old female patient with a Miescher's granulomatous cheilitis. Our intention has been checking over time the therapeutic results obtained with a series of LLLT applications in a pathology based exclusively on a chronical inflammatory matrix, rich in cell-vascular reactive components with a limited edemigenous and necrotic aspect. The follow-up after the LLLT treatment included controls performed by a single operator every 15 days for an overall period of 6 months. After 3 months a new incisional biopsy has been carried out to get a further histopathological follow-up. The microscopic analysis has demonstrated a sharp decrease in cellular inflammatory infiltrate, with a vascular connective origine, free of granulomatous alterations.
The LLLT treatment has been carried out with a diode Laser (Deka) with the following application parameters: wave length 635 nm, constant emission mode, power 200 mW using a 600 micron fiber and a handpiece with a 1 cm2 diameter tip. The handpiece has been used in defocused mode (without contact) and with gride-like scanning movements. the timing of application has been of 1 minute for each treated square centimeter. The patient has been treated 3 times a week with LLLT for a total of 12 applications (4 weeks).
Results: The controls made after the LLLT treatments let us observe and check over time the achieved clinical results that show a significant reduction of the upper lip inflammatory tissue and of the granulomatous injury. The volumetric parameters and measures of the affected tissue have been compared. During the 6 month follow-up neither signs of disease restarting nor local inflammatory recidivism have been detected.
Conclusions: The short clinical follow-up has once more confirmed the effectiveness and, above all, the stability over time of the anti- inflammatory and bio-modulatory effects of LLLT treatments. It has been widely demonstrated in the inflammatory reactions to local reactivity and, as in this case, also in the context

of chronic immunoreactive manifestations and in the cellular and tissue hypersensitivity complex reactions.

Effect of PBM on tumor vascular normalization evaluated using micro-CT and tumor-bound doxorubicin quantification

Katia Rupel[1], Giulia Ottaviani[1], Davide Porrelli[1], Jacopo Dus[1], Roberto Di Lenarda[1], Serena Zacchigna[2], Matteo Biasotto[1]

[1] Division of Oral Medicine, Dental Science Department, University of Trieste, Italy.
[2] International Centre for Genetic Engeneering and Biotechnology, Padriciano, Italy.

Aim: Photobiomodulation (PBM) is emerging as an effective strategy for the management of multiple inflammatory conditions, including oral mucositis (OM) in cancer patients undergoing chemotherapy or radiotherapy, but the direct effects on cancer are still unclear. Although several studies performed in vitro reported how PBM promoted cancer cell lines' metabolism and proliferation, our recent research works showed an opposite effect in vivo: we observed an inhibition in tumor growth and progression through an immunomodulating effect which seemed to affect tumor vasculature. The aim of this study was to investigate the effect of PBM on tumor vessel normalization by evaluating differences in vascular structure morphology.
Methods: A mouse model of oral squamous cell carcinoma (OSCC) was obtained in C57BL/6 mice (n=20) using the 4-NQO carcinogen diluted in the drinking water and administered to all mice for 16 weeks. After assessing the presence of tumor masses in the oral cavity, mice were divided into 2 groups. One group (n=10) was treated with PBM (protocol λ=970nm, 6J/cm2, 2.5W/cm2) once a day for 4 consecutive days, whereas the other group was used as control. On the day following the last laser treatment, mice in each group were divided into two subgroups, which were processed either for micro-CT scanning (n=5) or doxorubicin quantification to measure the tumor perfusion and vessel normalization. To prepare for micro-CT scanning, the circulatory system was flushed with 10 ml of heparinised saline, followed by perfusion with 5 ml of radio-opaque silicone rubber polymer (Microfil). Tumors and kidneys were harvested and analyzed for vessel thickness, vascularization over total volume, and necrotic avascular areas volume. For tumor perfusion evaluation, doxorubicin content was quantified and normalized on weight and expressed as tumor/liver ratio.
Results: The analysis of MicroCT volume data showed a decrease of avascular areas and mean vessel thickness and an increase in the vascular areas over total volume in laser treated tumors compared to non treated tumors. When comparing tumors and kidneys, there was a significant difference in the distribution of vessel diameters in both groups, with tumors being characterized by larger avascular areas. Regarding tissue-bound doxorubicin inside tumors, laser treated samples showed an increase, although not significant, in doxorubicin content normalized as tumor/liver ratio.
Conclusion: PBM seems to inhibit tumor growth by promoting tumor vessel normalization, and by improving tumor perfusion in order to increase tissue-bound doxorubicin. Further studies are needed to confirm this preliminary data and to evaluate long-term effects of PBM in terms of mice survival and/or healing.

LOW LEVEL LASER THERAPY supported an esthetic prosthodontic rehabilitacion: case report

F. Cattoni; L. Redi; L. Scudieri; R.Uccioli; F. Bova; B. Rebba; E. Polizzi

Aim: The use of laser technology allows us to obtain a rapid healing of soft tissues, optimizing working time, improving the patient's level of comfort, simultaneously decreasing pain and post-operative inflammation in fixed prosthodontic treatments, especially the ones that require a high aesthetic value. It is possible to use lasers following two distinct protocols that vary from one another by different wavelengths and parameters. The use of one of these protocols results in a gingivectomy while the other one results in a biostimulation that optimizes and increases tissue healing. All of this is made possible following a scientific protocol based on clinical evidence that makes treatment plans more efficient and less time consuming, allowing the operator to manage both the patient and the tissue with minimal postoperative discomfort. There is clinical evidence of the benefits provided by the use of laser therapy in support of prosthetic rehabilitations with high aesthetic requirements.
Methods: A 26 years old female patient was referred to the Dentistry Department of San Raffaele Hospital (Milan). She had previously refused orthodontic treatment in the upper anterior arch but still demanded a high esthetic value from the outcome of the treatment.
1' Step: Anamnesis and digital treatment plan
After the objective examination, the patient was classified as ASA I. We then proceeded to realize a case study producing a Wax-Up and Mock-up based on the digital analysis of photos of the patient made using 3D LYNX software (3D LYNX srl MILANO)
2' Step: Operative protocols.

A) -Laser gengivectomy of the elements 1.2 and 1.3 was performed as the same time of teeth preparation (mini-invasive preparation) using a EGG laser (DMT-Lissone-Italia). The protocol consisted of a wave length choice of 980 nm, continuous wave mode (CW), 2 Watts power after optic fiber activation, with a 300 micron fiber diameter.

B) -LLLT (Low Level Laser Therapy) to increase and improve tissue's healing using a EGG laser (DMT-Lissone-Italia). Healing was checked multiple times: immediately after the procedure (T0), three days after the procedure (T1), after five days (T3), after seven days (T4). The laser protocol consisted of a wave lenght choice of 645nm, 2cm2 spot area, 0,5 Watts power with a 300 micron fiber diameter.

3' Step: Adhesive Cementation of Lithium Disilicate Veneers (CAD-CAM Producted/milled).

We then isolated the operative field with a rubber dam before cementing provisionals realized on the wax-up, and we proceeded with the adhesive cementation using Variolink LC light cement (Ivoclar)

Results: The use of the experimental bio stimulation protocol allowed us to obtain an excellent management of the algic symptomatology in the immediate post-operative phase. The analysis of clinical indexes registered during a different phases of the treatment (PRE- POST) confirms that laser technology and use provides healing to be obtained based on the response of the clinical indices detected.

Conclusions: The application of laser technology for surgical purposes and for better tissue healing within a treatment plan aimed at complex prosthetic rehabilitation can be considered a valid option in the field of minimally invasive dentistry. Lasers can be inserted in this context as a useful tool both in the surgical phase and in the management of the healing tissues.

Potential of laser-assisted surgery in the treatment of oral fibroma: an experimental clinical study

Carmelo Stelitano[1], Marco Matarese[1], Mario Cherubino[1] , Claudio Cosio[1] , Roberto Lo Giudice[1], Giovanni Matarese[1]

[1] Department of Biomedical, Odontostomatological Sciences and of Morphological and Functional Images School of Dentistry University of Messina Messina, Italy

Aim: The aim of the study was to compare the intraoperative and postoperative bleeding and the healing process at day 15th and day 30th in a patient treated by conventional surgery vs patient treated by laser-assisted surgery.

Methods: The study was conducted on a group of 18 patient with a mean age of 47.3 years. Were included healthy subjects and patients with cardiovascular disease, diabetes, hemophilia, both smoking, and non-smoking patients. All patients were randomized into two main groups: group A of 9 patients treated by fibroid excisional biopsy performed with laser-assisted technique and group B, of 9 patients treated by fibroid excisional biopsy performed with cold blade technique. For laser-assisted techniques patients undergone low level laser therapy performed with a diode laser (Wiser Lite λ980nm, maximum power 2.5 in CW). Both groups were followed at day 15th and day 30th following surgery.

Results: At 30 days after surgery, the periodontal healing status was comparable between groups. Eight patients of group A showed better perioperative healing after 15 days compared to patients in the group B. All patients in group A showed a negligible intraoperative and postoperative bleeding even if they presented a greater increase in duration of surgery. Moreover, in almost cases of patients treated with a laser the pain was limited only to the first day, except for one patient, in which laser also determined a delay in gingiva healing, which nevertheless occurred within the thirtieth day. The patients in group A showed a good degree of examinability with accurate targeted cuts and clarity of cells and tissues to be analyzed; in fact by carefully modulating the laser emission power, it was possible to reduce the incidence of thermal tissues alterations of the peripheral portion of the sample, and it was fundamental the experience of the histopathologist to guarantee a correct histological diagnosis.

Conclusion: The results of this research suggest that the diode laser represents a valid therapy tool in the treatment of oral fibroma due to its positive effects linked to the reduced bleeding and the reduced presence of post-operative infections. This can also be an adjuvant technique for patients with a higher risk of postoperative bleeding. However, more studies on a higher number of patients are needed in order to better understand the merits and defects of the use of laser therapy in dentistry.

Dental Materials

A radiofrequency atmospheric pressure plasma jet portable equipment as a possible way to improve human gingival fibroblasts' adhesion: in vitro preliminary results.

Amoroso F.[1], Mussano F.[1], Cavagnetto D.[1], Carossa M.[1], Patelli A.[3], Genova T.[1,2], Carossa S.[1]

[1] CIR Dental School, Department of Surgical Sciences, University of Turin , via Nizza 230, 10126, Turin, Italy.
[2] Department of Life Sciences and Systems Biology , University of Turin, via Accademia Albertina 13, 10100, Turin, Italy.
[3] Department Physics and Astronomy , Padova University , via Marzolo 8 , 35131 Padova , Italy.

Aim: To evaluate the effect elicited by a carboxylic/esteric (COOH/R-Ti) functionality on human gingival fibroblasts through a radiofrequency atmospheric pressure plasma jet portable equipment, operated for less than 1 minute.
Material and methods: The atmospheric pressure plasma deposition system used for this research is based on a patented DBD-like jet design. The carboxylic/carboxylate functionalization (COOH/R-Ti) coating was deposited on planar commercially pure machined titanium samples starting from a methylmethacrylate (MMA, Sigma Aldrich, ≥ 99%) precursor. The film-forming agent was manipulated as described previously (Mussano et al). A number of titanium samples was left untreated as control. A Scanning Electron Microscope (Zeiss EVO 50, Carl Zeiss AG, Oberkochen, Germany) was used to study surface microstructure after cleaning in water, absolute ethanol for 20 min and drying under a laminar flow hood. The chemical composition of the outer surface of the specimens was characterized with a SPECS (Phoibos MCD 150) X-ray photoelectron spectrometer. Surface free energy was determined on the base of OCA measurements with water and di-iodomethane. Human gingival fibroblasts (HGF-1, CRL-2014, ATCC, USA) were used to perform the in-vitro tests of cell adhesion (10 minutes after seeding) and cell morphology (1 day after seeding). After fixation images were acquired using a Nikon Eclipse T-E microscope with a 40× objective. Cell proliferation was assayed with MTT at 1 and 2 days.
Results: A view of COOH/R-Ti surfaces by SEM microscopy attested a uniform deposition, without particular difference between the pristine and the coated surface in terms of morphology. XPS survey analysis supported the presence of a titanium signal on all the survey spectra, although in COOH/R-Ti it was attenuated by the coating. In the high resolution analysis, a considerable difference was observed between the bonding states of C: the untreated Ti samples had a more intense contribute of the C-(C,H) band than COOH/R-Ti. As for the O1s bondig states, a fairly stronger Ti oxide contribution appeared in the COOH/R-Ti treatment compared to the untreated Ti sample. The water contact angle measurements showed a slightly improved wettability for the COOH/R-Ti samples, while there was no difference as for the diiodomethane contact angles. Surface energy calculations confirmed the increased surface polarity for COOH/R-Ti. The COOH/R-Ti samples improved remarkably the adhesion of fibroblasts compared to the pristine titanium. Although cell proliferation on coated samples was initially (at 24 h) lower than on titanium control at 2 days, COOH/R-Ti equalled the proliferation rate of pristine titanium. Cells grown on COOH/R-Ti resulted more elongated than the ones seeded on the control.
Conclusion: Radiofrequency atmospheric pressure plasma jets (RF-APPJ) have been successfully applied to dental implant sterilization as well as to the acceleration of osseointegration. Here, it was possible to deposit carboxylic/esteric polymers leading to a

clear effect on adhesion and growth of fibroblasts in vitro. The present data are consistent with previous literature, although, to the authors' knowledge, this is the first report dealing with gingival fibroblasts. Noteworthy is also that the flexibility of this process allows the functionalization of complex 3D shaped materials and devices, such as dental implants, in less than 1 minute. These preliminary data encourage the implementation of further clinical research.

Evaluation of degree of conversion, rate of cure, microhardness, depth of cure and contraction stress of three nanohybrid composites containing pre-polymerized spherical filler

L. Fanfoni[1], M. De Biasi[1], G. Antollovich*[1], D. Angerame[1]

[1]Clinical Department of Medical Science, Surgery and Health, University of Trieste, Trieste, Italy

Aim: Manufacturers aim at improving filler technology to enhance the properties of the restorative materials, thus maximising the aesthetic and functional outcome of the restored tooth. The present study tested the degree of conversion (DC), rate of cure (RC), microhardness (VHN), depth of cure (VHR) and contraction stress (CS) of three new nanohybrid composites with pre-polymerized spherical filler.
Methods: Three commercially available composite resin were characterised in the present study, namely the Ceram.X® universal shade A3 (CXUA3), Ceram.X® duo enamel shade E2, and Ceram.X® duo dentin shade D3 (CXDE2 and CXDD3). The materials were light-cured with a LED light (SmartLite Focus, measured output 1301 mW/cm2) following the protocol recommended by the manufacturer. DC was assessed by means of Fourier-transform infrared spectroscopy, calculating RC from a second-grade polynomial fitting of the kinetic curve. A microhardness testing machine equipped with a Vickers indenter served to measure the top and bottom VHN of 2 mm-high disc-shaped specimens, using the bottom/top surface values ratio (VHR) as indirect evaluation of the depth of cure. CS vs time was evaluated by a universal testing machine provided with an extensometer as feedback system, CS was normalized for the specimen bonding area. All data sets underwent statistical analysis with dedicated software and tested for the assumptions for the use of parametric tests. Multiple analyses of variance with Scheffé post hoc test were carried out to compare the dependent variables of interest among the tested materials.
Results: All tested materials exhibited a DC lower than 50%, with CXUA3 reaching the lowest DC value after 10 s. RC of CXUA3 at 5 s was comparable to that of CXDE2, while after 10s RC of CXUA3 decreased to a value proportional to that of CXDD3. For all the tested materials, top-VHN was greater than bottom-VHN. Top-VHN of CXDE2 was lower than CXUA3 and CXDD3. CXDD3 was the only material achieving VHR>80%. The main differences in CS among the tested materials were found during the irradiation with curing-light: CXDE2 displaying the lowest CS after 10 s and CXDD3 the highest after 30 s.
Conclusion: The present study proved that the light-curing protocol suggested by the manufacturer for the three composites might be improved: 10 s of irradiation seemed insufficient to adequately cure CXUA3 and CXDE2. Longer curing times for these materials appear advisable.

Morphological and mechanical features of orthodontic composite resins: an innovative in vitro test

Cataldi M.E.[1], Maiolo L.[2], Tian K.V.[1], Cerroni S.[1], Cerroni L.[1], Pasquantonio G.[1], Condò R.[1]

[1]Department of Clinical Sciences and Translational Medicine, University of Rome "Tor Vergata", Rome, Italy
[2]Institute of Microelectronics and Microsystems - National Research Council (IMM-CNR), Rome, Italy

Aim: In order to investigate on the morphological and mechanical features of the following orthodontic composite resins: Bisco Ortho Bracket Paste LC (Bisco, Schaumburg, Illinois, USA), Light-Cure Orthodontic Paste (Leone s.p.a., Sesto Fiorentino. FI, Italy) and Transbond XT Adhesive Resin (3M Unitek, Monrovia, CA, USA),an extensive in vitro studywas performed. Moreover, the purpose of this research was also to introduce, in the field of Dental Biomaterials, an innovative technique of polymeric characterization based on the combined use of SEM (Scanning Electron Microscope) and FIB (Focused Ion Beam) analysis, we called Ion Bean Indentation (IBI) test, that results very performing in deeply investigations of hardness and nano-morphology.
Methods: Samples preparation protocol
Four samples of each material, divided into three randomly groups, were obtained by a polyurethane stamp (10x4 mm). A transparent matrix was used to uniform specimens surface and every specimen was light-cured using a light-source (LED starlight) at light intensity of 400 mW/cm² for 40 seconds; then each sample was stored in distilled water at 37°C.
FIB and SEM analysis
The study of the inner structure and robustness of the resins were performed by a FIB milling (FEI-Helios Nanolab 600) equipment with a Ga+ion source according to a milling protocol with a fixed time of 3 min at a high voltage of 5kV and at a current of 6.5

nA. To reduce drifts due to sample charging during operation, a thin film of Chromium has been deposited on samples. After milling, each sample was examined at SEM, with magnifications from 5000 to 60000X.
Results: On the samples surfaces FIB milling produced a rectangular excavation region 13x16µm in dimensions, its resulting average depth is strongly depending by the chemical nature of each resin. Particularly, the average milling rate in Bisco (4,5 µm) was almost twice than was shown both in Transbond XT and in Light-Cure (2,6 µm). An inhomogeneous milled areas were shown at 20000X of magnifications of SEM images: Light-Cure and Transbond XT held a rough surface characterized by many monolithic protruding, a less smooth surface with filamentary features was instead observed in Bisco. At 60000X of magnification, Bisco and Light-cure showed a similar to a grainy-like type morphology, while in Transbond XT many solid inclusions resulted immerse in a smoother and more homogeneous organic matrix.
Conclusions: The new method of analysis proposed in this study allowed to investigate in depth the morphological and mechanical characteristics of three orthodontic composite resins. The IBI test showed lower Bisco hardness than other two resins, while a lower density nanostructure was detected in Transbond XT at higher SEM magnifications. In the evaluation of the results it is clear that Bisco resin is probably the most elastic and less hard than the other two examined in the study, although its nanostructure was very similar to that of the Light-Cure resin. Such morphological differences between the three orthodontic bonding resins are closely related to the different polymeric chemical nature stated in the composition tables provided by the respective manufacturers and inevitably translate into differently performing clinical results.

Physical properties of orthodontic composite resins: an in vitro study

Cataldi ME1, Maiolo L2, Cerroni S1, Cerroni L1,Pasquantonio G1,La Rocca S1,Condò R1

1 Department of Clinical Sciences and Translational Medicine, University of Rome "Tor Vergata", Rome, Italy
2 Institute of Microelectronics and Microsystems - National Research Council (IMM-CNR), Rome, Italy

Aim: To investigate potential differences in physical properties of orthodontic composite resins, Shear Bond Strength (SBS) analysis and Surface Roughness Test (Surftest) were performedin vitro.
Methods: Bisco Ortho Bracket Paste LC (Bisco, Schaumburg, Illinois, USA), Light-Cure Orthodontic Paste (Leone s.p.a., Sesto Fiorentino. FI, Italy) and Transbond XT Adhesive Resin (3M Unitek, Monrovia, USA) were examined. 16 healthy human premolars, extracted for orthodontic reasons, were selected. The cusps were removed trough a separator disc to preserve a layer as thick as possible of enamel and the crowns were divided from the roots under the cemento-enamel junction to realize two surfaces parallel to each other. Each sample was inserted into a plastic cylinder and filled with a self-curing acrylic resin. Once resin hardened, the samples were sawed and flattened to be flush with the tooth surfaces. Each of them were put in a mold to allow the compaction of the orthodontic resins. Every disk obtained was inserted horizontally inside a support with screws, which had on its upper portion a hollow cylinder letting to the adhesive resin to be in contact with the surface of the tooth, so as to make on it a cylindrical material with a diameter suitable for testing with Ultra Tester Machine 91099/KB3 (Ultradent). After 12 hours from the bonding,on the slides so gained, SBS analysis was performed. The machine was equipped by a holder to locate the samples and a stab that applies a shear stress force over the cylindrical sample until reaching bind rupture, obtaining the maximum tensile shear force. Twelve measurements for eachorthodontic adhesive system were obtainedusing a specific force for 60 sec. 12 samples from each resins were prepared with a micrometer and Surftest was performed by using SJ-210-Series 178-Portable Surface Roughness Teste (Mitutoyo). Each sample was placed on a specific support of the machine with the tip at the center, then analyzed.
Results: The SBS values of the samples, in megapascal (Pa), were collected and then every measurement was compared. Mean SBS values and standard deviation was analyzed with the maximum and minimum measured values. The data point out that no significant differences can be found among the materials taken in exam. The roughness tester, allowed to compare the surface structure of the three orthodontic resins; for each sample the average roughness (Ra), the quadratic roughness (Rq) and the Rz values were recorded. By a first comparative analysis Ra, Rz and Rq parameter seem to be similar in all the resins; specifically, there is an identical average in Bisco and Light-Cure that involve all the parameters, while in Transbond XT different values,on average around 0,1 µn,were registered. Literature demonstrated that high values of Ra are often associated with filler particles large in dimensions and irregular in shapes.
Conclusions: No significant difference emerged from the SBS analysis in clinical terms, all the orthodontic resins exanimated indeed show a relevant strength of adhesion to the enamel surface. The Surftest demonstrated a similarity in structural organization both in Bisco and Light-Cure, compared to Transbond XT. Filler dimensions are important for the superficial

features of the resin as a matter of fact that roughness values increase with the increase of filler dimensions and moreover, the greater the surface roughness of the resin the greater the bacterial adhesion.

Biomimetic toothpastes and mousses for enamel remineralization

Andrei C. Ionescu[1], Deborah Izzo[2], Maria Giulia Pulcini[2], Arturo Dian[2], Eugenio Brambilla[1]

[1] Department of Biomedical, Surgical and Dental Sciences, Oral Microbiology and Biomaterials Laboratory, University of Milan, Italy.
[2] Department of Biomedical, Surgical and Dental Sciences, IRCCS Galeazzi Orthopaedic Institute, University of Milan, Milan, Italy.

Aim: Formulations containing hydroxyapatite (HAp) and its precursors, such as amorphous calcium phosphate (ACP), provide calcium and phosphate ions to dental hard tissues, reducing demineralization and promoting remineralization. HAp substituted (S-HAp) with ions such as CO3, Zn, Mg, F, and Sr have been introduced to improve biomimetic behavior and remineralization ability. This study aimed to morphologically evaluate the effect of a few HAp- or ACP-containing toothpaste and mousse formulations on enamel remineralization and to quantitatively analyze the changes in surface chemical composition.
Methods: Sixteen sound human molars had their root sectioned, and their occlusal surface flattened and finished. Two perpendicular grooves were made on the occlusal surface with a narrow dental bur, thus delimiting four areas in each tooth. The occlusal surface was etched for 30 s with 37% H3PO4, then rinsed under distilled water. Specimens were randomly divided into two groups (n=8). Group 1: the four areas were brushed with, respectively, toothpaste containing Mg-Sr-CO3 hydroxyapatite and fluor-hydroxyapatite (S-HAp1, Biosmalto Protezione Carie™, Curasept S.p.A., Saronno, Italy), Zn-CO3 hydroxyapatite (S-HAp2, Biorepair Plus Protezione Totale™, Coswell S.p.A., Funo, Italy), and 1450 ppm F (FL, Colgate Triple Action™, Colgate-Palmolive, New York, USA), or distilled water (WA). Group 2: the four areas were treated with, respectively, mousses containing citrate, fluoride ACP (ACPF, Biosmalto Mousse Protezione Carie™, Curasept) and Zn-CO3 hydroxyapatite (S-HAp3 Biorepair Desensibilizzante Trattamento d'Urto™, Coswell), again FL, or WA. Brushing was performed twice a day for 2 min each, followed by 1 min rinsing under distilled water, then storage in fresh phosphate buffered saline solution at 37°C. After seven days, specimens were dried and observed using a scanning electron microscope (SEM) equipped with an energy-dispersive x-ray spectroscopy (EDS) probe (TM4000Plus Tabletop SEM, Hitachi, Schaumburg, IL, USA, and Q75 EDS probe, Bruker, Berlin, Germany). Specimens were then sputter-coated and observed at high magnification (40000x) using SEM (JEOL JSM840A, Tokio, Japan). The EDS dataset was statistically analyzed using Oneway ANOVA, followed by Tukey's test ($p<0.05$).
Results: SEM analysis showed that all formulations provided signs of remineralization on enamel surfaces compared to the control (WA). However, contrarily to FL toothpaste that contained NaF, all formulations containing S-HAp or ACPF showed the precipitation of nanoparticle clusters on the surface and the progressive growth of hydroxyapatite microcrystals having the same orientation as the HAp prisms that were dissolved during etching procedures. Interestingly, S-HAp2 showed a similar degree of remineralization as S-Hap1, but in a less organized structure, since HAp microcrystals appeared to be less tightly packed. This finding confirms the biomimetic properties of the tested formulations. Formulations in form of "mousse" (ACPF and S-HAp3) showed better remineralization capability compared to the toothpastes, likely due to the presence of a higher concentration of active principles or compounds possessing higher solubility (S-HAp3 and ACPF). Indeed, EDS analysis showed that the amount of Ca and P was higher for the mousses than for the toothpastes. Nevertheless, the presence of Zn in S-HAp2 and S-HAp3, and F in S-HAp1 and ACPF, was similar comparing mousse with toothpaste formulations.
Conclusion: both remineralizing kinds of toothpaste and the mousse based on substituted hydroxyapatites and the mousse with ACP-F were able to exert their activity on demineralized human enamel, with mousses showing improved activity over toothpastes. The morphological features of the deposited HAp microcrystals demonstrated biomimetic regeneration capabilities of the tested formulations.

Aesthetic outcome between icon treatment and dental bleaching in esthetic area

Luca Albertini, Edoardo Falavigna, Davide Pappalardo, Francesca Zotti

Aim: The aim of this study is to evaluate the patient and pratictioner's satisfaction after treating dental fluorosis by using ICON (DMG, Hamburg, Germany) compared with Opalescence Boost bleaching (Ultradent srl, Milano, Italy).
Methods: The clinical study compared two different treatments of dental fluorosis in the aesthetic area in order to investigate the patient's satisfaction in two different patients. One patient was treated with ICON microinfiltrations, instead the other one with

Opalescence Boost (40% hydrogen peroxide) bleaching treatment. The evaluation was made comparing before and after photograph of treated teeth. Patients gave a score of satisfaction by completing a questionnaire concerning the following points:
-Aesthetic result (from 0 'not satisfied' to 10 'completely satisfied');
-Pain during the treatment (VAS);
-Time of treatment (from 0 'not adequate time' to 10 'adequate time');
-Post treatment sensibility and follow up to 1 week (Shiff air Index 0: the patient does not respond to air stimulation, 1: the patient responds to air stimulation but does not require the interruption, 2: the patient responds to air stimulation and requires interruption or moves away from the stimulation, 4: the patient responds to air stimulation and considers it painful).
The clinician's satisfaction was set using tooth surface index of fluorosis (TSIF) before and after treatment (TSIF 0: enamel shows no evidence of fluorosis, 1: enamel shows definite evidence of fluorosis, meaning areas with parchment-white color that represents in total less than one-third of the visible enamel surface. This category includes fluorosis confined only to incisal edges of anterior teeth and cusp tips of posterior teeth ("snowcapping"), 2: parchment-white fluorosis totals at least one-third of the visible surface, but less than two-thirds, 3: parchment-white fluorosis totals at least two-thirds of the visible surface, 4: enamel shows staining in conjunction with any of the previous levels of fluorosis. Staining is defined as an area of definite discoloration that may range from light to very dark brown, 5: discrete pitting of the enamel not associated with evidence of staining of intact enamel. A pit can be defined as a definite physical defect in the enamel surface characterized by a rough floor surrounded by a wall of intact enamel. The pitted area is usually stained or differs in color from the surrounding enamel 6: Both discrete pitting and staining of the intact enamel exist,7: presence of confluent pitting of the enamel surface. Large areas of enamel may be missing and the anatomy of the tooth may be altered).
Results: the patient treated with Icon gave the following evaluation to questionnaire:
- Aesthetic result:9/10
- Pain during treatment:0/10
- Treatment time:8/10
- Post treatment dental sensibility (Shiff air Index):0/4
- Dental sensibility after 1 week (Shiff air Index):0/4

The patient treated with Opalescence Boost gave the following evaluation to questionnaire:
- Aesthetic result:6/10
- Pain during treatment:3/10
- Treatment time:7/10

Post treatment dental sensibility (Shiff air Index):2/4
Dental sensibility after 1 week (Shiff air Index):0/4
The tooth surface index of fluorosis (TSIF) in both patients before the treatment was 2/7.
After the treatment the patient treated with Icon had reported 0/7 TSFI score, while the patient treated with Opalescence Boost had 1/7 TSFI score.
Conclusion: According to this results, the patient's preferential treatment for dental fluorosis in the aesthetic area was Icon. This material can be considered better than Opalescence Boost because of a better aesthetic result and less pain during the procedure. Treatment of fluorosis with Icon should be preferred by the clinician because of a better predictability and more improvement of dental fluorosis lesion.

Electrobonding effects on dental adhesives applied on dentinal surfaces

Ilaria Frustaci

Aim: In the last decades, the growing interest in health and beauty has increased the demand of aesthetic dental procedures. This new approach is driving a change in the dental profession: dentists not only have to deal with the dental diseases of their patients, but they also must meet an increasing demand of aesthetic restorations. In the past, aesthetic achievements were only obtained with invasive procedures and expensive dental prosthetic restorations, relegating these treatments to a limited public. Today, the progress in science materials and adhesive technology have produced a myriad of new materials, whose introduction in dental aesthetic restorations lay the foundation for brand new, not invasive and less expensive treatments, extending the demand of selective cosmetic enhancements. In the last years, thanks to the major improvements in physical and mechanical properties, composite resins took the place of silicate cements and acrylic resins. In the early applications of composite resins, mechanical retention of the material during the polymerization process had to be considered. In fact, these materials were applied following the "extension for prevention" concept. More recently, the introduction of the enamel-dentinal adhesives (commonly called adhesive dentin bonding agents -ADBA-), not only reduced the composite resin shrinkage, but also the extension of the cavity preparation. Dentin bonding agents penetrate rapidly into the submicroscopic dental imperfections providing a better interface for the binding of the composite resins. Indeed, in these applications, the enamel-dentinal adhesives realize the interface between the restorative material and the dental surface, therefore the binding strength depends straightly on the correct application of these brand-new adhesives.
Methods: To this purpose, in this work a novel

investigation method to verify the effectiveness application of enamel-dentinal adhesives by the electro-bonding technique is presented. The electro-bonding principle is based on the flow of a small current between the dentin substrate and the adhesive applicator, enhancing the adhesive penetration.
Results. The benefits of this application technique are correlated with the chemical composition of the adhesives. Better results have been achieved with adhesives whose polymers present more polarity. Indeed, the current flow orients the polymeric chains, increasing the penetration on the dental substrate. Since the electro-bonding technique is still experimental in the dentistry market, currently the few available electro-bonder appliances are closer to prototypes than actual medical devices. In addition, devices designed to provide small currents and generate a feedback about the adhesive application status at the same time, are still not available. Therefore, with the aim to investigate the effects of the current flow on the enamel-dentinal adhesives applications, an ad-hoc electro-bonder device has been designed.
Conclusion: In the first part of this study, the electro-bonder hardware design is developed. Following, a protocol to compare the standard application versus the electro-bonding technique is defined. Finally, the results of this comparative study are shown and final considerations of further implications and future developments are investigated.

SEM and confocal laser scanning microscope analysis of the effects of steam sterilization protocols on collagenated bone block

D. Rizzo[1], M. Matarese[1], E. Arcudi[1], G. Picciolo[1], R. Lo Giudice[2]

[1]Department of Biomedical and Dental Sciences and Morphofunctional Imaging, Messina University, Italy
[2]Department of Clinical and Experimental Medicine, Messina University, Italy

Introduction: The use of equine bone blocks is widely reported for bone augmentation techniques. The block must be shaped according to the form of the defect that should be regenerated. The shaping could be performed by hand before or during the surgery, in a sterile ambient, or using a CNC milling machine that could not be sterile. The aim of our study was to evaluate if a steam sterilization could provide a medical grade sterilization of the blocks and to evaluate if bone microstructure and collagen structures change after different steam sterilization protocols provided bymainstream autoclave.Materials and Method.Two blocks of equine bone were divided into 16 samples. 1 sample was used as control and not submitted to any treatment. 15 samples were infected with a Streptococcus faecalis bacterial culture. The samples were singularly packed, randomly divided into 3 groups, and submitted to autoclave sterilization on the same device. The groups were submitted to a sterilization cycle (Gr. A: 121 C, 1,16 bar for 20'';Gr. B:134 C, 2,16 bar for 4'';Gr. C:134 C, 2,16 bar for 3.30''.). 2 samples for each group were evaluated for the sterility. 3 samples for each group were observed at SEM to notice the macro- and microstructure modification and to confocal microscope to observe the collagen. Results. All samples were sterile. The SEM evaluation showed, in all groups, a preserved morphological structure. Confocal microscope evaluation shows that the collagen structure appears to be more uniform and preserved in group C. Conclusion. Data show that autoclave steam sterilization could be reliable to obtain sterilization of equine bone blocks.

Effects of different surface treatments on crystalline phases of tio2 on ti-6al-4v alloy dental implants: analysis by raman spectroscopy

S.M. Lupi[1], A. Rodriguez y Baena[2], B. Albini[3], P. Galinetto[3]

[1]Department of Clinical-Surgical, Diagnostic and Pediatric Sciences, Section of Dentistry, University of Pavia, Italy
[2]Master in Oral Surgery, Vita-Salute San Raffaele University, Milan, Italy
[3]Department of Physic, University of Pavia, Italy

Aim: The exceptional biocompatibility of titanium is due to its stable native oxide layer (TiO2), which forms immediately when exposed to oxygen in a very low thickness (<10 nm). The native titanium oxide formed during normal ambient conditions on Ti is amorphous. In addition to the amorphous phase, three different crystalline phases of titanium dioxide exist naturally, namely rutile, anatase and brookite. Amorphous TiO2 transforms to the anatase and then to the rutile phases by appropriate thermal treatment. Recent studies showed that crystalline phases of TiO2 could influence important features like osseointegration and bacterial adhesion. Raman spectroscopy (RS) is an important nondestructive structural characterization tool that can be used to investigate amorphous to crystalline phase transitions, oxygen defects, stress states and quantum size effects in transition metal oxides. The aim of this study is to qualitatively study the structural transformations of the layer of TiO2 on the surface of dental implants and in its depth of few tens of microns by the use of RS during manufacturing stages.
Methods: To study the transformation of TiO2 induced by manufacturing phases, experimental implants made of Ti-6Al-4V alloy were specifically produced by

FMD Medical Devices (Rome, Italy). Two implants for each surface treatment were prepared. Micro-Raman measurements were carried out at room temperature by using a LabRAM Dilor spectrometer (HORIBA, Ltd, 2 Miyanohigashi, Kisshoin, Minami-ku Kyoto 601-8510 Japan) equipped with an Olympus microscope HS BX40 (Shinjuku Monolith, 2-3-1 Nishi-Shinjuku, Shinjuku-ku, Tokyo 163-0914, Japan). Experimental implants with the following surface treatments were analyzed by RS: machining (M), Al2O3-blasting (B), HNO3\HF-etching (E), B + E, B + E + anodization (A). A second group of implants was treated with plasma (CP) in addition to the first group treatments.
Results: an increase in the amorphous TiO2 layer was observed, in increasing order of magnitude: M, E, B, B + E, B + E + CP, A and A + CP. Plasma treatment does not change surface characteristics, except for the B+E group, in which plasma treatment enhances the crystalline phase of TiO2. The biological implications of the characteristics of the TiO2 layer are to be determined.
Conclusion: manufacturing treatments affects superficial TiO2 structural organization. Controlling surface characteristics during manufacturing may affect biological features of dental implant. Raman evaluation of dental implants provides significative information on superficial TiO2 structural organization.

A comparison between literature reviews performed by a human being and IBM Watson cognitive computing: preliminary results

Marchio V.[1], Derchi G.[2], Marceglia S.[3], Lardani L.[2], Giuca M.R.[4]

[1]DDS, M.Sc. Visiting Fellow, University of Pisa, Italy. Department of Surgical, Medical, Molecular Pathology and Critical Area
[2]DDS, M.Sc, PhD. Researcher, University of Pisa, Italy. Department of Surgical, Medical, Molecular Pathology and Critical Area
[3]Associate Professor, University of Trieste, Italy. Department of Electronic Bioengineering and Informatics
[4]Professor, University of Pisa, Italy. Department of Surgical, Medical, Molecular Pathology and Critical Area

Aim: This study's objective is to compare two literature reviews on the comparison between composite inlays and ceramic inlays: one performed by a human and one performed by IBM Watson Cognitive Computing Platform, regarding the longevity.
The preliminary results include an evaluation of number of found and included studies, in order to determine IBM Watson's potential as an "assistant" to researchers and dentists in finding papers useful to answer clinical questions. It is our intention, in the future, to see if IBM Watson can also determine an answer to the question itself by interpreting the results obtained by its research.

Methods: A human researcher was trained to search papers on pubmed using MeSH terms, set filters (type of study and timeframe) and create search strings which could be used to verify the results of the man-made search.
IBM Watson was trained in order to be able to understand the necessary information to perform a research on PubMed based on the search string provided to it through a questionnaire system.
Both the human Researcher and IBM Watson performed multiple searches; results were compiled in tables and compared in terms of:
- Number of studies found.
- Number of studies which correctly answer the questions.
- Number of studies which do not answer the questions correctly.
- Number of studies found multiple times through the different searches.

The inclusion criteria for the research were:
- Systematic Reviews or Randomized Controlled Trials.
- In vitro or in vivo studies.
- 10 years timeframe from date of search (2008-2018).
- Longitudinal studies comparing composite resin and ceramic materials used for Inlays/Onlays/Overlays, or evaluating the longevity of either, over any period of time.
- Healthy patients.

The Exclusion criteria for the research were:
- Absence of study design description.
- Patients with pathologies such as bruxism or malocclusion included in the study.
- Studies on deciduous teeth.
- Studies regarding crowns, bridges and veneers.

The inclusion of the study was determined by reading the Abstracts of the papers obtained through the research.
Results: The first man-made search yielded a total of 25 papers with 1 repeat and 24 unique papers, 8 of which were included.
The first search made by IBM Watson yielded a total of 34 papers, with 16 repeat and 18 unique papers, 9 of which were included.
In Watson's search, the repeats are caused by the system which searches, selects, and presents relevant sentences in the published abstracts in order to provide the researcher with the most important information answering his/her scientific question.
The two searches obtained completely different results, with no papers found by both the human researcher and IBM Watson, but all of them fit to be included in a literature review.
Conclusion: These preliminary results show that IBM Watson could be used to assist a researcher for a literature review, but the model on which Watson is trained needs to be refined in order to provide more

extensive results and determine its precision further. These findings will help to refine IBM Watson's abilities and getting closer to obtaining a Cognitive Computing Platform able to answer clinical questions made by Dental professionals.

Alginate materials and dental impression technique: a current state of the art and application to dental practice

Roberta Mastroieni, Luca Fiorillo, Stefania Marino, Francesca Gorassini, Giulia Amoroso, Cristina Maria Rosa Scoglio, Gabriele Cervino, Marco Cicciù

Department of Biomedical and Dental Sciences and Morfological and Functional Imaging, University of Messina, Italy

Hydrocolloids were the first elastic materials to be used in the dental field. Elastic impression materials include reversible (agar-agar), irreversible (alginate) hydrocolloids and synthetic elastomers (polysulfides, polyethers, silicones). They reproduce an imprint faithfully, providing details of a high definition despite the presence of undercuts. With the removal of the impression, being particularly rich in water, the imprints can deform but later adapt to the original shape due to the elastic properties they possess. Hydrocolloid materials for dental impressions are available in the form of viscous liquids in the "sol" state or in the form of semi-solid substances of a gelatinous consistency. Without a filler, the gel would lack stability and would have a slimy surface covered with synerate exudate. Alginates are salts of alginic acid, a polysaccharide extracted from the cell walls of brown algae (washed, ground and chemically treated, especially the pulp) belonging to the Phaeophyceae family, widespread especially in America. The alginate comes in the form of a powder to be mixed with water in appropriate doses. Once mixed, the alginate turns into a soft paste that is placed on the tray and introduced into the oral cavity for the detection of the impression. They are irreversible hydrocolloids because the picking reaction is a chemical reaction of irreversible precipitation, therefore they cannot return in sol form using physical means, such as temperature, as with reversible hydrocolloids. The alginates available on the market can be of two types: fast setting (hardening time of 1–2 min) or normal setting (setting time between 2–5 min). The setting time depends on the composition (water/powder ratio, where increasing the powder accelerates the hardening reaction) and the temperature at which mixing takes place (the setting time is inversely proportional to the temperature, where the higher the temperature, the lower the setting time and therefore the reaction is faster). Dust tends to lose its organoleptic characteristics when exposed to moisture or heat. The advantages of using alginate include the low cost, a better tolerability on the part of the patient, the ease of manipulation, the short time needed for execution, the instrumentation and the very simple execution technique and possibility of detecting a detailed impression (even in the presence of undercuts) in a single step. A comprehensive review of the current literature was conducted according to the PRISMA guidelines by accessing the NCBI PubMed database. Authors conducted a search of articles in written in English published from 2008 to 2018. All the relevant studies were included in the search with respect to the characteristics and evolution of new marine derived materials. Much progress has been made in the search for new marine derived materials. Conventional impression materials are different, and especially with the advent of digital technology, they have been suffering from a decline in research attention over the last few years. However, this type of impression material, alginates (derived from marine algae), have the advantage of being among the most used in the dental medical field.

How human dental pulp stem cells and gingival fibroblasts behave in direct contact with different dental materials? An in vitro short-term evaluation

Riccardo Monterubbianesi[1,2], Pierfrancesco Pagella[1], Angelo Putignano[2], Maurizio Procaccini[2], Thimios Mitsiadis[1], Giovanna Orsini [1,2]

[1] Orofacial Development and Regeneration, Institute of Oral Biology, Centre for Dental Medicine, University of Zurich, Zurich, Switzerland
[12]Department of Stomatology and Clinical Sciences, Polytechnic University of Marche, Ancona, Italy

Aim: The present pilot study Aim to evaluate the interface between different dental materials and human dental cells.
Methods: The following materials were used and put in direct contact with Human Dental Pulp Stem Cells (hDPSCs) ans Human Gingival Fibroblasts (hGFs): an endodontic cement (Pulp Canal Sealer, PCS, Kerr. Corp); a BisGMA - free resin-based material (SDR, Dentsply); a bonding Prototype (BP) and a light-curing resin-luting agent (Relyx Veneer, RV, 3M ESPE). The following combinations of material/cells were evaluated: PCS/hDPSCs; RV/hGFs; SDR/hDPSCs and SDR/hGFs; BP/hDPSCs and BP/hGFs. After the hardening of the tested materials inside the culture plates by chemical or light activation, the specific cells and medium were put inside. A medium consisting on DMEM/F12 (Sigma-Aldrich

Chemie GmbH, Buchs SG, Switzerland) with 10% fetal bovine serum (PAN Biotech GmbH, Aidenbach, Germany), 1% penicillin/streptomycin and 0.1% amphotericin B was used for both dental cell lines. Every two days, the cells were washed with 10% PBS and medium was changed. The cultures were maintained at 37°C in a humidified atmosphere with 5% CO2. The t0 point was established when the cells were attached on the plates. At t0, after 3- (T3) and 5-days (T5) microscopic pictures were taken. The interfaces between the cells and the materials were evaluated.

Results: The direct contact between the cells and the following dental materials, RV/hGFs, SDR/hDPSCs, SDR/hGFs, BP/hDPSCs, BP/hGFs was maintained after 5 days. On the other hand, in PCS/hDPSCs, although after 5 days the cells grew in other areas of the plates, no cells were in direct contact with PCS.

Conclusion: The behavior of the cells in contact to the tested dental materials seem to be material dependent. For the Bis-GMA free material, SDR and for the BP, both hGFs and hDPSCs remained in contact after 5 days. Although RV has Bis-GMA inside, it seems no toxic when put in direct contact with hGFs. Despite the limitation of this study, we can suggest that not only single monomers can influence materials biologic properties, but also the filler type as well as the content and other substances could affect their biocompatibility. Further studies are ongoing to characterize the modification of the cellular behavior at these interfaces in order to understand the potential clinical implications.

Implant abutment microgrooves influence myofibroblasts response via connexin 43 expression and organization

Beatrice Mozzoni[1,2], Ludovica Parisi[1,2], Benedetta Ghezzi[1,2], Andrea Toffoli[1,2], Giulia Ghiacci[1,2], Miriam Cutrera[1,2], Simone Lumetti[1,2], Edoardo Manfredi[1,2], Guido M. Macaluso[1,2,3]

[1] Centro Universitario di Odontoiatria, Università degli Studi di Parma, Parma, IT
[2] Dipartimento di Medicina e Chirurgia, Università degli Studi di Parma, Parma, IT
[3] IMEM-CNR, Parma, IT

Aim: Titanium abutment surface microtopography can affect soft tissue cell response and induce a better transmucosal component in the implant-crown system. Connexin 43 (CX43) is one of the main components of cell-to-cell gap junctions (GJs) and of membrane hemichannels (HCs) in soft tissues. Recent studies highlighted that the down-regulation of CX43 HCs promotes the expression of pro-healing genes and inhibits that of pro-fibrotic ones, possibly identifying CX43 as a potential target for wound healing modulation. Therefore, the aim of the present work was to investigate whether the differences in titanium surface profile may influence the expression of Connexin 43 in myofibroblasts.

Methods: Murine myoblasts C2C12 were seeded on three different groups of titanium discs with increasing values of grooves depth in surface profiles (M1 l=20µm h=0,05 µm, M2 l=80µm h=0,8 µm, M3 l=120µm h=0,4 µm). Cell proliferation and ATP release. Cells were cultured up to 3 days and daily monitored for viability and ATP release in the supernatant with chemiluminescence at 24h, 48h and 72h. Gene expression analysis. After 3 days of culture, total RNA was isolated, retrotranscribed to cDNA and amplified through quantitative RT-PCR for genes encoding connexin 43 (CX43), transforming growth factor ß1 (TGF-ß1) and collagen alpha I (COL1a1 and COL1a2). Intracellular localization of CX43. Cells were stained for actin, CX43 and nuclei labeling and observed under fluorescence in order to detect the expression of CX43 and identify its organization as HCs or GJs. Differences among groups were evaluated through one-way ANOVA statistical test and Tukey post-test comparisons (significance level $p<0.05$).

Results: Cell proliferation. The differences in surface topography did not affect cell proliferation. However, extracellular ATP release at 72h was significantly higher on M3 surface if compared to M1 ($p=0.0002$) and M2 ($p<0.0001$) surfaces. Gene expression analysis. The expressions of TGF-ß1, COL1a1 and COL1a2 were significantly up-regulated on M1 surface (TGF-ß1 M2 $p=0.0062$ M3 $p=0.0071$; COL1a1 M2 $p<0.0001$ M3 $p<0.0001$; COL1a2 M2 $p=0.0018$ M3 $p=0.0011$). Interestingly, CX43 expression was extremely up-regulated on M3 surface after 3 days, when compared to M1 ($p=0.0002$) and M2 surfaces ($p<0.0001$). Intracellular localization of CX43. Both on M1 and M3 surfaces, CX43 expression was marked in the perinuclear area, demonstrating its organization in HCs. Furthermore, on M1 surfaces CX43 signal was also marked at cell periphery, designating GJs formation among cells. Cellular shape and organization: Notably, on M2 and M3 surfaces cell disposition followed the grid of the grooved surface microtopography, with cells laying on the grid hollows and elongated to colonize the surface.

Conclusion: Microgrooved titanium surfaces revealed a modulatory role on myoblasts in terms of organization of CX43 and expression of pro-healing genes and promoted a peculiar cell arrangement along surface grooves of M2 and M3 surfaces. This result may potentially lead to deposition of an oriented extracellular matrix.

Serum IGG are preferentially adsorbed by deproteinized bovine bone mineral and promote il-10 expression in human macrophages

Beatrice Mozzoni[1,2,*], Massimiliano G. Bianchi[2,*], Ludovica Parisi[1,2,*], Andrea Toffoli[1,2], Benedetta Ghezzi[1,2], Miriam Cutrera[1,2], Martina Chiu[2], Ovidio Bussolati[2], Guido M. Macaluso[1,2]

[1] Centro Universitario di Odontoiatria, Università degli Studi di Parma, Parma, IT
[2] Dipartimento di Medicina e Chirurgia, Università degli Studi di Parma, Parma, IT
[*] Equally contribution of the authors

Aim: Deproteinized bovine bone mineral (DBBM) is the gold standard biomaterial used in bone augmentation procedures. During surgery, DBBM soaks in patient's own blood, thus promoting the quick adsorption of plasma proteins on its surface. The formation of this protein corona is the first pivotal step in the DBBM interaction with the host and drives the subsequent interaction between tissue cells and the material.
Macrophages are monocyte-derived phagocytic cells involved in innate immunity, which show a plastic capacity to switch their metabolism and functions into a killing/inhibitory setting (M1) or a healing/growth promoting capacity (M2) when exposed to different milieu signals. Recent findings have shown that plasma immunoglobulins G (IgG) drive macrophage polarization toward the M2 differentiation. Therefore, the aim of this study is to characterize the adsorption pattern of blood plasma proteins to DBBM and to identify a potential mechanism of macrophage polarization triggered by the protein corona.
Methods: BioOss® granules (range size 0,25-1 mm, Geistlich Pharma AG, Wolhusen, CH) were used. The adsorption pattern of blood plasma proteins to DBBM was investigated by soaking DBBM granules in 2% human serum through SDS-PAGE and Western Blot (WB). An albumin solution at the serum concentration, supplemented or not with human IgG at the physiological concentration, was then used to coat DBBM for 1h prior to cell seeding. Human macrophages isolated from whole blood were used for the in vitro assays. To assess macrophage activation and polarization on DBBM, we monitored the expression of cluster of differentiation (CD) genes encoding for the macrophage activation marker CD68, the pro-inflammatory CD86 and the anti-inflammatory CD36, as well as for cytokines (the pro-inflammatory interleukin 8 and TNFa and the anti-inflammatory interleukin 10) through qRT-PCR.
Results: Blood plasma protein adsorption. SDS-PAGE and WB results documented a marked affinity of DBBM for serum IgG.
Human macrophages in vitro assays. The effects of IgG adsorption on macrophage polarization highlighted a markedly enhanced expression of CD68 when IgG were adsorbed on DBBM ($p=0,0029$). Even though statistical significance was not reached, the fold-change expression of the pro-inflammatory CD86 was lower in the presence of IgG ($p=0.0764$), while the anti-inflammatory CD36 was promoted by the immunoglobulins ($p=0.1445$). Interestingly, the presence of IgG had profound effects on cytokine expression. Considering the fold-changes induced by IgG presence, an impressively larger induction of the anti-inflammatory IL-10 was detected if compared with the pro-inflammatory IL-8 ($p=0.0116$) and to the TNFa ($p=0.0091$).
Conclusion: DBBM showed a remarkable capability for the specific adsorption of IgG. Human macrophages exposed to DBBM with adsorbed IgG preferentially stimulated the production of the anti-inflammatory IL-10 rather than that of IL-8 and TNFa. These findings point to the possibility that the IgG-driven M2 macrophages play an important role in the development of a osteogenic environment through the increased production of IL-10.

Chemical and mechanical roughening treatments of a microhybrid composite resin surface. SEM and profilometry analysis.

Puleio F., Lo Giudice F., Pinizzotto M., Barbera S., Campolo E., Miragliotta G.

Dept. Biomedical and Dental Sciences and Morphofunctional Imaging, Messina University.Messina, Italy

Aim: The failure of restorative therapy can be caused by: fractures, secondary caries, changes in color or a total detachment of the restoration. Repairing the restoration is a more advantageous and less invasive alternative to its total makeover. The prognosis of this treatment, when the restoration repair is chosen, depends on the adhesion force that can be developed between the old restoration and the new layer of composite material. The adhesion of new composite to the old restoration is guaranteed, not only by a new bond established with residual monomers, but also by a micromechanical retention that exploits the superficial irregularities of the old restoration. In order to improve this type of adhesion various surface treatments have been described in the literature, such as roughening with diamond burs of various granulometry, sandblasting with aluminum oxide and silica sand, acid etching, application of hydrogen peroxide or silane. The aim of this study is to analyze the effects of some chemical and mechanical surface treatments aimed at increasing the roughness of a microhybrid composite resin surface in order to

improve micromechanical adhesion.
Methods: 27 cylindrical blocks (height 4mm, diameter 6mm) of microhybrid composite were made. To level out the surface of the various samples, all the composite blocks were polished using the polishing discs with decreasing granulometry. The samples were randomly divided into 9 groups (n. 3). The surface of the samples of each group was treated differently:
A) Control group, no surface treatment.
B) Acid etching with 35% orthophosphoric acid for 30".
C) Acid etching with 35% orthophosphoric acid for 60".
D) Abrasion with diamond bur coars.
E) Abrasion with diamond bur and etching with 35% orthophosphotic acid for 30".
F) Abrasion with diamond bur and etching with 35% orthophosphoric acid for 60".
G) Sandblasting.
H) Sandblasting and etching with 35% orthophosphoric acid for 30".
I) Sandblasting and etching with 35% orthophosphoric acid for 60".
The treated surface of the samples was observed at the S.E.M. at magnifications of 600x and 2100x. The samples were then analyzed with a confocal microscope in order to measure the roughness. For each treated surface the roughness (Ra) was recorded in three different points.
Results: The observation of samples at S.E.M highlighted the presence of heterogeneous surface morphologies, variable according to the treatments used. The images of the samples sandblasted with Al2O3 show the greatest irregularity and the highest number of microcavities. Combining the described treatments with acid etching with 35% orthophosphoric acid for 30" and 60", the observations did not show any change in the treated composite surface. The t-test was applied to compare the Ra values obtained between the control (Group A) and all experimental groups. No significant roughness differences were recorded between of Groups A (94,22±44,65 nm) samples Vs B (78,55±23,27 nm) and C (60,68±35,34 nm). We obtained the same results comparing Group D (1647,77±471,82 nm) Vs E (1812,34±300,62 nm) and F (1603,78±280,45nm), and Group G (2955,55±572,83 nm) Vs H (2777,8±447,52 nm) and I (2855,55±493,94 nm). Comparison between control group A and the groups D and G showed significant statistics ($p<0.01$). The difference in roughness between groups D and G was also statistically significant ($p<0.01$).
Conclusion: In according to our results, sandblasting is the best treatment to increases the surface roughness of a microhybrid composite. Etching with 35% orthophosphoric acid for 30 "and 60" does not involve significant superficial alterations.

Surface hardness of different restorative cad/cam materials after immersion in acidic drink

Benedetta Turcato[1], Sofia Merlini[1], Elisa Di Ronza[1], Marco Ciuffreda[1]

[1]Department of Clinical-Surgical, Diagnostic and Pediatric Sciences, Section of Dentistry, University of Pavia, Pavia, Italy

Aim: CAD/CAM indirect restorative materials have been recently introduced in Dentistry; the purpose of this study was to evaluate the change of surface micro-hardness of four different restorative CAD/CAM materials after immersion in acid drink (Coca-Cola, Coca-Cola Company, Milan, Italy).
Methods: 180 specimens of identical size (2mm thickness) were obtained sectioning each tested CAD/CAM block of the four different materials: a force absorbing hybrid ceramic block (CERASMART™, GC Corporation, Tokyo, Japan), a resin nano ceramic (Lava™ Ultimate, 3M, Minnesota, USA), a nano hybrid composite (Grandio blocs, VOCO GmbH, Cuxhaven, Germany) and a zirconia reinforced lithium silicate glass ceramic (VITA SUPRINITY® PC, VITA Zahnfabrik, Bad Sackingen, Germany).. Before testing their properties, each specimen was polished, rinsed with water and exposed to air-dry. For each restorative CAD/CAM material the 45 specimens were randomly divided into three groups (n=15 per group). The hardness of each CAD/CAM material was tested at baseline (T0), after immersion in a sealed vial containing 50 mL of acidic drink (Coca-Cola Company, Milan, Italy; pH 2.52) for 7 days (T1, n=15) and after immersion in 50 mL of acidic drink (T2, n=15). Each specimen's micro-hardness was determined with a micro-hardness tester (Isoscan HV2, LTF Spa, Antegnate, Bergamo, Italy) using a Vickers diamond indenter. The two diagonals' length of each indentation were measured by a 40x magnification built-in scale microscope and were converted into a Vickers value (VHN). Scanning electron microphotographs were taken before and after indentation test for each group tested (mvBlueFOX3, MATRIX VISION Italia, Brescia, Italia). The data were analyzed (Kruskal-Wallis and ANOVA).
Results: Each material varied significantly its hardness after immersion in acidic drink. The nano hybrid composite had a high initial Vickers hardness and the greatest percentage loss after acid exposure. The hybrid ceramic and the resin nano ceramic had a similar percentage loss of Vickers values even if the second material had higher initial values. The zirconia reinforced lithium silicate glass ceramic had the highest baseline Vickers values and the lowest percentage loss of micro-hardness.
Conclusion: The oral cavity is a complex aqueous environment, modified by everything is introduced daily: food and beverage can lower the salivary

pH values. In this way, physical and mechanical properties of restorative CAD/CAM materials can be changed. After immersion in acidic drink (pH=2,52) for 7 and 28 days Vickers micro-hardness of all tested materials was negatively affected. However, the four CAD/CAM materials present significant different micro hardness values before and after acid exposure. Zirconia reinforced lithium silicate glass ceramic (VITA SUPRINITY ® PC) is less affected presumably because of its high chemical stability. Dental composite resins have a polymeric network that can be negatively influenced by the exposition to acid beverages. The results obtained at T0 confirmed that CAD/CAM resin composites have greater mechanical properties, particularly in this study micro-hardness characteristics, than traditional composites because of their industrial process of post-polymerization. Mechanical characteristics, in this case Vickers hardness, of ceramics materials are stronger than composites' ones. As confirmed by other studies, it has been also demonstrated that the loss of mean micro-hardness percentage is higher during the first 7 days of exposition (T0-T1) than during the other 21 days (T1-T2).

Dentinal temperature rise during photo-activation of restorative composites in premolars

V. Lodato[1], C. Rengo[3], A. Valletta[1], G. Simeone[1], E. Vaia[1], R. De Santis[2]

[1]Department of neurosciences, reproductive and oral sciences, University Federico II Naples, Italy
[2]Institute of Composite and Biomedical Materials, National Research Council, Naples, Italy
[3]Department of prosthodontics and Dental Materials, School of Dental Medicine, University of Siena, Italy

Aim: The rise of temperature during polymerization can affect tooth pulp with potential pulpar damage. This study wants to investigate dentinal temperature rise during light activation of a composite restoration to determine if clinically significant critical temperature rises were reached using different placing techniques.
Methods: 10 extracted premolars were collected and stored in 0.5% thymol at 5 °C. They were cemented in metal cylinders and divided into two groups (n = 5). Specimens received standardized MOD preparations. Adhesive system (FL Optibond) was applied and the MOD cavities were restored according to the following protocols: SDR flow applied in bulk-fill for Group 1; SDR flow applied in 2mm increments for Group 2. K-type single-use thermocouples were used to measure temperature profiles. Thermocouples were placed in a standardized hole created within each premolar 1 mm below the cavity floor. Thermocouples were cemented with acrylic glue. Before testing, each specimen was heated at 35°C through the ThermBlock system (FALC), and this temperature was kept constant during the test. The EMS Swiss Master Light lamp 1100 mW/cm2 operating for 21 s was used for the polymerization process, and ThorLab power meter was used to monitor the light power level before each test, while a photo-diode was used to monitor the light power level during each test. Temperature and light intensity signals were acquired for one hour using the Signal express software (National Instruments). Data were subjected to statistical analysis (mean and standard deviation).
Results: Light activation of restorative composite affected dentinal temperature rise which was up to ten Celsius degrees. There is no significant difference between Group 1 and Group 2. Teeth restored with bulk fill technique shown rise of dentinal temperature similar to that recorded for teeth restored with incremental technique.
Conclusions: In vitro assessment of intrapulpar heat gain during light curing may provide a better approach to assessing operative steps, thus reducing dental damage so that a less empirical dental procedure can be drawn up. Under the limitation of this study, during polymerization of dental resin composites, it was revealed that there is no significant difference of temperature rise between bulk fill technique and conventional incremental technique.

Digital Dentistry

Full digital process of cad-cam no-prep partial veneers after orthodontic treatment, a case report

Veronica Campana, Alice Ronchetti

University of Insubria, Department of Medicine and Surgery, Italy

Aim: The purpose of this paper is to present the esthetic and orthodontic outcome of multiple lithium disilicate ceramic partial veneers, produced through a full digital process that includes an intraoral scanner impression and the computer-aided design/computer-aided manufacturing (CAD/CAM) phases. In this case report the advantages of this digital technique are presented : thus, they brought us to an acceptable aesthetic outcome obtained by the re-distribution of space after an orthodontic treatment using partial veneers in unpleasant and irregular spaces between maxillary anterior teeth (13-23). Porcelain laminate veneers have been proposed in order to compensate for the limitations of orthodontic treatment, achieving a modification of crown anatomies and smile proportions such to provide a satisfying aesthetic results for patients with irregular interdental spacing. The digital technique also allows an accurate analysis of undercuts and occlusion so that a minimal or totally absent, as in this case, teeth preparation is needed, in order to avoid any kind of invasive treatment, above all when the dental elements are healthy and can be modified exclusively by an additive technique thanks to an accurate dental design.
Methods: A CAD digital scan of the maxillary teeth, mandibular ones and of the bilateral closed-bite were taken (3Shape TRIOS® 3 Intraoral Scanner). Data were sent to the digital laboratory service where the partial no prep veneers were virtually designed using CAD/CAM design software (3shape dental system 18.1.0.) and milled from low translucency IPS e.max lithium disilicate (Vita A3) blocks (Ivoclar-Vivadent, Amherst, NY, USA) with a four axes milling machine (Vhf model N4). A minimum thickness of 0.3 mm for the veneer and of 0.1 for the margins were set. A virtual marginal design was performed, checking with a 2D cross section the accuracy of the positioning of the veneer closing margin. The direction of insertion of the veneer was also designed and the occlusion was controlled through a virtual articulator. Veneers were then verified intraorally using a translucent try-in paste (Multilink Automix Try In, Ivoclar-Vivadent). All internal bonding surfaces of the veneers were etched with 5% hydrofluoric acid for 25 seconds and silanated (Monobond Plus, Ivoclar-Vivadent). After conditioning the teeth surfaces with a primer (Multilink primer base + catalyst Ivoclar-Vivadent) the laminate veneers were cemented one at a time using a translucent light-cure resin cement (Multilink Automix Ivoclar-Vivadent) following manufacturer recommendations. All excess cement was removed from margins and cured using a Elipar™ DeepCure-S LED Curing Light (3M ESPE). An occlusal check was performed, revealing the absence of interfering contact points both in protrusive and laterality.
Results: It was obtained a no-preparation adhesive cementation of veneers with a layer thickness between 0.1 and 0.3 mm. The adaption to the teeth surfaces was clinically easy due to a well-designed planning phase that included not only the selection of the margin but also the detection of the axis of insertion: when this axis was involved in an undercut area, the software reports the error such to modify the design of the veneer.
The aesthetic outcome of the lithium disilicate veneers was natural-looking and conservative, while providing high optical properties.
Conclusion: No-prep adhesive restorations are an

excellent rehabilitative option for situations in which the dental elements are healthy and can be modified exclusively by an additive plane of treatment, for example if there is a need to compensate the limitations of an orthodontic treatment. The digital workflow allowed the fabrication of satisfying clinical results in terms of marginal fit, shape and aesthetics.

Bionic beyond the limit of fully adjustable articulators: narrative review and technology presentation

Davide Cavagnetto, Federico Davide Costanti Mussano, Federico Amoroso, Paola Cerutti, Massimo Carossa, Gianfranco Gassino, Stefano Carossa

C.I.R Dental School, Department of Surgical Sciences, University of Torino, Italy

Aim: the aim is double fold: a) to perform a narrative review of the literature on limitations of currently available fully adjustable articulators and pantographs and b) to present an accurate and time saving robotic system for individual mandibular movement registration and reproduction.
Methods: Different primary studies were summarized and conclusions were drawn into a holistic interpretation contributed by the reviewers' own experience.
RESULTS: In the Sixties fully adjustable articulators and pantographs were developed: Hanau 130-21, Stuart gnathological computer and Denar D5A. They reproduce individual condylar movements better than average values and semi-adjustable articulators and facebows. Pantographs record mandibular movement in every direction and curved condylar inserts inside these articulators can reproduce glenoid fossa anatomy and condylar dynamics. They require complex information and several time to be set. Albeit accurate, these instruments present several limitations:

1. Determination of the system of reference for movement recording: Variability of clinical individuation of reference point with respect to which to perform pantographic registration
2. Movement recording limitations: only border movements are considered
3. Movement analysis: inter and intra examiner variability interpreting pantographic recordings in order to set the articulator
4. Kinematic assumptions: that is the necessary simplification of the movement during the first millimeters of mouth opening and closing as pure rotation around a hinge axis.

BionicTM system integrates a particularly precise jaw movement analyzer adopting intraoral based reference system and a simplified robotic mechanics to reproduce recorded movements.
The Acquisition system utilizes an optoelectronic motion capturing system that records 200fps. The dedicated software recognizes known geometries on markers connected to each jaw at a predetermined distance. Markers are rigidly connected to circumferential retainers that does not cover any occlusal surface and does not impair oral functions. Each recording process lasts five seconds.
Six degrees of freedom of movement are required to perform mandibular movements on a robot, 3 translations and 3 rotations. Previous robots used delta mechanics that required a various number of parallel effectors between motors and the object to be moved introducing mechanical inter-component tolerances. Bionic Robot is configured as a gyroscope, it has 3 motors working in translation and 3 in rotation in a point where all of the rotation and translation axis converge. This mechanical configuration eliminates the parallel effectors thus improving precision and reducing manufacturing costs. The recording system and the robotic machine both quantify movement as translations and rotations of a rigid body in space. This is an advantage compared to traditional delta mechanics robots that need to translate recorded movements by decomposing them into segmented information for each parallel effector.
Conclusion: Bionic system allows to quickly record and reproduce individual mandibular movements. It also overcomes many of their limitations. It adopts an intraoral reference system thus avoiding clinical error of locating extraoral landmarks whose univocal determination is almost impossible, it allows to record not only border movements but also functional ones.

Digital individualized indirect bonding

S. Costa, A. M. Bellocchio, C. Tamà, G. Chirieleison, R. Castellaneta, A. Lo Giudice, E. Gatto, M. Portelli, A. Militi, R. Nucera

Department of Biomedical and Dental Sciences and Morphofunctional Imaging, Section of Orthodontics, School of Dentistry, University of Messina, Policlinico Universitario "G. Martino", Messina, Italy

Aim: Precise bracket positioning is essential in order to achieve all the benefits of straight-wire orthodontic appliance. Moreover, it leads to better treatment results and shorter treatment time.
Digital orthodontic approach to indirect bonding allows clinicians to virtually plan orthodontic bracket positioning on virtual 3D dental patient's arches and to construct brackets trays with rapid prototyping techniques for indirect bonding.

The aim of this contribution will be to illustrate a new approach for indirect digital bonding procedure and explain the advantages of this procedure over the conventional indirect bonding procedure.
Methods: A new approach was designed in order to perform individualized bracket positioning according to the individual patient characteristics.
This new approach requires the following step: digitalization of patients' dental arches in STereo Lithography interface format with extra-oral scanner (Maestro 3D scanner, Age Solutions, Pisa, Italy), teeth segmentation, virtual dental set-up of ideal patient occlusion, straight virtual bonding bracket positioning on the set-up arches and transfer of the specific bracket-teeth position to the pre-treatment unset-up teeth in pre-treatment position, brackets trays design for indirect bonding (Maestro 3D software, Age Solutions, Pisa, Italy), direct brackets' tray construction with 3D rapid prototyping techniques, (3D form, Formlabs, Somerville, MA, USA) brackets indirect bonding on pre-treatment patients dental arches.
Twin conventional bracket with MBT prescription were used (Forestadent Mini Sprint® II Brackets, McLaughlin Bennett 5.0 System, Pforzheim, Germany). Forestadent provided .stl brackets file. These files were preliminary loaded into Maestro 3D software in order be virtually place onto crown surface.
Results: This new approach and its benefits will be illustrated in detail with the presentation of some clinical case. This in-direct bonding procedure offers the possibility to visualize final treatment results and position the brackets in order to achieve a specific planned result. Clinical results of treated patients showed that it is possible to create brackets trays able to transfer planned brackets position with excellent accuracy. The applied indirect bonding technique allowed us to successfully treat all included subjects.
Conclusions: This new approach allows the clinician to define treatment objectives and to visualize the final occlusion before treatment. Moreover, applying this method, bracket's final position will be planned in order to improve final occlusion according to the dental and periodontal patient anatomy.

Efficacy of a standardized prescription protocol conceived for orthodontic treatments with invisible aligners in increasing the reproducibility of virtual orthodontic set-up realized by different operators.

Dalessandri D.[1], Tessitore M.[1], Sangalli L.[1], Gregorini C.[1], Massetti F.[1], Laffranchi L.[1], Bonetti S.[1], Paganelli C.[1]

[1]Dental School, Department of Medical and Surgical Specialties, Radiological Sciences, and Public Health, University of Brescia, Italy.

Aim: The number of orthodontic treatments conducted using invisible aligners is continuously and exponentially growing worldwide. Several systems have been developed during the last decade to manufacture these aligners, in most cases applying a fully digital protocol. Virtual set-up popularity consequently increased and some issues arose up especially regarding the accuracy and reliability of this kind of set-up. Therefore the aim of this study was to investigate the reproducibility of orthodontic set-up of the same patient, based on a unique individual prescription protocol for orthodontic treatments with invisible aligners, performed by different operators.
Methods: 30 patients with class I molar relationship and slight to moderate frontal teeth crowding, according to Little's index of discrepancy, were consecutively evaluated by the same orthodontist which formulated an individual prescription for each one of them, applying the following standardized protocol for set-up planning in patients treated with invisible aligners: orientation of the occlusal plane of pre-treatment virtual models according to the angle formed with the Frankfurt plane; setting of the anterior limit of the upper and lower dentition; and determination of the need for dento-alveolar lateral expansion. Virtual set up, according to these prescriptions, were prepared by 3 different operators, using the 3Shape OrthoAnalyzer™ software, at the begin of the study (t0) and after 1 month (t1). After a three months wash out period (t2), the same virtual models were sent to the same operators with a simple request of teeth alignment, leveling and derotation; this procedure was repeated after one month (t3). Extrusion, intrusion, angulation, and inclination correction's values for each single tooth were recorded and ANOVA was used to identify differences. Two-way mixed intraclass correlation coefficient (ICC) of absolute agreement was used to test both intra- and inter- operator reliability.
Results: The comparison between t2 and t3 set-up showed both statistically and clinically significant differences with regard to extrusion, intrusion, and inclination correction's values in the anterior teeth, and with regard to inclination correction's values in the posterior teeth. The same differences were found after comparing t0 and t1 mean results with t2 and t3 mean results. No significant differences were found betwee t0 and t1 set-up. The intra-operator reproducibility study showed mean ICC coefficients, for each correction type and tooth considered, ranging from 0.922 to 0.991 (excellent reproducibility) at t0 and t1 and ranging from 0.755 to 0.839 (good reproducibility) at t2 and t3. The inter-operator reliability showed mean ICC coefficients, for each correction type and tooth considered, ranging from 0.901 to 0.977 (high reliability) at t0 and t1 and ranging from 0.715 to 0.808 (good reproducibility) at t2 and t3.

Conclusion: The use of an individual prescription for each patients and the application of a strict set up protocol are effective in improving virtual set-up reproducibility when planning an invisible aligner treatment.

Occlusal Fingerprint Analysis And Craniofacial Models Of Malocclusion. A New Digital Paradigm For Dental Archeology

Di Carlo G.[1], Coppa A.[2], Cristiani E.[1], Vozza I.[2]

[1]Department of Oral and Maxillo-facial Sciences, Sapienza University of Rome, Rome, Italy
[2]Dipartimento di Biologia Ambientale, Università di Roma 'La Sapienza', Rome, Italy

Aims: To create models of microwear of the different facial skull morphologies that will represent a fundamental interpretative reference for the paleoanthropological study and the reconstruction of the ancient diet. These models will make it possible to distinguish the occlusal facets from the facets related to eating or working habits. The project will provide paleoanthropologists with a map of the occlusion capable of recognizing and characterizing the occlusal components and excluding wear processes that are not typical of habits and lifestyles. Some scholars have attempted to analyze the different aspects of the ancient diet from the masticatory apparatus, focusing, in particular, on the molar macrowear, a cumulative process that reflects the long-term diet of individuals. More recently, the importance of occlusal facets has been considered in order to trace and characterize the eating habits of ancient populations.
Methods: Reference 3D models will be created for the three skull cranial malocclusions starting from cephalometric norms shared and accepted in the scientific literature of the sector on the sagittal, transversal and vertical plane on a modern sample. Masticatory movements will be simulated by articulator and identification of the Occlusal Fingerprint to be associated with the different craniofacial typologies; The occlusal models will be obtained through the application of the digital 3D technology, 3D printing, and assembling it in the digital articulator. The method is based on the comparison between the commonly defined areas of wear facets that describe the main masticatory movements through the three dimensions of the space.
Results: Since the movements of the jaws and the resulting occlusal contacts are strongly correlated, the information obtained from the occlusion analysis can be used to understand how the facets are formed and the movements responsible for the occlusal contacts (microwear). Macrowear, on the contrary, is a cumulative process of wear that occurs during the life of individuals and reflects the long-term diet of the same.
Conclusions: In particular, the study of the occlusal fingerprint allows to differentiate the wear produced by the chewing of wear caused by eating habits and lifestyles.

3D printed retainer after orthodontic treatment in a periodontal patient

Luzi C.[1], Ferrari Cagidiaco E.[1], Ruggieri A.[1], Di Vece L.[1], Doldo T.[1], Ferrari M.[1]

[1]Department of Medical Biotechnologies, University of Siena School of Orthodontics, Dir. Prof. Stefano Parrini

Aim: Aim of this study is to use customized splinting, with integrally digital workflow, in an orthodontically treated patient with stable periodontal disease but with serious bone loss: indeed purpose of the work is to avoid the tendency for teeth to return to their initial positions and furthermore to guarantee good oral hygiene and the control of periodontal disease.
Methods: A woman of 55 years has been included in the study. She was suffering from a widespread periodontal pathology mainly located in the inferior incisal sector (second degree of mobility), she also presented: III ° class dental skeletal, flat profile, absence of the elements 1.3-2.3 (extracts at a young age) 4.6, 2.5, ceramic gold bridge 2.4 -2.6. The patient requested to improve the aesthetics of the anterior sector without modifying the posterior prosthetic restorations. Based on periodontal consulting, which confirmed that the periodontal disease is stable, we decided to treat her with fixed therapy multibrackets; then we used a customized 3D printed retainer from 3.3 to 4.3 in order to avoid movements back of teeth after orthodontic treatment, furthermore to guarantee a good oral hygiene and therefore the control of periodontal disease. The digital workflow consisted: digital impression (Aadva iOS) of the mandibula arch, creation of a digital model and finally CAD/CAM software is used to process the STL file and prepare it for printing the retainer with an experimental resin (Genial Printing Resin, GC) using a 3D printer.
Shown below the clinical steps we took after the creation of the retainer.
Dental cleaning, isolation by rubber dam from 3.4 to 4.4; etching lingual side of the elements 3.3-4.3 with 32% orthophosphoric acid for 45 seconds; washing; drying with air, brushing adhesive (Premio Bond Universal Adhesive System, GC) and curing it 40 seconds with U.V. lamp; applying on the retainer (which was already sandblasted with CoJet device

(3MESPE) and silanized for 1 minute with MultiPrimer (GC)) a thin layer of cement MutliLink Force (GC); placing the retainer in contact with the dental surfaces with a constant pressure and removing the excess cement before polymerization.
Results: The patient underwent three check-up: that is 7 days, one month and six months after the retainer application. We found a good plaque control, no bleeding on probing and so a perfect control of the periodontal disease; moreover the patient looked really satisfied about the comfort and the aesthetic. No detachment or fractures of the retainer was noted. The digital design of the retainer guaranteed perfect adaptation on the anatomy of dental surface and so reduced possibility of plaque retention; moreover compared to the direct chairside techniques for splinting (multistrand stainless steel retainers or fiber-reinforced composites) this procedure needed less working time, relatively lower cost, any physical model and it's less operator-dependent.
Compared to other indirect digital techniques (subtractive manufacturing) it presented : low percentage of wasted raw material; speeder and cheaper realization; shorter time repair operations; cheaper copies of the retainer in case of breakages. Overall the most important advantages were: easiness of removing resin cement excess; greater flexibility; perfect adaptation to the teeth surface; easier maintenance of oral hygiene at home and the periodontal disease's stability.
Conclusions: The short-term follow-up evidences that 3D printed retainer could be considered an effective alternative compared to conventional retainers for orthodontic treatment especially for a perfect plaque control and periodontal disease stability.

Conventional versus digital impressions for full arch screw-retained maxillary rehabilitations: a randomized clinical trial

Margherita Minoli [1], Gianpaolo Sannino [2], Paolo Cappare [1], Pietro Montemezzi [3], Filippo Pirani [3], Francesco Ferrini .

[1] Dental School, Vita-Salute University and IRCCS San Raffaele, Milan, Italy;
[2] Department of Dentistry, IRCCS San Raffaele Hospital, Milan, Italy;
[3] Oral Surgery Specialization School, Vita-Salute University and IRCCS San Raffaele, Milan, Italy;

Aim: The traditional workflow for implant prosthetic rehabilitations has been chosen in clinical practice for a long time as the leading technique. Even though no technique has yet been identified as the gold standard, intraoral digital impressions can be considered a reliable alternative.
The accuracy of the impression is affected by impression material, impression technique, implant angulation and by the number of implants. The objective of this clinical study was to evaluate the most accurate impression technique for Full-Arch maxillary rehabilitations, comparing conventional and digital impression workflows.
Methods: Patients selected for this study were treated with full-arch screw-retained rehabilitations supported by six immediately loaded dental implants. Patients have been scheduled randomly into control (conventional impression group, CIG) and test (digital impression group, DIG) groups respectively for a fully conventional workflow and a fully digital workflow. In both groups, within 24 h, temporary prostheses were delivered. Four months after the implant positioning, the two groups dealt with the fabrication of definitive restorations: conventional pick-up was performed in the control group, and definitive digital impressions were carried out in the test group. The time involved following these two procedures was recorded. Patients underwent intraoral digital radiographs to evaluate the accuracy of the framework-implant connection, check for the presence of voids at the bar-implant connection and measure bone level. Criteria used to assess success at the prosthetic level were the occurrence of prosthetic maintenance, the absence of fractures of the acrylic resin superstructure and voids.
Results: A total of 50 patients received immediately loaded prostheses supported by six implants (total 300 implants). A fixture and prosthetic survival rate of 100% was observed. All digital X-ray examinations revealed a bar-implant connection accuracy and no voids. Differences that were not statistically significant ($p > 0.05$) in marginal bone loss were found between control and test groups. Significantly less time was spent to perform digital impression procedure ($p < 0.05$).
Conclusion: Clinical and radiological results of the test group advocate a satisfactory accuracy and predictability of the intraoral scanner (IOS) to be a reliable alternative in clinical practice for implant full-arch rehabilitations and suggest fabrication of definitive restorations with a successful marginal fit precision. The accuracy of CAD/CAM systems has shown to be compatible with conventional impressions. On equal terms of the two approaches, the digital workflow seems to be a valid choice for full arch rehabilitations due to the less invasive option for patients and its time saving.

Three-dimensional planning integrating cbct and virtual models to reposition roots using clear aligners

A.C. D'Alessandro[1], V. D'Antò[2], F. Paganelli[3], F. Montebugnoli[2],

A.V. Razionale[4], G. Alessandri-Bonetti[1]

[1]Section of Orthodontics, Department of Biomedical and Neuromotor Sciences (DIBINEM), University of Bologna
[2]Section of Orthodontics, Department of Neurosciences Reproductive Sciences and Oral Sciences, University of Naples Via Pansini 5, 80131 Naples, Italy
[3]Section of Orthodontics, Department of Neurosciences Reproductive Sciences and Oral Sciences, University of Naples
[4]Department of Civil and Industrial Engineering, University of Pisa

Aim: Clear aligners are becoming more and more popular among patients for their aesthetics and it is believed that they facilitate better oral hygene compared with conventional fixed orthodontic appliances.
As described in literature, the two procedures are not yet equivalent from the biomechanical point of view; braces guarantee a precise three-dimensional control of the tooth and allow to achieve all types of movements; on the contrary the ability of clear aligners to move roots to designated positions has not yet been confirmed especially because most of the treatments are planned by only considering crown data and ignoring root geometries. Therefore, more complete information on tooth shapes, including both coronal and root anatomies, would be a precious aid to enrich treatment planning and provide more realistic simulations. The aim of this study is to describe the modality to predict and display the final root position in an orthodontic therapy that involves difficult root movements with clear aligners using CBCT and digital models to have a reliable virtual base for clinical diagnosis and 3D treatment planning and to investigate if torque movement can be obtained with clear aligners to correct root malposition in relationship to the underlying bony arch.
Methods: Three-dimensional (3D) data captured by independent sensors are fused to create accurate orthodontic digital models composed of teeth, oral soft tissues and alveolar bone structures. The methodology is based on integrating data from CBCT with models from 3D optical scanner. The latter is used to acquire the shape of tooth crowns and soft tissues through the digitalization of both patients' mouth or impressions/casts.
While the conventional virtual setup displays moving crowns but not roots, the 3D digital models with roots enable observation of their positions in the jaws, ensuring a better final outcome.
A clinical case treated with clear aligners involving difficult root movements of the lower central incisors is reported and their correction took place according to the 3D digital planning. In this poster only the variations of the torque angles are presented.
Results: Using clear aligners, the predetermined final root position for the lower central incisors was achieved, displaying a good accuracy between the expected and obtained root positions.
Conclusion: Integrating information from CBCT and virtual models for 3D root planning offers high-resolution images and can be used for orthodontic diagnosis and treatment planning with clear aligners. Torque movements of the lower incisors can be digitally predicted and clinically achieved using clear aligners.

Effectiveness in communication: new features in aesthetic dentistry. Experience of northern italy

Davide Pappalardo, Luca Albertini, Edoardo Falavigna, Francesca Zotti

Aim: The primary aim of this study was to evaluate the favorite way to receive preview of aesthetic rehabilitations by different kind of patients. The second aim was to assess the aesthetic patterns of people in Northern Italy concerning social six area.
Methods: 285 subjects (male 139, female 145) received an online questionnaire made of three sections and ten questions.
First section investigated epidemiological data: age, gender, educational attainment, ethnicity and, were applicable, dental affiliation. Second section asked subjects to identify which was the best way to preview the final result of an anterior aesthetic rehabilitation. Options proposed were DSD (Digital Smile Design), DWU (Diagnostic Wax-Up) or oral explanation.
In the last section sample was asked to answer about the most suitable color used in a social six rehabilitation, using VITA Scale from A1 to A4. Last one question was to combine teeth shape and face shape. Deciding which teeth's shape (square, triangular or round) was the most suitable for round, triangular and square shape faces.
Results: The 285 subjects were divided into dental field affiliated (48,1%) and laic people (51,9%). The 49,1% of the subjects was 15 to 25 years old, 24,2% was 25 to 35 years old, 17,9% was 35 to 50 years old and 8,8% was over 50 years old.
65,6 percent of entire sample answered to prefer DSD to be informed about the final results of aesthetic rehabilitation, opposite to the 27% of 285 people that preferred DWU. Oral explanation was optioned by a small group of sample (7,4%). In particular 70% of laic people preferred DSD whereas 21% answered in favour of DWU. Data collected from the questionnaire of the most appropriate color from VITA Scale surely showed that A 3.5 and A 4 colors are the less appreciate colors for an aesthetic rehabilitation, whereas A 1, A 2 and A 3 are considered more suitable for aesthetic rehabilitations.
Correlation between teeth shape and face shape

showed that round teeth are suitable to a round face for 58% of the people without differences in two groups of people (dental professionals group and laic people group). Triangolar teeth are suitable to a triangolar face for 48,1% of people but also to a square face for 45,3% of people.
Conclusions: DSD is the most appreciated method to communicate by laic people (70.3%) and by affiliated of dental field (60,6%). Perception of coherence between face shape and teeth shape seemed to be overlapping among the two categories investigated (dental professionals and laic). These results and the aesthetic patterns collected might allow developing an easy-to-use tool to better communicate with patients. Further investigations are required to improve these encouraging findings.

Dentistreaming: reality dentistry channel

Pasqualotto Debora[1], Corridore Denise[1], Rinaldo Francesca[1], Pandolfi Andrea[1], Spota Andrea[1], Guerra Fabrizio[1]

[1]"Sapienza" University of Rome, Department of oral and Maxillo Facial Sciences

Aim: - Dentistreaming (dSTRg) is a long-distance learning web platform and promotes an innovative, educational approach to dentistry, offering the possibility to utilize presentation services via streaming of audio and video content. Presenters such as professors, can use the platform to broadcast live or deferred audio and video content with the objective of disseminating information.
Methods: - The platform has been used in the Department of Oral and Maxillo-Facial Sciences of Sapienza University of Rome as a teaching aid and to get both students and dental professionals alike involved. Information on the platform is available to users who are only able to access the platform through their personal digital credentials. Dentistreaming is a web platform that can be consulted by PC, tablet and smartphone.By using Dentistreaming (dSTRg) for video on demand services and the live streaming of seminars, conferences, continuing education courses, didactic-clinical lessons and live surgeries, students were able: to gratuitously and from the comfort of their home, review an entire missed lesson; to follow live surgeries on patients without missing out on any of the steps of the operation; to actively participate by asking questions in real time through the chat system and multimedial links; to review at any moment and without charge any of the on demand videos of past events and video tutorials present on the platform, in order to purposefully learn a specific procedure.
Results: - During lessons in the dentistry and oral hygiene courses at Sapienza University of Rome, 60 final year dental students and 30 final year hygiene students thoroughly appreciated the use of the video tutorials for interactive lessons. This is because during clinical lessons with tutors at the dental clinic of the university, it is impossible for all students to see the inside of the mouth, making it possible to miss important steps and not understand the sequence in procedures.
Conclusion: - dSTRg is an educational opportunity for students and professionals who want to increase their knowledge and remain up-to-date on new dental techniques. The benefits of dSTRg are: following courses based on personal time schedules; attending courses at a distance; the possibility of independently viewing a course again with replay sessions and not having to book spaces specifically for events or lessons.

Prosthetic rehabilitation in aestethic area supported by 2d and 3d digital project: a case report.

F. Cattoni; R.Uccioli; L. Scudieri; L. Redi; F. Manazza; F. Ronzino; B. Rebba; G. Gastaldi.

Aim: The aim of a aestethic reabilitation of the cranio-facial district is the restoration of the masticatory function with particular attention for the respect of the natural harmony between teeth and soft tissues. Nowadays the expectations of our patients for the facial and dental aesthetic appearance are at all time high.
Methods: A 42 year old female patient was referred to Dentistry Department (IRCCS San Raffaele Hospital – Milano) for aesthethic evaluation of the upper anterior arch. After clinical and radiological evaluation of the natural abutment we proposed to the patient a treatment comprehensive of three aesthetic veneers (positioned on elements 11, 21, 22) and an aesthetic crown on 12 (implant abutment). The preliminary study of the dental design project was showed to the patient. Subsequently a resin Mock-Up of the veneers was realized directly in the mouth of the patient for aesthetic and functional evaluation. This made possible for us to show the patient a pre-operative view of the final result defining a digital diagnostic-comunicative protocol. The first step was to obtain a digital 2D design with 3D-LYNX software (3D-LYNX srl Milano) using two technical extra oral pictures which show a specific marker after an objective examination, a clinical, gnatological and phonetical evaluation. The second step was a CAD design of the new shape of the teeth using CAD-LYNX software (3D-LYNX srl Milano). This Software is able to match automatically the informations defined in 2D project. After the CAD waxing we obtained the printed model on which we

can make a silicone mask that will be used directly in the mouth of the patient to print the final Mock - Up. To improve the aesthetic and the harmony of the smile we performed a laser gingivectomy with a diode laser: EGG laser (DMT technology-Lissone-Italia). The thickness of the optical fiber was 300 micron. The surgical protocol used consisted of: 980 nm wave lengths, continuous wave mode, 2 watts power after fiber activation. The cementation of the manufacts realized by digital workflow in lithium disilicate was performed after rubber-dam isolation using a dual resin cement.

Results: The result is a great integration between the colors and the shape of the manufacts in relation to the facial harmony: this is possible thanks to the matching of patient's photos and dental models (3d-LYNX srl Milano) provided by the aforementioned specific marker. Laser gengivectomy represents a very good treatment choice to reduce significantly both the operative invasiveness for the patient and tissue healing time: in fact, the cold-blade gengivectomy requires much more time to heal.

Conclusions: This Software allows the clinicians to show to patients the final prosthetic result matched on a patient's photo. Moreover dental technicians can take advantage of the Software realizing their Mock-Up/Provisionals and analyzing a strictly detailed report computed by the software itself. Nowadays our patients are highly demanding when it comes to rehabilitation endurance aesthetic results and pain suffered: the previewing of the final result and the use of medical devices that can reduce healing time and post-operative pain, represent a great strategy that can be used to approach new patients.

Comparison of different intraoral scanning techniques on totally edentulous maxilla: an in vitro 3d comparative analysis.

Gennaro Ruggiero[1], Roberto Sorrentino[1], Fernando Zarone[1].

[1]Department of Neurosciences, Reproductive and Odontostomatological Sciences, Division of Prosthodontics and Digital Dentistry, University "Federico II" of Naples, Italy.

Aim: The primary aim of the present in vitro study was to compare the accuracy of intraoral scans of 2 totally edentulous maxillary typodonts characterized by a different definition of the anatomical landmarks, using an intraoral scanner (IOS).
The secondary aim was to evaluate the accuracy of 3 different scanning strategies.
The null hypotheses stated that there was no difference between the accuracy of the scans and the presence of anatomical landmarks and the use of different scanning strategies.

Methods: Two reference typodonts in polyurethane resin (PRIMA-DIE, Gerhò) of a totally edentulous maxilla were fabricated: a wrinkled typodont (WT) with palatal rugae and a smooth typodont (ST) without palatal rugae.
Both the reference typodonts were scanned using an industrial metrological machine (Atos Core-80, GOM), obtaining 2 digital reference scans in .stl format. All the areas needed for the fabrication of a complete maxillary denture were included in the scans.
Differently, all the experimental scans were obtained using an IOS system (TRIOS 3 Pod, 3Shape).
In scanning technique-1 (T1), the scanning proceeded longitudinally along the ridge occlusal side of the arch, starting from the left maxillary tuberosity and ending at the right one, then continuing on the buccal side and finally on the palatal side. The latter was scanned with a counterclockwise movement along the palatine vault and finally in the posterior-anterior direction along the palatal midline. In scanning technique-2 (T2), the scanning started from the buccal side of the left maxillary tuberosity, moving the scanner tip with bucco-lingual and linguo-buccal alternate movements along the ridge, from one side to the other, and finally the area along the palatal midline was detected in the posterior-anterior direction.
In scanning technique-3 (T3), the scanning proceeded longitudinally along the ridge occlusal side of the arch, starting from the left maxillary tuberosity and ending at the right one, then continuing on the palatal side and finally on the buccal side. The palatal side was scanned with a clockwise movement along the palatine vault until the left maxillary tuberosity, then with a counterclockwise movement until the contralateral tuberosity.
Six groups of scans were obtained (n=10), respectively named WT/T1, WT/T2, WT/T3, ST/T1, ST/T2 and ST/T3 according to both the presence/absence of palatal rugae and the scanning strategy.
The scans in .stl format were imported into a dedicated software (Geomagic Control X) and the accuracy of each one was evaluated calculating trueness and precision in m.
Data were statistically analyzed by means of a dedicated software (SPSS 25, IBM).
Results: Trueness values (95% CI): WT/T1=48.7 [37.8-59.5]; WT/T2=65.9 [54.9-77.4]; WT/T3=109.7 [96.1-123.4]; ST/T1=48.1 [42.4-53.7]; ST/T2=56.4 [43.9-68.9]; ST/T3=61.1 [53.3-69.0]. The Kruskal-Wallis' test showed statistically significant differences (p<.001) between the means of the groups: WT/T1-WT/T3, ST/T1-WT/T3 and ST/T2-WT/T3.
Precision values (95% CI): WT/T1=46.7 [29.7-63.7]; WT/T2=53.6 [37.6-69.7]; WT/T3=90.0 [59.1-120.9]; ST/T1=46.0 [39.7-52.3]; ST/T2=76.0 [55.5-96.6]; ST/T3=52.9 [41.9-63.8]. The Kruskal-Wallis' test showed statistically significant differences (p=.005) between

the means of WT/T1-WT/T3. Accordingly to the results, both the null hypotheses were rejected.
Conclusion: The scans performed on the typodont with more defined anatomical landmarks were less accurate than those on the typodont with less defined landmarks; however, the precision of the scans made with the scanning technique-2 on the wrinkled typodont was better than on the smooth typodont.
Within the use of the tested IOS system, on both typodonts, the scanning technique-1 showed a better accuracy than the other experimental scanning strategies.

Full-arch rehabilitation on cad/cam-milled titanium bars: a case report

C. Ruscica[1], O. La Spesa Martinengo[1], A. De Gregorio[1], F. Ferrini[1], P. Capparé[1]

[1]Department of Dentistry, IRCCS San Raffaele Hospital, Milan, Italy; Dental School, Vita-Salute University, Milan, Italy

Aim: This case report shows a maxillary rehabilitation with the All-on-4 technique and an immediate full-arch mandibular rehabilitation on six implants. For the realization of the definitive prosthesis, a digital workflow was adopted. Two acrylic screw retained prosthesis with a titanium reinforcement bar were chosen to rehabilitate function and aesthetics of the patient.
Methods: A no-smoker 56-year-old male was referred to the Dental Clinic of the Department of Dentistry of San Raffaele Hospital, Milan, Italy in order to have a full mouth rehabilitation. In preoperative evaluation, both clinical and radiological examinations were acquired. After the extraction of the residual teeth in the upper arch, two anterior axial implants (3.8x13 CSR, Sweden & Martina, Padua, Italy), and two distal ones tilted (3.8x15 CSR, Sweden & Martina, Padua, Italy) were placed, following the "All-on-four" protocol. Angulated abutments (PADs, Sweden-Martina, Padua, Italy) were screwed up to 20N. Angulated abutments (17 degrees) for the anterior implants, angulated (30 degrees) for the posterior ones were adopted to compensate the lack of parallelism between implants. To obtain aesthetics and function, the temporary prosthesis was positioned. One month later, hopeless mandibular teeth were extracted and, due to high quantity of bone, we proceed with insertion of 6 axial implant (CSR, Sweden & Martina, Padua, Italy). In this case, 0 degrees abutments (PADs, Sweden-Martina, Padua, Italy) were adopted and immediate loading was performed. 4 months after the 2nd surgery, the patient was ready for the realization of the definitive prosthesis. During the whole process, the intraoral scanner adopted was Carestream CS-3600 (Carestream Dental, Atlanta, GA, USA). A scan of the provisional maxillary and mandibular prosthesis was performed together with a complete scan of the tissues once the provisionals were removed from the patient's mouth. Subsequently scan bodies (for CSR, Sweden & Martina, Padua, Italy) were applied over all maxillary and mandibular PAD's in order to digitally register the spatial position of implants. Maxillary and mandibular scan bodies were splinted together using silk suture and a dual composite material. Then, scans of the two arches were recorded and the data sent to Wisil-Latoor laboratory (Milan, Italy). The splinted bars with the scan bodies were delivered to the laboratory in order to be scanned with a laboratory scanner which shows higher levels of accuracy and precision compared to IOS. Thanks to Exocad software, the laboratory designed and subsequently milled titanium bars for both the upper and lower jaw. After checking the perfect fit into the patient's mouth, denture teeth wax try-up was performed following digital worklow. Finally, the maxillary and mandibular prosthesis were delivered to the patient and screwed to PADs with a torque of 25 N/cm.
Results: At 14-month follow-up, the rehabilitation is well tolerated and no biological and mechanical complications occurred. The marginal bone levels and peri-implant soft tissue demonstrated excellent outcomes both functionally and aesthetically.
Conclusion: Within its limitations, this study suggests that it is possible to manufacture full-arch acrylic restorations on CAD/CAM-Milled Titanium Bars with satisfactory accuracy following a digital impression technique. Moreover, the use of an intraoral scanner facilitates patient satisfaction and the previsualization of the work undertaken, reduces the probability of impression size variations, and allows acceptable marginal fit values of the restorations.

The use of 3d printed retainers after orthodontic treatment: clinical and laboratory workflow

Tornaboni. G.[1], Luzi. C.[1], Ferrari Cagidiaco. E.[1], Di Vece. L.[1], Doldo. T.[1], Ferrari. M.[1]

[1]Department of Medical Biotechnologies, University of Siena School of Orthodontics, Dir: Prof. Parrini. S

Aim: The aim of this study is to evaluate the use of 3D printed retainers after orthodontic treatment and to define a clinical and laboratory workflow.
Methods: The clinical and laboratory workflow to realize the orthodontic retainer was defined.
The first step consists in the digital impression (Aadva iOS) of the interested arch. After the creation of a digital model, the retainer was designed from it. CAD/

CAM software is used to further process the STL file and prepare it for printing. The STL file was sent to a 3D printer (ASIGA). The retainer was prepared using an experimental resin (Genial Printing Resin, GC). To remedy a possible retainer's breakage, a copy was made. Once the retainer was prepared, the patient, who had previously undergone professional oral hygiene treatment, was prepared for cementation. The operative field was isolated by rubber dam. The lingual side of the elements was etched with 32% orthophosphoric acid for 45 seconds, then washed with water and drying with air.
Then the teeth were treated with adhesive (Premio Bond Universal Adhesive System, GC) cured for 40 seconds using a light curing lamp. Meanwhile the retainer has been silanized for 1 minute with MultiPrimer (GC). MutliLink Force (GC) was used for cementation. The internal surface of the resin splint was sandblasted with CoJet device (3MESPE).
Once the surfaces of the teeth and retainers were prepared, a very thin layer of cement was applied to the retainer, which was gently placed in contact with the dental surfaces. A constant pressure has been applied on the splint to allow the excess cement to escape and to be removed before polymerization. Once the polymerization has been completed, the rubber dam has been removed and the patient has been sent home with instructions to clean the retainer.
Results: After 7 days, one month and six months the patient returned to the control and showed nice aesthetic, comfort, good plaque control and no bleeding on probing. Also no detachment or fractures of the retainer was noted. The technique presented above, represent several advantages compared to the direct techniques for splinting to the chair (multistrand stainless steel retainers or fiber-reinforced composites).
First of all, the possibility of drawing the retainer taking into account the different anatomical situations with an adaptability of the retainer that cannot be achieved with direct techniques. When this new splint is compared to the indirect digital techniques (subtractive manufacturing e.g. zirconia and similar), other advantages can be found in using it: the low percentage of wasted raw material, the speed of realization, the greater flexibility and therefore adaptability of the final piece, the cost of the product, the possibility to repair it in a short time and also the chance of making copies of the retainer in case of breakages or detachments with reasonable cost. However, the most positive aspect is the easiness of cleaning resin cement excess and also the easy maintenance at home.
Conclusion: From the short time clinical observations, the following conclusions can be drawn: the use of a 3D printed retainer may be considered, at this time, as a possible alternative to conventional multistrand stainless steel retainers or fiber-reinforced composites retainers for orthodontic treatment. Medium and long term clinical trials are needed to verify the promising results reported.

Digital workflow in implant-prosthetic rehabilitation: case report

Visca A.[1], De Angelis F. [1], Cioffi N. [1], Marinaro E. [1], Brauner E. [1], Piccoli L. [1], Di Carlo S. [1]

[1]Department of Oral and Maxillofacial Sciences, "Sapienza" University of Rome, Rome, Italy

Aim: In the field of implantology, new hardware and software are completely changing the way the treatment plan is drawn up and the surgical and prosthetic phase is performed. The aim of this study is to describe a fully digital workflow used to perform implant-prosthetic rehabilitation in a partially edentulous patient without the production of conventional impressions, plaster models or radiological and surgical guides templates.
Methods: Implant-prosthetic rehabilitation was performed on a 65-year-old patient at the UOD of Implant-Prosthetic Rehabilitation of the Department of Oral and Maxillo-Facial Sciences - Sapienza University of Rome. The patient had partial bilateral edentulism in the lower jaw and she already possessed a Cone-Beam Computed Tomography (CBCT) scan. Before the surgery, a digital impression was taken using an intraoral scanner (CS 3500 CareStream®) and a digital diagnostic wax-up was created. STL file and DICOM data were imported into the virtual implants planning software (Navident®, ClaroNav Inc.) and merged in order to perform a prosthetically guided implant placement. The insertion of two implants in sites 4.5 (10.5x3.8 mm) and 3.6 (10.5x4.6 mm) was programmed. Implants (BioLogic®, Gemix) were placed with a dynamic guided computer surgery system (Navident®, ClaroNav Inc.) using the new Navident "Trace and Place" protocol. Six months after the surgery, implants were uncovered, and the definitive digital impression was taken using scan-abutments (Elos Accurate®). Two screw-retained prosthetic crowns in monolithic zirconia were fabricated using CAD-CAM technology.
Results: The advantage of the workflow presented was the reduction of time and cost's treatment. Digital diagnostic data collection required for treatment was completed in a single visit with improved workflow efficiency. The use of the Trace and Place protocol doesn't involve the production of a radiological stent: in this way the work phases have been further reduced, the risk of error due to possible movements of the stent has been eliminated and there wasn't a

need to perform a new CBCT scan avoiding additional doses of radiation to the patient. Digital impression and CAD-CAM technology allowed aesthetic and functional prosthetic rehabilitation. No occlusal adjustments were necessary during the final delivery of the restorations and no biological or mechanical complications have been recorded during subsequent follow-up visits.
Conclusion: The use of Navident "Trace and Place" protocol, intraoral scanner and CAD-CAM technology have simplified working phases and created a totally digital workflow. This has proved to be a valid alternative to the traditional procedures and shown promising results in terms of accuracy in both surgical and prosthetic phases, reduction of workload and execution of minimally invasive procedures.

Artificial markers on totally edentulous upper-jaw: in vitro evaluation of trueness and precision of an intraoral scanner

Vincenzo Zarrella[1], Roberto Sorrentino[1], Gennaro Ruggiero[1], Fernando Zarone[1]

[1]Department of Neurosciences, Reproductive and Odontostomatological Sciences, Division of Prosthodontics and Digital Dentistry, University "Federico II" of Naples, Italy

Aim: - The aim of the present in vitro study was to compare the accuracy of scans performed with an intraoral scanner in case of presence or absence of artificial markers on the palate of a typodont of a totally edentulous maxilla.
The null hypothesis stated that there was no difference between the accuracy of the experimental scanning typologies and that of the reference scan.
Methods: - A typodont made up of polyurethane resin (PRIMA-DIE, Gerhò) of a totally edentulous maxilla was fabricated without palatal rugae and smooth mucosal surfaces, in order to remove the anatomical landmarks that could influence the efficiency of the stitching algorithm of the software associated with the intraoral scanner.
The reference typodont was scanned using an industrial metrological machine (Atos Core 80, GOM), obtaining a digital reference scan in ".stl" format. The areas needed for the fabrication of a complete maxillary denture were included in the scans.
The artificial markers were made with injectable flowable composite resin (Charmfil Flow; Dentkist) in 6 different sites on the hard palate: 2 along the median palatal suture and 4 laterally to them, at a distance of 1 cm, in a half-sphere shape with a diameter of 2 mm. The markers were light-cured and the edentulous maxilla was scanned with the intraoral scanner (TRIOS 3 Pod, 3Shape). After scanning, the markers in the scans were deleted with a dedicated software (Meshlab) in order that the surfaces corresponding to the markers could not alter the measurements of accuracy during the superimpositions between each scan and the reference scan.
The scanning strategy and the movement of the scanner tip were the same both in presence and absence of the artificial markers. The scanning proceeded longitudinally along the occlusal side of the edentulous ridges, starting from the left maxillary tuberosity and ending at the right one, then continuing on the buccal side and finally on the palatal side. Particularly, the scanning was carried out with a circular movement in a clockwise direction along the palatine vault and then with a longitudinal movement in the postero-anterior direction along the median line of the palate.
Two groups of scans were made (n=10). The group of scans made with artificial markers was named "With markers", while that made on the typodont without artificial markers was named "Without markers".
The scans in ".stl" format were imported into a dedicated software (Geomagic Control X) and the accuracy of each one was evaluated calculating trueness and precision in m.
Data were statistically analyzed by means of a dedicated software (SPSS 25, IBM)
Results: - Trueness values (95% confidence interval): "With markers"=77.5[63.7-91.3]; "Without markers"=48.1[42.4-53.7]. Kruskal-Wallis' test was performed (p=.001) and statistically significant differences were detected between the means of the groups.
Precision values (95% c.i.): "With markers" =61.2[52.4-70.0]; "Without markers"=46.0[39.7-52.3]. Welch and Brown-Forsythe's test were performed (p=.002) and statistically significant differences were detected between the means of the groups.
Accordingly to the results of the present in vitro analysis, the null hypothesis was rejected.
Conclusion: - The presence of artificial markers placed on the palate of a typodont of an edentulous maxilla did not improve the accuracy of the scans performed with the tested intraoral scanner.
Furthermore, the accuracy of the scans performed in presence of artificial markers was worse than that achieved in absence of such markers.

Pediatric Dentistry

Prevention of malocclusion: a pediatric dentistry approach

Eleonora Angelino (DDS)[1], Gianluca Meazza[2], Maria Teresa De Grazia (DDS)[1], Valentina Lanteri (DDS, MS, PhD)[1], Luciano Zaffarano (DDS) [1]

[1]University of Milan, Department of Biomedical, Surgical and Dental Sciences, School of Specialization in Pediatric Dentistry
[2]European University of Valencia

Aim: Nutritive suction is one of the key of normal and natural grow. Non-nutritive suction, instead, especially if prolonged after the age of 4 year, is still considered one of the most important causes of dental – skeletal malocclusions due to the imbalance between internal force (as tongue) and external ones (as lips or cheecks). Lips, tongue, big toe and the most disparate objects might be used for non-nutritive suction. Many strategies could be used to stop these bad habits, for sure one of the most simple and cheapest is the persuasion-dissuasion technique associated to speech therapy. The aim of this study is to show how the early treatment of bad habits through persuasion-dissuasion technique and speech therapy could prevent or limit malocclusions development.
Methods: One of the main goal of pediatric dentistry is the prevention of malocclusion that are very common, for sure the length and the rate success of the treatment usually depend on the timing of diagnosis. A very important factor is the effective communication not only toward the parents, but also to the young patient. Twenty patients were selected, including eight males and twelve females (age range 4-6 years, average age 5,05 years) with bad habits such as thumb or tongue sucking, tongue thrusting, prolonged use of the pacifier or baby bottle in the period between the years 2015 and 2018. A persuasion-dissuasion based treatment was used through a mix of audience with patients and parents, and a speech therapy in office and at home, during 8/9 months. The speech therapy was provided by a speech therapist through weekly appointments of three quarters of an hour each.
Results: In the majority of the patients (14 pt – 70%), bad habits were completely controlled and removed with just persuasion-dissuasion associated with speech therapy, while for the other patients (6 pt – 30%), bad habits were not solved and they required the addition of an orthodontic device as lingual spur, grid (fixed or removable), occlus-O-Guide or similar. The greatest success rate of therapy has been found in female patients (60%).
Conclusion: Although the mechanical therapy still remain the gold standard, the early detection of bad habits could enhance the potential benefit of a less invasive and cheaper therapy as the persuasion-dissuasion technique associated to speech therapy.

Multidisciplinary management of dentigerous cyst in young patients: a case report.

Zaffarano Luciano[1], Romeo Salvatore Andrea[1], Angelino Eleonora[1], Balian Araxi[1], Damiano Consuelo[1], Malerba Angela[1], Strohmenger Laura [1]

[1]Pediatric Dentistry Departement, Dental Clinic "G.Vogel", ASST Santi Paolo e Carlo, University of Milan, Italy

Aim: Dentigerous cyst is the most common odontogenic cyst in young patients. The inflammatory type is the most common in the first and early second decades. Here's the ortho-surgical management of a case of inflammatory dentigerous cyst in association to several nonvital immature deciduous teeth.
Material: A 8 year-old girl without any systemic

pathology, came to the Pediatric dentistry departement of Dental Clinic "G.Vogel" ASST St. Paolo and Carlo, in Milan, for a suspected dental abscess in the upper right maxilla. Oral examination showed a buccal bony expansion over the right primary maxillary region. The panoramic radiograph revealed a osteolitic lesion over the decayed right maxillary first and second deciduous molars; the succedaneous teeth germs were displaced. A CBCT revealed an unilocular lesion with right maxillary sinus involvement. Under general anesthesia, primary molars were extracted and a cyst marsupialization was performed. The marsupialized wound was sutured and a small temporary catheter was positioned in the wound. According to the hystologic diagnosis, the bony lesion was a dentigerous cyst. After 6 weeks a fixed orthodontic obturator was inserted in order to avoid the wound closure thus permitting cyst reduction. After three months, the obturator was removed and a multi-brackets fixed appliance was positioned on the maxillary teeth in order to manage the displaced permanent teeth eruption. Regular monthly check-up were scheduled; an archwire sequence was inserted (0014-0016-0018-14x25 Ni-Ti). Ni-Ti coil springs were used to gain more space for the permanent teeth eruption. After six months, a CBCT showed the decreasing bony defects and regenerating bone around the crowns of the involved teeth. After twelve month from the surgery time, a fixed multi-brackets appliance was inserted in the lower teeth. After eighteen months, the upper right canine and premolars erupted and, as soon as an ideal occlusion was achieved, the orthodontic aplliances were removed. Removable retention appliances were given to the patient to be worn night time and 2-3 h during the afternoon.

Discussion: In case of extensive dentigerous cysts, preservation of the displaced teeth is desiderable. Marsupilazation in an option more conservative than an enucleation. The orthodontic treatement permitted a spontaneous eruption of the permanent teeth after 12 months.

Conclusion: According to cystic size, and the age of the patient, conservative treatment is a favorable treatment modality for extensive dentigerous cyst. The sinergy between surgeon and orthodontist is fundamental to achieve the best result for the patient.

Dental sealant versus fluoride varnish: which is the more effective method to prevent occlusal caries?

Bellina A.[1], Dini C.A.[1], Mauri M.A .[1], Grossi G.B.[1], Cagetti M.G.[1]

[1]Scuola di Specializzazione di Odontoiatria Pediatrica.
Dipartimento di Scienze Biomediche Chirurgiche e Odontoiatriche, Università degli Studi di Milano

Aim: Dental caries is considered one of the major public health issues. The only restorative therapy of the carious lesion does not influence, if not marginally, the infectious disease; if risk factors are not controlled, an increased risk of developing new caries lesions in the near future is documented. Focusing on the concept of caries control by managing the activity of biofilm, fluoride, which is considered the cornerstone of caries prevention, has a key role. Several fluoride vehicles have been developed over the years, each of them with different concentrations, frequency of use and dosages. Recent studies have demonstrated that the application of fluoride varnishes affects positively the progression of the carious lesion, considering this procedure as a "medical approach" to the carious lesion. On the other hand the use of fissure sealant on the occlusal surfaces of permanent molars is a common preventive measure for children and adolescents at high caries risk. The efficacy of pit and fissure sealants has been extensively studied.
Several clinical trials focusing on the efficacy of fissure sealant (FS) and the application of fluoride varnish (FV) to prevent caries on the occlusal surface of first permanent molar have been recently reported. The aim of this study is to analysed the available literature to establish which of these two techniques is more effective in caries prevention in children.

Methods: Using Pubmed a literature revision was performed, searching for the following keywords: "caries prevention, fluoride varnish, dental sealant". Filters of literature search were: human subjects, aged between 6-12 years old and publication date within 15 years; clinical trials were the type of papers included. The research identified 8 documents, 3 papers were relevant and met the inclusion criteria.

Results: included studies having at least 2 years follow-up period. In the Chinese study conducted by Liu (2012), the number of decayed tooth surfaces in all groups were rather small: at 24-month follow-up, the incidence of decayed pit/fissure sites were 1.6% in sealant, 2.4% in fluoride varnish and 4.6% in control groups. The Spanish study by Bravo (2005), found resin sealants better than fluoride varnishes at four years and nine years follow-ups. The incidence of caries on occlusal surfaces in the control group after nine years was 77%, 26.6% in sealant group and 55.8% of in fluoride varnish group. In the Chestnutt's clinical case report (2017), the proportion of children who developed dentine caries on at least 1 first primary molar after 36 months was similar in both the FS (19.6%) and the FV (17.5%) groups.

Conclusions: The benefits of both dental sealant and topical fluorides are firmly established based on a sizeable body of evidence. Therefore, from the available literature it is not possible to draw clear conclusions about differences in the effectiveness of the two preventive strategies in preventing or

controlling dental caries on occlusal surfaces of permanent molars. There is some evidence suggesting a slight superiority of fissure sealants over fluoride varnishes application; however the effectiveness of fissure sealants is influenced by material type and length of follow-up.

Early multidisciplinary therapy of orofacial hypotonia in children with down syndrome

L. Andrenelli[1], M. Farronato[2], R. Biagi[2]

[1]Private practice of Paediatric Neuro-Psychomotor Therapy, Pavia, Italy
[2]Department of Biomedical, Surgical and Dental Sciences, School of Dentistry, University of Milan, Fondazione IRCCS Cà Granda Ospedale Maggiore Policlinico, Milan, Italy

Aim: to evaluate the effects of Castillo Morales method on oral motor function after 1-year treatment period.
Methods: a 6-month-old male infant with Down syndrome was treated according to Castillo Morales method. The therapy should be implemented immediately after birth. It consisted of the stimulation of seven motor trigger points (glabella, angle of the eye, side of the nose, upper lip, corner of the mouth, chin, floor of the mouth) with techniques of touching, brushing , rubbing, vibrations and pressure several times a day. This type of exercises activates mimic muscles and evokes movements connected with swallowing, chewing, articulation, closing lips and tongue retraction. Early orthodontic palatal plate therapy ought to be an integral part of the multidisciplinary rehabilitation.The palatal plate is an individually made, removable acrylic device. It induces a sucking effect at the back of the tongue with its button-like stimulator, with a central hole, positioned at the dorsal edge and at the borderline between the hard palate and the velum; and it improves the function of the orbicularis oris muscle with its corrugate texture in the vestibular front part. The plate has been worn about four hours a day, unworn during the night, during meals and speech exercises, with two hour intervals during the use. When the plate was ready to be exchanged for the next one, it was evaluated by the parents/caregivers and by the dentist regarding compliance, problems and benefits. The patient was treated with four plates: a new plate was made every three months. Physical therapy to stabilize body posture and speech therapy to improve language development were performed. At every stage of treatment a close cooperation with the parents/caregivers is essential, because the success of the therapy largely depends on them.
Results: the objective evaluation of oral motor function is difficult, since the methods available are mostly based on visual and audible estimation. After 1 year of treatment a significative increase of the closed mouth and a decrease of the inactive tongue protrusion with an improvement of child's physiognomy were observed.
Conclusion: an early comprehensive multidisciplinary program is important to minimize the effects of the anomalies in children with Down syndrome. Castillo Morales method had a positive effect on oral motor function during the first year of therapy.

Interceptive surgical and orthodontic management of 8 years syndromic patient

L. Azzi[1], F. Brusamolino[1], V. Maurino[1], L. Tettamanti[1]

[1]Department of Pediatric Dentistry, University of Insubria, Varese

Aim: Genetical disorders can frequently involve maxilla, mandible and teeth.These conditions include teeth's number, shape, eruption anomalies and maxillofacial growth anomalies. The presence of supernumerary teeth is associated with some genetic syndromes, for example cleidocranial displasia, familial adenomatous polyposis, trichorhinophalangeal syndrome type I, Rubinstein–Taybi syndrome, Nance–Horan syndrome, Opitz G/BBB syndrome, oculofaciocardiodental syndrome and Robinow syndrome etc. Prevalence of supernumerary teeth is reported between 0.2 to 3%, and is more frequent in males than females. In Cleft lip and palate the most common tooth alteration observed is tooth agenesis, 62% of all dental anomalies. We presents a syndromic cleft lip and palate patient with supernumerary teeth treated with surgical and interceptive orthodontic terapy, highlighting the systemic relationship between oral and systemic conditions.
Methods: A 8 year's old patient with congenital cleft lip and palate and a chromosome 7 deletion shows a eruptive disorder, in particular he has a eruption's stop of central right upper incisor 1.1. the right upper lateral incisor 1.2 is placed in 1.1 position, deciduous incisors are not present. In Orthopantomography we find supernumerary teeth localized at the 51 apex and a impacted 1.1. A cone beam tc is performed, it shows the presence of two supernumerary teeth. With general anesthesia we extract the supernumeraries, after 3 months we observe the vestibular eruption of 1.1 and we place a rapid palate expander, four roth brackets on 1.1 1.2 2.1 2.2 and a straight ni-ti wire 0.12. after 5 weeks we change the ni-ti 0.12 wire with a 0.16 ni-ti wire during this period we active the RPE once a week. after that we change the ni-ti steel with a stainless steel wire 0.16, and remove it and the RPE after 3 months. Than we follow up the teeth development and plan a second phase of treatment

with fixed appliance to align upper arch and lower arch.
Results: Early diagnosis of supernumerary teeth permitted a early treatment during 8 months, this treatment let a 1.1 eruption in a better position in relationship with other upper incisors and a better maxillary arch.
Conclusion: Dental anomalies are more frequently seen in patients with Cleft lip and palate compared with the general population, but the presence of supernumerary teeth is uncommon. Thus the presence of atypical supernumerary teeth could help to diagnose genetic disorders and in all systemic genetic disease oral condition should always be vaulted. Early diagnosis and interceptive treatment should be the gold standard of these conditions.

Early childhood caries - important aspects related to health improvement: a systematic review

Martina Sonia Bua (DDS)[1], Maria Teresa De Grazia (DDS)[1], Gianluca Meazza[2].

[1]Department of Biomedical, Surgical and Dental Sciences, University of Milan
[2]European University of Valencia

Aim: The aim of this study is the comprehension of the importance of infancy caries, and improve oral health in children.
Methods: Information of dental care were retrieved from Databases such as PubMed and other hand searches. Under American Academy of Pediatric Dentistry (AAPD), the presence of a single tooth or more teeth caries affected, or missing because of caries, or any primary dental surface in any 5 years old or younger child, is considered early childhood caries (ECC). The definition of serious early childhood caries is due to a clinical sign of caries on a smooth surface in a less than 3 aged child, and in children aged from 3 to 5 years old. ECC is a multifactorial and progressive disease seriously influenced by life behavior and attitude about oral hygiene. It's a chronic condition in these affected children so that it can bring them into oral health complications such as pain, abscess, loss of appetite, inability to eat, and above all an important financial burden for the family. Caries prevalence in early infancy all over the world is really variable, going from 3% to 85% in a strong correlation with economic status and social conditions (ethnias, education and so on...). Some countries such as Scotland, show a decreasement of prevalence of caries due to prevention programs applied. Nevertheless, dental caries in developing countries has become a serious public health problem, and its diffusion is going to be higher and higher because of easy availability of refined sugar; in addiction to that there' a lack of public health programs to eradicate the problem.
It has been demonstrated that the prevalence of caries in primary posterior teeth is higher in children affected by caries involving anterior maxillary teeth.
These children should be accurately evaluated during odontoiatric examination, and considered as indicators/guide to high risk of caries in posterior teeth, and receive more prevention and therapeutical acts.
Results: ECC and S-ECC are known to be a significant public health problem in developing countries.
There's a lack of community programs to eradicate the disease.
Other factors can influence caries early development such as oral behavior, child general health, family financial status, parents' educational level and knowledge about oral health.
Conclusion: At the time being the main aim is to improve oral health status in pre-scholar aged children, helping with educational programs, promoting good behavior related to oral health using media available: tv, educational plans, books, magazines. Even if different programs promoting oral health started, wrong concepts about the importance of primary dentition, and misunderstanding about risk factors such as pain, abscess, and serious local and systemic infections are still present in the common thought.
Different measures of improving oral health still can be considered as necessary because oral caries in early infancy is a multifactorial disease.

Oral manifestations of coeliac disease (cd) in paediatric patients

Cantatore D., Girotto L. , Deldot L., Mazzoleni S., Gracco A., Ludovichetti F.

[1]Padua University - Faculty of Medicine – Post Graduate School of "Paediatric Dentistry"
[2]Azienda Sanitaria per i Servizi Sanitari di Trento (APSS-TN) – Oral Surgery and Odontology Unit

IntroductioN: Coeliac disease is an immune-mediated chronic enteropathy, affecting genetically susceptible paediatric subjects following exposure to dietary gluten (a proline/glutamine rich storage protein to be found in wheat, barley and rye). The immune response is triggered by a gluten protein-fraction named gliadin. Children-CD is usually diagnosed at 6-18 months, after the weaning and the introduction of gluten in the diet. It shows typical histological jejunal lesions leading to villous atrophy, crypt hyperplasia and lymphocyte infiltration, thus resulting in malabsorption of relevant nutrients in the small intestine: chronic diarrhea,

slowing of growth, lack of appetite, abdominal pain, muscular hypotonia, irritability and weight loss are the main signs and symptoms.
Methods: CD individuals may present gastrointestinal symptoms (enteropathy, leading to malabsorption syndrome) or a cluster of extraintestinal manifestations often involving the oral cavity soft and hard tissues. Oral ulcers (Recurrent Aftous Stomatitis – RAS), Geographic Tongue and Atrophic Glossitis, qualitative/quantitative changes in saliva and disturbances in the dental germ developement are the most common intraoral signs than shouldn't be overlooked. The 15 ys clinical experience of the Oral Surgery/Odontology Unit of the APSS-TN represents the basis of this paper
Results: RAS is characterized by recurrent oral ulcers, initially appearing in childhood or adolescence. It usually manifests itself in the non-keratinized oral mucosa. A likely correlation between CD and RAS is supported by the improvement of the lesions in patients undergoing gluten-free-diet and by their recurrence after the reintroduction of gluten. The tongue is often involved, with increasing atrophy of filiform papillae. Geographic Tongue represents the first stage, soon leading to Atrophic Glossitis with oral tingling sensations, numbness and even burning sensation and severe pain. Like RAS, these lesions show radical improvement after the restart of a gluten-free-diet. Changes in salivary composition and a low salivary flow rate are often described in paediatric CD (in connection with the active phase of the disease and tending to fade after transition to a gluten-free diet) and may induce oral dryness and glossodynia, easing the onset of dysgeusia and difficulties in chewing/swallowing. Highly specific oral hard-tissue lesions may also occur in paediatric CD, mainly involving permanent teeth. Dental defects may vary from hardly perceptible alterations (limited discolorations/opacities) up to severe impairment of dental crowns (pits, grooves, complete loss of enamel), being usually characterized by a symmetric and chronological distribution that can be detected in all four sections of the dentition. Dental enamel defects may be connected with both hypomineralization (qualitative disturbances) and hypoplasia (functional disturbances) and their etiology hasn't been clarified yet, with theories varying from malabsorption-induced hypocalcemia to autoimmune response against ameloblasts or a specific immune response to gluten on a genetic basis. Dental lesions in CD mostly affect incisors and molars (thus accomplishing the features of the MIH-S, i.e. Molar-Incisor-Hypomineralization Syndrome) in connection with the chronological developement of permanent dentition and the related early start of crown-mineralization. Canine and premolar mineralization usually occurs after CD diagnosis, with gluten already removed from diet.
Conclusions: Taking into account that the first CD-symptom in children is often an oral manifestation (dental enamel defects and recurrent aphthous ulcers), rather than the typical gastrointestinal symptoms, the dentist may play a relevant role in the early diagnosis of the disease. A correct approach to the dental-oral manifestations of CD might lead to detect the otherwise still undiagnosed patients, improving their quality of life.

Assessment of age in forced migrant populations: an accurate and friendly-to-use method

Coccia Erminia[1], Rappelli Giorgio[1], Skrami Edlira[2], Aquilanti Luca[1], Faragalli Andrea[2], Cazzanti Federico[1*], Ferrante Luigi[2]

[1] Department of Clinical Specialistic and Dental Sciences, Polytechnic University of Marche, Ancona, Italy;
[2] Department of Biomedical Sciences and Public Health, Polytechnic University of Marche, Ancona, Italy.

Aim: Age estimation is one of the challenges of forensic medicine. Nowadays, it has a considerable importance in the immigration context, and particularly for those undocumented individuals seeking asylum in Europe. Age assessment is important as it is critical for children to be protected appropriately, receiving the social and health interventions they need.
Several methods have been devised to estimate age, using physical examination, skeletal or dental ages as maturity indicators. The methods perform well when used for the evaluation of growth process, but it is not reliable when it is used to estimate the age in young individuals.
Tooth maturation provides a valuable indicator of dental age and serves as a better index, particularly in children, as compared to other maturity indicators when used to estimate the age. Ferrante et al. modelled the relationship between age and dental development, measured by the open apices, using a new full Bayesian calibration method.
The aims of the study were to calibrate the model of age estimation proposed by Ferrante et al. and to assess if the subjects belonging to the populations that characterize the forced migration flows were aged equal or more than 18 years old using this test.
Methods: This is an observational cross-sectional study. The cohort is constituted by forced migrants arrived in Marche Region and resident in the regional reception centers for immigrants. After signing an informed consent, participants underwent a dental examination at Dental Clinic of Polytechnic University of Marche and clinical data were collected. The subjects having the third left or right permanent mandibular molar underwent also an orthopantomography (OPT). OPTs were processed by a computer-aided drafting program

and, for each tooth image, the distance between the inner surfaces of the apices and the entire length of the tooth and their ratio were evaluated. Subsequently, the ratios were added together obtaining a single dental maturity measure.
Results: 69 forced migrants with a mean age of 21.3 years were enrolled in this study. Out of 69, 68 were male. The subjects came from different countries: 44.9 % came from Africa, 24.6 % came from Asia, 17.3 % from Europe and 13.2 % were unknown.
92% of the subjects had insufficient oral hygiene. The mean of lost teeth was 1.8. The mean of decayed teeth was 3.52. We had performed tooth maturation analysis on 61 subjects. 29 of them resulted to be aged over 18 years old, 32 under 18 years old. The test reached a sensibility of 100% in discriminating subjects aged equal or more than 18 years old and a specificity of 72%.
Conclusion: The method is simple to use and can support authorities in the case of undocumented migrants. In particular, it could help in identifying subjects with age equal or more than 18 years old.

Oral findings in prader-willi syndrome: a case-report.

C. Cecere[1], F. Villamaina Scorrano[1], C. Gentile[1], B. Prisco[1], R. Femiano[1], R. De Luca[1], C. Mazza, G. Minervini[1]

[1]Multidisciplinary Department of Medical-Surgical and Dental Specialties, University of Campania "Luigi Vanvitelli", Naples, Italy.

Aim: Prader-Willi syndrome is a complex genetic disease caused by lack of expression of paternally inherited genes on chromosome 15q11-q13, with a prevalence of 1/25000. It is characterized by hypothalamic-pituitary anomalies associated with severe hypotonia (in the neonatal period and in the first two years of life) and the onset of hyperphagia, pathological obesity during childhood, learning difficulties, behavioral disorders or severe psychiatric problems. The aim of this study was to assess the oral manifestations in patient with Prader-Willi syndrome and to evaluate the response to therapies.
Methods: In this case-report we present the oral conditions of a 11 years-old girl affectd by Prader-Willi syndrome in pharmacological therapy with topiramate (antiepileptic drug used in anorectic therapy). Clinical examination revealed onychophagia, multiple diastemas, plaque and tartar due to poor oral hygiene, gingivitis, multiple caries and brown spots. The case was particularly complex beacuse of behavioral disturbances (characteristic of the syndromic spectrum) and odontophobia following previous negative dental experiences. The first steps, therefore, were dedicated to the psychological approach to get the patient's collaboration. In this way it was possible to treat the patient without the use of sedative techniques. Scaling has been performed, followed by conservative treatment of carious dental elements. Subsequently, fluoroprophylaxis sessions were performed through the use of fluoride gels with trays in order to prevent the development of new caries. Salivary secretion from both a quantitative and qualitative point of view was assessed, evaluating flow rate and pH. A follow-up has been planned every three months.
Results: At the follow-up the presence of plaque and caries on the erupting teeth (with consequent gingivitis) was found due to both poor oral hygiene and bad eating habits. Salivary flow rate was so low that it did not allow the pH evaluation. Moreover, despite the eruption of the second molars, the closure of diastemes did not occur probably due to the anterior lingual pressure.
Conclusions: Given the trend to carioreceptivity caused by the low compliance of the patient to daily oral care, the hyperphagia (which causes the change of the ph towards acidity) and the low salivary flow, early interventions are necessary as well as regular follow-up to monitor oral hygiene and to prevent dental caries and periodontal disease in patients with Prader-Willi syndrome. In fact, short-term follow-up allows to intercept carious problems or prevent them through periodic sessions of professional hygiene and fluoroprophylaxis, supported by a careful motivation to correct oral hygiene and diet.

The application of ozone in cavities of primary teeth: a review

Bozbay B., Cingari P., Raciti N., Rendina F.

"Sapienza" University of Rome Department of Oral and Maxillo-Facial Sciences UOC Pediatric Dentistry
Pediatric Dentistry specialization school
Dir: Prof.ssa A. Polimeni
II level Master degree in Dentistry in evolutionary ages
Dir: Prof. M. Bossù

Aim: Dental caries is the most prevalent oral diseases worldwide. Over the recent years, the ozone therapy is becoming more popular as an alternative minimal invasive way for managing dental caries. It is highly recommended for children and patients who suffer from Dental Phobia or Dental Fear or Anxiety, due to being a painless alternative to conventional treatment for tooth decay .Ozone therapy is a medical grade ozone, a highly reactive form of pure oxygen. Ozone or trioxygen, is an inorganic molecule with the chemical formula O3: is a natural gas negatively charged, with the 3 oxygen atoms bonded

together. Therapeutic use of ozone in medicine has been well known due to its microbiological effects: strong oxidation for eliminating bacteria, fungus and viruses.
Controlled ozone application has been found to be extremely safe and the patient's compliance has been excellent. No adverse effects have been noted: nobody is allergic to ozone and bacteria were not observed as resistant to ozone. The aim of this review is evaluate effectiveness and application of ozone for managing dental caries in paediatric dentistry.
Method: The search was conducted using the following key words: "ozone" and "ozone therapy" alone or in combination with "dentistry", "primary teeth", "cavities", "carious lesions", and "paediatric dentistry".
The following electronic databases were used to search the literature from 2004 to 2019 and sorted by best match: Biomedical Journal Literature of the National Library of Medicine (MEDLINE/PubMed) and Google. Manual library search and review of bibliographies of published literature were also included.
Results: Antimicrobial effectiveness of ozone therapy: In restorative dental researches, ozone is gently applied as a gas to the affected tooth through hand tools with a silicon cup and it is exposed for a minimum period of 10 seconds. In few seconds, ozone was capable of reducing the numbers of Streptococcus mutans and Streptococcus sobrinus in vitro due to the antimicrobial effectiveness of ozone, without side effects. Application of ozone in cavities of primary teeth: Drilling isn't necessary as a preventive measure in ozone therapy, unless the cavity has no option to let the gas diffuse into decay. Ozone is most effective when it has the ability to penetrate shallow lesions which are about 1mm deep maximum. In the present case, drilling isn't necessary. To manage cavitated lesions deeper than 1 mm, the outer caries must be removed first, by leaving about 1mm of caries over the dental tissue, and ozone treatment followed by routine restoration is indicated. The application of ozone in cavities of primary teeth are resumed as follow:

- Treatment of Non cavitated and Cavited carious lesions
- Management of Pit and Fissure caries
- Management of root caries
- Prevention and treatment of Baby Bottle Tooth Decay (or Early Childhood Caries).

Conclusion: Ozone therapy proved to be an excellent alternative, with the fundamental advantage of saving dental tissue and preventing the invasion of the pulp chamber. The integrity of the tooth is more conserved and there is a strong evidence for saving time and money. There are some evidence which suggest that ozone therapy can be useful in preventive restorative dentistry. More of randomised and controlled clinical studies need to be conducted to guide with this new treatment method and promising medical agent on paediatric dentistry.

Application of third molar maturity index (i3m) for assessing adult age of 18 years in a southern italian population sample University of messina

Ciraolo L., Rustico L., Gatto E., Spinuzza P., Leonardo P., Bertino R., Cingari P., Nucera R., Portelli M., Militi A.

Dept. of Biomedical Sciences, Dental Sciences and Morpho-functional Imaging Dental School - Pediatric Dentistry

Aim: Age estimation of living or dead individuals has a strategic importance in Medicine, Anthropology and Forensic Science, in the context of mass disasters and in civil or criminal matters. Teeth have an important role because they are more resistant than bones in extreme environmental conditions and in particular the third molars (3rdM) are useful for determining whether an individual has reached the legal age of 18 years because they are still in development from the age of 14.
Methods: In this study a sample of 307 panoramic radiographs performed on healthy subjects aged from 13 to 23 was analysed to consider the correlation between the I3M (maturity index of the 3rdM) and age in order to verify the reliability of the cut-off 0.08 indicated by Cameriere et al. (2008) in a sample of Italian subjects living in South Italy. The method developed by Cameriere et al. in 2008 provides an age estimation of the non adult subject, which is based on the relationship between age and the third molar maturity index (I3M). The I3M is obtained through an evaluation of the radiographic aspect of the wisdom tooth and, in particular, by measuring the open apices and the length of the tooth itself. The method was developed in order to identify a cut- off value (I3M=0.08) which could represent a threshold for discriminating between individuals aged 18 or over and those under 18 years.
Results: The analysis of 307 panoramic radiographs resulted in a sensitivity of 89.2% with a confidence interval of 95%, a specificity of 96.5% with a confidence interval of 95% and a positive predictive value of 96.7%.
Conclusion: The method proved itself reliable in estimating adulthood in the population of the Province of Messina but the I3M should not be used as the sole indicator to determine whether a person is younger or older than 18 years because age estimation based on dental methods alone has limitations as the third molars suffer from many variations related to their morphology, their location and their development.

We recommend a combination of several methods that are available to increase accuracy of age estimation, depending on the different legal requirements in civil or criminal cases.

The aesthetic rehabilitation of the anterior deciduous teeth

F. Cosimi, G. Rosati, F. Fabiano, C. Pala, M. Oricchio, M. Aprile, E. Medici, A. Mascia, C. Lupo

Specialization School in Pediatric Dentistry, University of Cagliari

Aim: Caries has always been considered the most widespread pathology in the world. This phenomenon is present especially in children, due to poor eating habits and poor oral hygiene, and is called Early Chilhood Caries. Dental decay in children's teeth is a significant public health problem, affecting 60% to 90% of school children in industrialized countries. Maintenance of the primary dentition in a no pathological healthy condition is important for the overall well being of the child. Treatment of the severely destructed teeth poses a challenge for the pediatric dentist. The gingival tissue of ECC patients tends to be inflamed, leading to hemorrhage and compromising composite restauration. Primary incisor anatomy, including small overall size, thinness of enamel and surface proximity to the relatively large dental pulp, make intracoronal restauration difficult. Another aspect that makes the rehabilitation of the anterior deciduous teeth complicated is the increase in the aesthetic demand of the parents. Many options exist to repair carious teeth in pediatric patients, from stainless steel crowns to its various modifications to other esthetic crowns like strip crowns and zirconia crowns, which are rising in their popularity. It is important to stress that a variety of esthetic options are available for maxillary primary teeth but a few are available for mandibular primary teeth owing to its small size and closeness to the pulp chamber.
Methods: For the bibliographic review, a sample of 20 articles was chosen among the journals with the greatest scientific impact, also using the Pubmed portal. We decided to start our research from 2009, then selecting the articles of the last 10 years, containing the most current materials and clinical protocols. We have not made any selection of items by geographic area and we have taken all those who included children up to 6 years of age, when deciduous incisors are being exchanged. No article has been discarded since we do not yet have a substantial literature on the subject.
Results: From the bibliographical review performed it was possible to emphasize that in recent years attention has increased to the dental aesthetics of the small patient. The choice of the material for the crowns in pediatric age is therefore based on both long-term durability and function as well as on the aesthetic maintenance of the smile. In recent years, in order to obtain these results, zirconia crowns have been introduced. This material allows to have a high aesthetics combined with a high resistance.
Conclusion: Resin composite strip crowns have lower success rate and higher gingival inflammation. Pre-veneered SSCs are retentive, but can have facial veneer fracture. Pre-fabricated zirconia crowns are retentive and gingival friendly but cause non-significant abrasion of opposing teeth. We can also say that the beauty of esthetic crown will depend on the clinician's knowledge, child's behavior and retention of the crown and proper maintenance of oral hygiene.

Oral health-related quality of life in children using the child perception questionnaire cpq11-14.

Giorgia Costa[1], Alberto De Stefani[2], Giovanni Bruno[2], Giuliano Irlandese[1], Martina Barone[1], Antonio Gracco[3], Edoardo Stellini[3]

[1]Undergraduate student, Department of Neuroscience, School of Dentistry, University of Padua, Italy
[2]DDS, Department of Neuroscience, School of Dentistry, University of Padua, Italy
[3]Professor, Department of Neuroscience, School of Dentistry, University of Padua, Italy

Aim: The Child Perceptions Questionnaire 11-14 (CPQ11-14) is the most common and effective indicator of paediatric oral health-related quality of life. It is the most frequently used, followed by the Child Oral Impacts on Daily Performances (C-OIDP) and the Child Oral Health Impact Profile (COHIP). It is associated with different parameters such as orthodontics, dental anomalies, temporo-mandibular disorders (TMD), periodontology, restorative dentistry (dental caries, fluorosis, tooth erosion, enamel defects), oral surgery and trauma, oncology and systemic diseases, psychology and socio - economic status. The aim of this work was to conduct the first narrative review on CPQ 11-14 to verify if it can be considered a valid instrument for assessing the impact of oral health on the quality of life of adolescents for the paediatric population aged between 11 and 14 years old.
Authors also aimed to identify which oral conditions mainly affect oral health-related quality of life in paediatric population worldwide and to highlight criticalities found in the studies of other authors.
Methods: A literature research from Pubmed Medline database was adopted using a systematic search strategy in order to identify the eligible studies

among the published articles related to CPQ 11-14 using keyword search strategy. From 170 initial articles, published from 2002 to 2018, 42 were discarded while a total of 128 articles were included for the full text reading, based on specific inclusion/exclusion criteria chosen by the authors. Found evidences were subdivided in different categories, such as orthodontics, periodontology, conservative, traumatology and psychology.
Results: Conditions that mainly interest the oral health-related quality of life of children are untreated dental caries, dental trauma, increased dental protrusion, wearing orthodontic appliances, and severe periodontal disease. Moreover, from a psychological point of view, OHRQoL increases with the age because patients become more conscious about the importance of their oral health.
Conclusion: CPQ 11-14 seems to be a solid and valid indicator to measure oral health-related quality of life, because it has been widely tested and validated in several states including developed, developing and underdeveloped countries.

Impaction of 6.3: Early diagnosis and orthodontic treatment

G. D'Angeli, A. Bucca, F. Calcagnile, G.L. Sfasciotti

"Sapienza" University of Rome, Italy
Department of Oral and Maxillo-Facial Sciences
UOC Pediatric Dentistry Pediatric Dentistry specialization school

Introduction: The odontomas are classified as odontogenic neoplasms of epithelial-mesenchymal derivation. The different tissues of the odontomas are completely differentiated. In relation to their degree of organization the odontomas are distinguished in compounds and complexes. In their compound form we observe the presence of rudimentary denticles, different for morphology and size; in the complex form the tissues take on an amorphous appearance and without structural organization.
The odontomas make up about 22% of the maxillary odontogenic tumours; the highest incidence is observed in the maxillae with greater presence in the premaxilla region, with a percentage of 39.9%. The most frequent manifestations are observed in the second decade of life.
The finding of this lesion in general is completely accidental because it is almost always asymptomatic. This finding is often done through radiographic examination and is associated with the inclusion of the dental elements of the permanent series, more rarely of the deciduous, which constitutes a mechanical hindrance to the physiological eruption.
Aim: The aim of our research is to describe the therapeutic- diagnostic iter in a case of compound odontoma associated to impaction of a deciduous dental element.
Methods: The 7 years old patient appeared for the first time to the UOC Pediatric Dentistry. From the intraoral examination the absence of the deciduous element 6.3 in dentition raised some curiosity, therefore a first level X-ray examination was requested. The orthopantomography highlighted the presence of a non-homogeneous radiopacity surrounded by a radiotransparent halo compatible with diagnostic hypothesis of a compound odontoma in region 2.1 - 2.3 which is the cause of the inclusion of 6.3. For the surgical management a second exam level, tc dentalscan, was requested, in order to evaluate the extension of the odontoma and the continuity/ contiguity relationship with the 6.3 and the other elements of the permanent and deciduous series. Once examined the patient from the orthodontic side, we decided to excise the odontoma and to extract the element 6.3. Once the healing took place, an orthodontic palatal expander associated with a Delaire mask was applied for the correction of the skeletal third class and to facilitate the eruption of 2.3.
Results: After one year a complete healing was observed in the region affected by the lesion with perfect remineralization of the bone tissue. The patient reaction to the orthodontic therapy was positive and we decided to suspend the use of extra-oral traction. We wait eruption of element 2.3 from the upper teeth.
Conclusions: We considered it appropriate to report this clinical case because rarely the odontomas create a mechanical obstacle to the eruption of the dental elements of the deciduous series. The etiopathogenesis of the odontoma is attributed to local traumas, inflammatory processes, inherited pathologies, genetic mutations of the factors responsible for controlling the development of odontogenic components. In this case one could also suppose a hyperactivity of the dental lamina already present in the pre-eruptive phase of the deciduous dentition could be the cause.

Influence of lifestyle and eating habits on DMFT in obese pediatric patients

D. De Angelis, R. Femiano, M. Contaldo, A. di Santi, M. Guida, R. De Luca, F. Loffredo, G. Minervini

Multidisciplinary Department of Medical-Surgical and Dental Specialties, University of Campania "Luigi Vanvitelli", Naples, Italy

Aim: To evaluate how lifestyle and eating habits can affect DMFT in paediatric obese subjects.
Methods: Paediatric subjects (5-14 years age range) affected by obesity related to eating habits with a BMI> 85th percentile were considered. Exclusion

criteria were: subjects with BMI <85th percentile, with previous systemic diseases and/or obesity of non-alimentary origin. To join the study, the parents of all the subjects were preliminarily and adequately informed about the purposes and methods of the study, thus including in this research only those who gave written and informed consent, as well as the consent of the minor himself. The execution of this study has been preliminarily approved by the ethics committee of the structure where the research was conducted. For each case, the parents completed a questionnaire of five questions (score 0 or 1) on lifestyle, eating habits and oral hygiene, while each child underwent a non-invasive dental visit, for the clinical evaluation of the oral hygiene (presence and severity of gingivitis; and CPI index under 15) and carious experience, evaluated by the DMFT index. Based on the DMFT values, patients will be included in the study group (DMFT> 0) or in the control group (caries free, DMFT = 0). For each patient, the questionnaire score was correlated with clinical data for statistical evaluations.

Results: Totally, 171 patients were analysed: 86 in study group (DMFT> 0) and 85 in the control group (caries free, DMFT = 0). In relation to the oral hygiene conditions, comparing the clinical data obtained in the two groups, the incidence and the severity of gingivitis are superimposable in the two groups, but with a tendency of the control group to have a higher prevalence of tartar (DMFT = 0 14% DMFT> 0 7%) and of the test group to present, instead, a higher prevalence of plaque (DMFT = 0 59% DMFT> 0 73%). In relation to the answers to the questionnaire, almost all the obese children enrolled take sweet food 2-4 times a day (85% of the children in the control group and 92% of the study group) and part of them brushes the teeth less than 2 times per day (26% of the control group and 55% of the study group). Also the brushing duration tends to be less than 3 minutes in most of the subjects (in 62% of the control group and in 87% of the study group), with a lower brushing bleeding frequency in the caries-free compared to the subjects with DMFT> 0 (26% and 55% respectively). Finally, the consumption of fruit and vegetable snacks was more frequent in the caries-free group (85% of children) than in the group with DMFT> 0 (64%).
With the exception of the first, all the answers to the questionnaire questions, compared to the patients' clinical examination, are statistically significant (p value <0.001).

Conclusion: The data emerged in this study shows that, although it is shown that obesity is a risk factor for the development of caries lesions, a healthy lifestyle associated with a healthy diet and proper oral hygiene can help children patients to avoid the occurrence of the disease, maintaining the aesthetic and functional integrity of the oral cavity. The role of paediatric dentist is important not only on oral hygiene education but also to make both parents and patients aware of a healthy lifestyle.

Treatment of pathological frenulums: diagnosis and therapies compared in pediatric dentistry

De Luca R., Prisco B., Donnarumma M.C., Villamaina Scorrano F., Romano A., Esposito A., Porzio C., Minervini G.

University of Campania "Luigi Vanvitelli"

Aim: the target of this work is to identify clinical cases that may have an indication for the intervention of labial frenectomy that justifies the early repositioning of the frenulum in pediatric age. Specifically, the aim is to compare the pre, intra and postoperative clinical parameters of the superior medial labial frenectomy performed by conventional surgery and the use of specific laser systems (CO2 laser, Erbium laser, Nd: YAG laser).

Methods: the research in literature was based on the selection of scientific articles using PubMed as search engine and the following keywords: frenectomy, laser, clinical parameters, pediatric dentistry. The clinical parameters evaluated were: insertion of the frenulum, bleeding, surgical time, suture techniques, anxiety and preoperative fear, postoperative disconfort / functional limitations. Many of the frenulums were classified by papillary or transpapillary insertion. In particular, the anatomic classification according to Mirko et al., which considered four types of insertion of the superior medial labial frenulum, was modified by Olivi et al. The latter includes also the abnormal frenulum by shape or structure (V Class) due to its potential pathogenicity.

Results: surgical techniques based on the use of laser offer considerable advantages compared to traditional methods such as: reduction of the amount of local anesthetic required, optimization of intra-operative comfort and post-operative comfort of the patient without the need for analgesics, simplicity of learning and use, haemostatic properties with relative non-use of sutures, micro-selective efficacy on the target tissue, decontaminating action and biostimulant of the surgical site. Considering the hypertrophic, bifid or fan-shaped or fibrotic frenum (V class), the presence of water in the fundamental substance of the extracellular matrix (structural component of the frenulum) makes Erbium and CO2 lasers effective and useful for their affinity with water. Differently, the presence of hemoglobin and of capillaries makes the blue and green visible lasers useful.

Conclusions: a good knowledge of the basic physics concerning the interaction between laser and tissues needs to be deepened in order to operate on different

tissues in compliance with all the advantages that the use of this technology offers. Laser therapy is increasingly spreading as a valid and effective tool also in child dentistry. The correct psychological approach to the patient, as always, contributes decisively to the full success of the therapy.

Surgical exposure and orthodontic traction of impacted permanent maxillary central and lateral incisors: a case report

F. Desiderio, T. Cantile, M. Quaraniello, C. Papa, C. Salerno, A. Ingenito, G.F. Ferrazzano

Department of Neuroscience, Reproductive and Oral Sciences, School of Pediatric Dentistry, University of Naples, Federico II, Naples, Italy

Aim: This case report describes the treatment of a 9.5-year-old patient with permanent maxillary central and lateral incisors impaction. The diagnosis was reached through clinical evaluation and radiography. This is a rare condition associated with multifactorial etiology determined by general and local factors. Causes of dental inclusion can be: dental germ position far from the eruption site; wrong direction of the dental germ; permanence of deciduous tooth; absence of space; presence of neo-formations that impede the eruption; volumetric disproportion of the tooth; and, finally, general causes like hereditary factors, endocrine factors, developmental and nutrition disorders.
Methods: The resolution of this case consisted in the combination of two different treatments: surgical and orthodontic. The therapeutic program was divided into three phases: two orthodontic ones and a surgical one. During the first (orthodontic) phase, a trans-palatal bar was used like an anchorage for the traction of the impacted teeth and to obtain the rotation of the molars. To increase the anchorage, passive steel sectional wires were used on the other deciduous elements of the dental arch. The second (surgical) phase was important for the exposure and the engagement of the impacted teeth crown. During this step, a crestal incision was performed from 5.3 to 6.3 with two release cuts. Thereafter, the four incisors were adequately exposed to apply a direct orthodontic button on each tooth, each one of which was connected, by chains, to an orthodontic round steel arch acting as a guide for the traction of the impacted teeth. Finally, the flap was repositioned covering the teeth, the attachments, the chains and then sutured. The third (orthodontic) phase consisted in the traction of the impacted teeth in order to position them correctly. At a later time, the extrusion and vestibule inclination of the incisors was obtained by means of an activated utility arch-wire in titanium molybdenum alloy, which was tied to the buttons in a punctiform way in order to act as lever. Once the extrusion was done, the crowns of the incisors were bonded and later, steel wires were used to align and level the teeth.
Results: During the first seven months after surgery, the incisors were pulled down to reach their physiological position. Subsequently, the four incisors were aligned thanks to orthodontic treatment. Finally, the treatment was declared completed fifteen months after surgery.
Conclusion: The multidisciplinary approach, surgical and orthodontic, allowed functional and aesthetic oral rehabilitation, thus helping the patient to avoid the psychological impact of a missing anterior tooth.

Diagnosis and treatment of dens invaginatus in a 8-year-old child: a case report

A. di Santi, R. Santoro, D. De Angelis, C. Gentile, L. Laino, C. Cecere, C. Porzio, G. Minervini

Multidisciplinary Department of Medical-Surgical and Dental Specialties, University of Campania "Luigi Vanvitelli", Naples, Italy

Aim: Dens invaginatus also known as "dens in dente" is a dental malformation that affects 0.3- 10% of the population. It consists in the intrusion of an enamel-coated cavity into the crown or root of a tooth before calcification has occurred. In this report we will describe the diagnosis, management and treatment of a permanent maxillary lateral incisor (12), affected by type III invagination according to Oehlers, in a young 8-year-old patient. The patient comes to our observation reporting painful recurrent abscess episodes in the right hemimascellar, appeared after the exchange of 52, regressed after treatment with amoxicillin.
Methods: The orthopantomography (OPT) showed the presence of a dens invaginatus in site 12. Owing to the difficulty in treating these anomalies and to better investigate the position and the relationships with the teeth and surrounding structures, a low-dose Cone Beam Computed Tomography (CBCT) was done. This confirmed the anomalous conformation of the endodontic system and the malformation of the crown which made the element incompatible with the treatment and with its permanence in the arch. Moreover, given its size and position, it represented an obstacle to the correct and physiological eruption of the permanent canine (13). For these reasons it was decided to proceed with the extraction of the anomalous element and organize an orthodontic treatment plan. The phases

of the surgical intervention and of the healing will be described.
Results: This case highlights the importance of a correct diagnostic classification in cases of dens invaginatus in order to better perform the choice of an appropriate therapeutic plan. The option of treating the tooth endodontically and then recovering it in the arch should always be the first choice when possible. In the same way it is important to establish early the impossibility of recovery of the tooth due to external morphological causes to avoid setbacks and overtreatment especially in the young patient.
Conclusion: It is essential for this diagnosis a correct medical history and specific radiographic examinations such as Opt, RX intraoral and, if necessary a CBCT, especially in cases like ours where the element is not yet erupted. In case of extraction, a long-term treatment plan must be provided in order to restore a correct appearance and function following the lack of an element of the permanent series.

Thyroid disease and oral manifestation

M.C. Donnarumma[1], F. Villamaina Scorrano[1], C. Cecere[1], A. Esposito[1], A. Romano[1], M. Contaldo[1], G. Minervini[1]

[1]Multidisciplinary Department of Medical-Surgical and Dental Specialties, University of Campania "Luigi Vanvitelli", Naples, Italy.

Aim: The present systematic review describes the oral findings in patients with hypothyroidism and hyperthyroidism from childhood to adult life. The importance of the dentist in the early identification of these pathologies and the management of the patient with thyroid problems.
Methods: Studies on hyperthyroidism and hypothyroidism reporting dental features were eligible. A systematic literature search was conducted using three bibliographic databases (Scopus, Pubmed and Embase) and was limited to studies written in English. A total of 30 scientific articles were examined. Meta-analyses and letters were excluded.
Results: The thyroid is the major regulator of metabolism and affects all of the bodily functions. The oral cavity is adversely affected by either an excess or deficiency of these hormones. Hypothyroidism is defined by a decrease in thyroid hormone production and thyroid gland function. Up to 5% of the female population have alterations in the thyroid function. In some of these cases, hypothyroidism develops and others hyperthyroidism results. Hypothyroidism occurs in about 1% to 2% of the general population. It is 5 to 6 times more common than hyperthyroidism. It is caused by chronic autoimmune thyroiditis (Hashimoto's disease), radioactive iodine, surgery and pharmacological agents such as lithium and amiodarone. However, some cases appear with no identifiable cause as in our case. Babies who are born with underactive thyroid function have a disorder known as congenital hypothyroidism. Congenital hypothyroidism is characterized by dwarfism, overweight, a broad, flat nose, wide set eyes, thick lips, a large, protruding tongue, poor muscle tone, pale skin, stubby hands, retarded bone age, delayed eruption of teeth, malocclusions, a hoarse cry, an umbilical hernia and mental retardation. The most frequently reported findings in patients with Hypothyroidism enamel hypoplasia, micrognathia, openbite,macroglossia, dysgeusia, delayed eruption, poor periodontal health, altered tooth morphology and delayed wound healing. Childhood hypothyroidism known as cretinisim is characterized by thick lips, large protruding tongue (macroglossia), malocclusion and delayed eruption of teeth. The long-term effects of severe hypothyroidism on craniofacial growth and dental development have also included impaction of the mandibular second molars. This seems to be caused by a dissociation of ramus growth and failure of normal resorption of the internal aspect of the ramus, resulting in insufficient space for proper eruption of these teeth. Hyperthyroidism is a condition caused by unregulated production of thyroid hormones. The oral manifestations of thyrotoxicosis, includes increased susceptibility to caries, periodontal disease, enlargement of extraglandular thyroid tissue (mainly in the lateral posterior tongue), maxillary or mandibular osteoporosis, accelerated dental eruption and burning mouth syndrome. Burning mouth syndrome, a condition that causes a burning pain in the mouth, and Sjogren's syndrome, a condition that causes dry mouth, are more common in people with thyroid disease.
Conclusions: Thyroid dysfunction (both hypothyroidism and hyperthyroidism) has impact on the oral health status. Thyroid hormoned are related to the developement and dental eruption processis. Thyroid function is involved in the maturation of teeth from birth to childhood. A lower availability of these hormones during pregnancy and early childhood can lead to a delay in the child's dental developement. Children with thyroid disorders showed high prevalence of dental caries and periodontal disease compared to the control group. The pediatric dentist plays a fundamental role in the identification of oral signs and symptoms of unknown thyroid disease and in guiding these patients to a specialist visit.

Impact of obesity in children with osas

R. Femiano[1], C. Caliendo[1], A. di Santi[1], G.R. Umano[1], L. Perillo[1], G. Minervini[1]

[1]Multidisciplinary Department of Medical-Surgical and Dental Specialities, University of Campania "Luigi Vanvitelli", Naples, Italy

Aim: Obesity, is one of the major risk factors for OSAS in children; it is associated with an increase in both the prevalence and severity of OSAS. The purpose of the study is to investigate how obesity in children can influence the severity of obstructive sleep apnea syndrome (OSAS).
Methods: 60 children aged between 8 and 14 years old, with a body mass index (BMI) > 5th percentile and a diagnosis of OSAS were included in this study. 36 children had a BMI> 85th percentile (obese) and were considered as a test sample, whereas 24 children with a BMI ranging from 5th to 85th percentile were enrolled as a control group.Subjects with BMI<5th percentile, previous systemic diseases and obesity of non-alimentary have been excluded.The OSAS was assessed with the polysomnography, a nocturnal data recording of the sleep, currently considered the gold standard of OSAS diagnosis.The Apnea/Hypoapnea index (AHI) is the main value of polysomnografy. Patients were classified in three groups according to AHI severity: mild (between 1 and 5 events of apnea/hypopnea per hour of sleep), moderate (between 5 and 10 events of apnea/hypopnea per hour of sleep), and severe (more than 10 events of apnea/hypopnea per hour of sleep).Also the oxygen desaturation index (ODI), the lowest oxygen saturation value recorded during the polysomnography (NADIR) and the arterial oxygen saturation (SaO2), were investigated.The parents were previously and adequately informed about the purposes and methods of the study, by including in the research only those who gave written consent.
Results: The comparison between the two groups showed a higher prevalence of severe OSAS (AHI >10 events) in obese patients (22% versus 12%), whereas the mild OSAS in non obese patients was 25 % compared to 42% in non-obese group.More deeply, in patients with severe OSAS, the polysomnographic parameters showed a higher ODI in obese group (14.4 / h +/- 5.63 versus 3.76 / h +/- 2.28) group and a lower NADIR in the obese group (80.5 +/- 5.90 versus 92.3 +/- 1.691). All three differences were statistically significant with a p value <0.001.Moreover, the SaO2 was not particularly discordant between the two samples.
Conclusions: The obesity can influence the severity of OSAS, with higher values of ODI and lower NADIR parameters. No correlation between obesity between BMI and SaO2 was observed.

Video self-modelling in the dental setting: a pilot study in children with autism spectrum disorders

Rossella Fenili[1], Luciano Zaffarano[1], Guglielmo Campus[2], Maria Grazia Cagetti[1]

[1] Department of Biomedical, Surgical and Dental Sciences, University of Milan, Italy
[2] Department of Surgery, Microsurgery and Medicine Sciences, School of Dentistry, University of Sassari, Italy, Italy

Aim: Subjects with Autism Spectrum Disorder (ASDs) have often difficulties to accept dental therapies. The aim of this randomized controlled pilot study is to evaluate the effect of a dental care protocol based on visual supports (Control group) versus a new protocol based on Video Self Modelling (Test group), to help children with ASDs to undergo oral examinations and treatments.
Material and methods: Ten children (M – F, age range 6-10 years) with a signed consent form, and without any dental symptom, were randomly allocated in two groups. Visual supports explaining the oral examination were e-mailed to parents of all children enrolled before the first appointment. In the control group, children were introduced into a four 15 minutes weekly stages path after the use of visual supports at home illustrating each single stage: an oral examination (Stage 1), a fluoride varnish application (Stage 2), and a professional oral polishing (Stage 3). Stage 4 (sealant application on a superior first permanent molar with cotton roll isolation) was proposed only to children with sound erupted primary molars, so it was excluded from data analysis. In the test group, in addition to the visual supports, a video was realized and edited at each appointment; any critical moment was excluded; a describing voice was added focusing on giving positive reinforcement at each most important step. The video was e-mailed to parents of children in order to show it at home before the following appointment. For each child at each stage, the collaboration grade was recorded using the Frankl Scale, focusing on the ability to keep the mouth open (consecutive seconds) and on the acceptance level towards each dental procedure (fluoride varnish application, oral hygiene section, sealant).
Results: In the test group, three children out of five showed an improvement of the collaboration grade during the three stages and two children maintained the same collaboration grade in all the stages. In the control group only one child showed an improvement of the collaborating grade, two children maintained the same grade, while a child showed a worsening of the collaboration.Regarding Stage 3 (oral hygiene session), while in the control group a 80% of the children showed low collaboration grades (Frankl

scores 3 or 4), in the test group all the participants showed an improvement of collaboration (Frankl scores 1, 2 and 3) and no score 4 was recorded.
Conclusions: The complexity and heterogeneity of ASDs disorders makes it difficult to develop effective strategies for all patients. Despite the low sampling number, the present findings are promising. Video self-modelling technique could be considered an effective and cheap method to improve the collaboration rate of oral treatments in patients that frequently receive dental treatment under pharmacological sedation or general anaesthesia. Further researches with wider samples are needed to improve and refine this strategy for behaviour management of children with disabilities in the dental setting.

Association Between Premature Birth, Dental Maturation And Craniofacial Morphology: Review.

AC. Gentile[1], M. Contaldo[1], R. Femiano[1], D. De Angelis[1], A. Romano[1], B. Prisco[1], M. C. Donnarumma[1], G. Minervini[1]

[1]Multidisciplinary Department of Medical-Surgical and Dental Specialties, University of Campania "Luigi Vanvitelli", Naples, Italy.

Aim: the purpose of the review is to evaluate how the premature birth (defined by the WHO as a gestation period of less than twenty-nine weeks or between twenty-nine and thirty-two weeks and a birth weight of less than 2,500 g.) affects the eruption, the form and the dental structure and craniofacial morphology.
Methods: From the analyzed literature, three articles have had greater importance. All the selected articles was published in English and the electronic database used was PubMed. The keywords were: dental maturation, tooth development, preterm birth, term birth, premature birth, panoramic, radiography, craniofacial morphology, cephalometric analysis. In addition, inclusion criteria were identified; the study sample was divided according to age, gender, ethnicity and on the basis of the time of gestation in: birth extremely preterm (before the twenty-nine weeks), preterm birth (between twenty-nine and thirty-two weeks) and in full-term birth. While children with systemic disorders and children who were not evaluated at the age of nine (age of mixed dentition) were excluded from the sample. Finally, all the radiographic findings were analyzed.
Results: The analysis of the articles shows that premature birth affects dental maturation and craniofacial development. The study conducted by L. Paulsson shows that children born preterm, compared to children born at term, have a reduced dental maturation as seen in sector 31-37; while in children born extremely preterm the dental maturation is more reduced compared to children born preterm and to term. According to E. Ebrahim, the group of extremely preterm born children presents a measurement of the mesio-distal and buccolingual distance in the first molars significantly reduced compared to the group of children born at term. Also the central and lateral incisors are significantly smaller in the mesio-distal sense in babies born extremely preterm in comparison to the children born at term. Finally, according to L. Paulsson, the group of extremely preterm infants has a significantly shorter anterior cranial base compared to full-term children and a lower convexity of the skeletal profile compared to full-term children. Finally, both extremely preterm babies born and preterm babies have a low weight and a lower cranial circumference compared to full-term babies.
Conclusion: In conclusion, preterm birth may be an important factor in the clinical evaluation of the patient and may be indicative in order to identify a time for early orthodontic treatments.

Anhidrotic ectodermal dysplasia (aed) in paediatric patients - early management of dental-oral manifestations

Girotto L.[1], Cantatore D. [1], Deldot L. [1], Stellini E [1]., Menin M. [1], Bergamini D. [1]

[1]Padua University - Faculty of Medicine – Post Graduate School of "Paediatric Dentistry" Azienda Sanitaria per i Servizi Sanitari di Trento (APSS-TN) – Oral Surgery and Odontology Unit

Aim: AED is an X-linked hereditary pathology characterized by ectodermal tissues dysplasia. In addition to the absence/reduction of sweat glands, AED diagnosis at least requires one of the following signs: hair dysplasia, teeth dysplasia, nail dysplasia. With reference to oral cavity, AED usually expresses itself with anodontia or hypodontia (with usually ill-shaped teeth). As a consequence, alveolar ridges do not fully develop and a reduction in height of the lower third of the face is commonly described. An early stop of the splanchnocranium development is often described. Aim of this work is to illustrate a possible management of dental-oral manifestations in AED, from early childhood to adolescence, in order to minimize the impact on the child's psychophysical development.
Methods: The present case report refers to one of the three AED cases up to now followed by the Oral-Surgery and Odontology Unit of APSS-TN. AED diagnosis was stated at the age of 2. Oral manifestations essentially consisted of hypodontia (4 erupted conoid maxillary teeth; 1 erupted conoid tooth and 3 included incisor-like teeth in the mandible) and consequently relevant atrophy of the alveolar ridges. Attention

was paid to parents' motivational involvement as well as to the young patient's relaxation and trust. At the age of 3 the first partial dentures (both added with central expansion-screw) were adopted, in order to support the onset of appropriate chewing-engrams and, through the related muscle activity, to stimulate the widest possible development of the alveolar ridges. Regular screwing (determining the enlargement of both dental arches) followed, thus allowing the growth of the partially edentulous alveolar ridges and maintaining the mechanical stimulation on the periosteum of the ridges themselves. New "expandable" partial dentures were performed at 2-year intervals, up to the age of 9, when the restoration (with composite crowns) of the conoid elements took place. From then on, both upper and lower dentures could be equipped with metal hooks for better retention. At the age of 16, removal of all erupted and included mandibular teeth was performed; at 17, after auxological evaluation revealed a substantial completion of mandibular growth, two implants were inserted in the interforamina-area of the lower jaw, in order to ensure adequate retention to a removable total denture on "Locator"@ attachments.

Results: Early manufacturing of removable "expansible" prostheses and their periodic replacement throughout childhood and adolescence proved to be able 1) to help the child in the developement of correct chewing patterns and therefore to accompany and stimulate the growth of the jaws thanks to the strain exercised on periosteum by muscle insertions; 2) to ensure an early acceptance of the removable prostheses by the pediatric patient, in relation both to their functional (nutrition) and relational (socialization) value; 3) to grant sufficient bone amount as to allow minimally invasive implant-surgery for a decent anchorage of the final removable prosthetic restoration.

Conclusion: In AED patients, early management of the dental-oral manifestations should be aimed at supporting the otherwise weak growth of the alveolar ridge in both upper and lower jaw. Achieving the above mentioned goal would help minimizing the oral surgery usually needed to ensure prosthetic retention. An acceptable esthetic appearance and a satisfactory function will then be within reach thanks to the final implant-anchored removable prostheses, after completion of maxillo-mandibular growth.

Comparison between different marsupialization techniques in the resolution of root cysts in pediatric patients

Guadagno N., Zara F., De Sanctis C. , Milo D., Fioravanti M., Sfasciotti G.L.

Department of Oral and Maxillofacial Sciences, "Sapienza" University of Rome, Italy

Aim: The purpose of this report is to present two cases of cystotomy (or decompression, or marsupialization) in the treatment of jaw cysts in pediatric patients during mixed dentition. Root cysts are the most frequent amongst cysts with prevalence in the jaw (52-68%). Decompression is the conservative treatment for cystic lesions, as opposed to cystectomy, when the cyst involves the buds of permanent dental elements, in order to guarantee their physiological eruption. This surgical technique, alternative to the enucleation of the lesion (cystectomy), foresees two essential moments, namely the creation and maintenance of a communication between the cystic cavity and the oral cavity to allow the spontaneous healing of the lesion.

Methods: At the U.O.C of Pediatric Dentistry, in the Department of "Scienze Odontostomatologiche e Maxillo-facciali" of "Università degli Studi di Rome La Sapienza", two patients came to our observation, both with first-level X-ray examinations. In both cases, the evaluation of these radiological exams led to the evaluation of radiotransparent lesions apical to the elements 7.3, 7.4 and 7.5. These lesions both presented sclerotic margins and dislocation of the permanent dental buds. The examination showed in both children the presence of endodontic treatment on the primary element 7.5.

It was therefore decided to plan an operation to extract the deciduous elements and marsupialize the underlying cystic lesions with a surgical crestal approach, exploiting the post-extraction alveolus to create a communication between the oral cavity and that of the cystic lesion. Both operations were conducted in ambulatory only with local anaesthesia. Postoperative maintenance of the communication between the two cavities was performed with different modalities in the two children (i.e. an obturator for one case and a catheter or drainage tube in the other). The decision being guided by the study of local anatomo-topographical conditions, such as the relationship between the lesion and the alveolar bone crest, the position of the permanent dental buds and the dimensions of the cystic space to be occupied by the device chosen to maintain the patency.

Results: After a marsupialization operation, patients undergo a close clinical and radiographic follow-up until complete healing of the lesion and until the complete eruption of the permanent dental elements affected by the cyst. The timing and methods of follow-up are guided, among other things, by the type of device chosen to preserve communication between the cystic cavity and the oral cavity. This is in fact the crucial factor in order to allow the centripetal bone healing that is typical of this surgical technique, which allows to guide the physiological eruption of the permanent dental elements involved in the lesion.

Conclusions: The root cyst is the most common amongst

jaw cysts, even if it's rare on primary teeth. The treatment modalities range from marsupialization to enucleation of the lesion and are based, for example, on the involvement of the adjacent structures by the lesion. The involvement of permanent dental buds makes for an absolute indication for a marsupialization treatment. We adopted two different devices in order to maintain the patency between the cyst and oral cavity during the healing phase. The choice between the devices is made during the diagnostic and programming of the therapy through a clinical and radiological evaluation.

A 3 months follow up evaluation of a special needs patient going under treatment with liquid ozone: a case report.

Guaragna M.[1], Corvino I., Zumbo G., Corridore D., Bossù M.

" Sapienza" University of Rome,
Department of Oral and Maxillofacial Sciences
UOC Paediatric Dentistry, Specialization in Pediaric Dentistry. Dir. Prof. Antonella Polimeni

Introduction: The efficacy of ozone in treating incipient carious lesions is documented in scientific literature; in paediatric dentistry its use has been limited by the difficulty in controlling the dispersion of the gas in the environment. Its formula as an oil avoids the problem of the dispersion and proves to be useful especially in patients with low compliance index, particularly in special needs patients. The aim of this study is to evaluate the efficacy of this innovative material in managing carious lesions in the phases of primary, secondary and tertiary prevention in special needs patients, taking advantage of the easy application of the product; moreover, to evaluate the grade of improving the attitude of the special needs paediatric patient during the treatment sessions and the progressive control of the carious lesion.
Materials and Methods: The three-year old patient in temporary dentition is affected by Williams syndrome, a rare genetic disease characterized by developmental disturbs associated with cardiopathy, psychomotor retardation, typical dysmorphic facial features and specific cognitive and behavioural profile.
This general clinical picture involves high compliance index and difficulty in treating the patient on the chair.
From the clinical point of view, we can observe a high carious index characterized by an ICDAS of 2 on each buccal surface of all the teeth present, and the absence of the dental element 6.1 due to premature exfoliation caused by recurrent abscesses.
Considering the low collaboration of the patient on one side and the ease of application of the product on the other, it has been decided to use a therapeutic protocol on the dental chair based on the subministration– after cleaning with the brush - of four/six drop of product once a week, softly massaging the involved parts of the teeth for two to three minutes.
The same procedure will be repeated daily by the parents, massaging the involved teeth twice a day. The parents are provided with a leaflet regarding domestic hygiene instructions and application of the product.
Results: After a month of daily applications, the patient results more cooperative, both on the chair and at home; this is dueto the positive association of the application of the material with the decrease of the perception of pain.
In addition to these positive results, the clinical evaluation after three months shows a hardening of the tissues affected by caries and a regression of ICDAS codes from 2 to 1 on most of the dental elements.
Conclusions: Thanks to the ease in the application of the product, significant improvements in the grade of cooperation of the special needs patient were achieved, decreasing the feeling of pain and making the management of the progression of the carious pathology easier to handle.
Furthermore, the resolution of dental problems in the operation room with general anaesthesia is avoided or delayed, allowing a greater growth of the child.

What's new in the treatment and prevention of oral mucositis in oncohemalogypediatric patient?

Andrea Guernelli, Andrea Tesei, Ricarda Berlin, Salvatore Romeo, Anna Maria Biaetti, Maria Grazia Cagetti

Scuola di Specializzazione di Odontoiatria Pediatrica. Dipartimento di Scienze Biomediche Chirurgiche e Odontoiatriche, Università degli Studi di Milano, Italy

Aim: Chemotherapy is the main treatment for nearly all childhoodblood cancers. Oral mucositis (OM) is a common complication of cancer chemotherapy, becoming a huge problem for the child's quality of life and for his/her compliance to the therapy. The "National-Guidelines for the management of oral health in children to be treated with chemo-radio therapy" were published in 2010 by the Minister of Health and reviewed in February 2018. A literature review was performed to analyse the new studies and the new option in the management of OM. The innovation in the purview requires continual updating, being careful to the level of evidence of the published researches.
Methods: using the database PubMed, the following

key-words were searched: "oral, mucositis, pediatric, stomatitis, child, chemotherapy" with AND and OR. The main effective therapies such as "cryotherapy, biophotomodulation, etc" were also used as keywords. Limits of literature search were: human species, age between 0-18 years. Systematic review and clinical trials were the type of papers included. The research identified 89 documents, 25 papers were relevant and met the inclusion criteria.

Results: Different studies used different protocols, focused on the pain and the symptoms. Others used the common WHO staging of OM to explain the success or not of the prevention/ therapy. The findings in some cases are conflicting. Most studies have a small sample size that cannot allow the generalization of the results. Many issues support the hypothesis of a positive effect of many available interventions to prevent the onset of oral mucositis. All studies emphasize the importance of oral hygiene maintenance. Oral care can improve comfort, prevent complications, and improve the overall quality of life of the child. The patient/caregiver have to be informed and formed to perform a systematic cleansing of teeth and oral mucosa. The effectiveness of all available interventions is higher if compared to placebo, but many problems emerge when the comparison is between different therapies. A standardized effective prevention-treatment strategy is still missing. The proposed strategies included: chewing gum, fluoride, miconazole, vitamin E, chlorhexidine gluconate, prostaglandins, biophotomodulation with light-emitting diodes; with high power laser therapy (HPLT); with low level laser therapy (LLLT), cryotherapy, glycine, keratinocyte growth factor (KGF), psychotherapy, homeopathic remedies, sodium bicarbonate, topical anaesthetics, hydrogen peroxide, FANS, corticosteroids, amphotericin B. A regular monitoring of the oral cavity is essential to reduce adverse events and to limit opportunistic infections arising in the damaged mucosa. The management of the patient can be individualized depending on the type of primary antineoplastic therapy. It is essential to remove infectious dental/oral foci before the start of the therapy, to prevent the risk of complications and infections. Many articles emphasise the importance of an early detection of OM to improve the control of this side-effect. When the OM is almost noticeable, the topical application of drugs, homeopathic remedies, etc. can be effective in reducing the severity and duration of management.

Conclusion: the management of OM in children under chemotherapy is complex and required a multifactorial approach. All healthcare givers should cooperate to common purpose. The efficacy of different available therapies in OM prevention and treatment is suggested but further high-quality researches with wide sample are required to confirm the findings, since a truly effective treatment is still missing. Despite the high amount of new publications on this topic, the studies are inconclusive, and they do not support significant changes in OM management.

Hereditary gingival fibromatosis in a zimmermann laband syndrome: case report of a patient and analysis of his salivary biomarkers.

Federica Guglielmi[1], Andrea Camodeca[1], Laura Di Tonno[1], Edoardo Staderini[1], Patrizia Gallenzi[1]

[1]Fondazione Policlinico Universitario A. Gemelli IRCCS, Roma, Università Cattolica del Sacro Cuore. Institute of Dentistry and Maxillofacial Surgery, Dean: Prof. Massimo Cordaro

Aim: The term "Laband syndrome", also known as Zimmerman Laband syndrome (ZLS), indicates an extremely rare genetic disorder characterized by abnormalities of the head and facial area and the hands and feet. Most children with this disorder have abnormally gingival hyperplasia. Furthermore, affected infants may exhibit abnormally long, thin fingers and toes and/or deformed or absent nails at birth. In some cases, mental retardation may also be present. The range and severity of symptoms vary from case to case.

Hereditary gingival fibromatosis (HGF) is a rare disease in both autosomal dominant and recessive types and has a frequency of 1:175.000. Clinically, it is characterized by benign gingival enlargement with normal color and firm consistency and non-hemorrhagic symptomatic illness. Although the gingival enlargement does not directly affect the alveolar bone, the gingival swelling may add to the bacterial plaque accumulation, inducing gingivitis, periodontitis, bone resorption and halitosis.

We describe a case of multidisciplinary management of a hereditary gingival fibromatosis in a 3-year-old boy who had cutaneous and phenotypic features of Zimmerman Laband syndrome.

Methods: We report a case of a 3-year-old boy who was referred for the first time to our observation in January 2016, when, during the early diagnostic phase for suspected genetic abnormalities, the pediatrician noticed a particular anatomy at the level of the gums. During the first observation, we noticed a delay in dental eruption and a severe generalized hypertrophy; no lesions involving teeth and / or soft tissues were detected. At this time, intraoral photographs were taken. It was therefore decided, in agreement with the parents, to keep the situation under control with re-evaluation every 6 months.

Two-years-after the first observation, the child came for a check-up appointment. The parents revealed that the child was diagnosed with Zimmermann Laband

syndrome, associated with a true gingival hyperplasia. The progressive gingival enlargement, particularly in the molar area, did not allow a correct eruption of the deciduous teeth. Therefore, it was proposed to the parents to remove the gingival overgrowth in order to improve the clinical display of the crowns.
Owing to his uncooperative attitude and his medical history, gingival excision was performed under general anaesthesia, in a day surgery service designed for special needs patients. The excised gingival tissue was sent for histopathological analysis. Histological features of the biopsied sample reveal the present of squamous-lining oral mucosa with parakeratosis and pseudoepiteliomatosa hyperplasia and with the presence in the subepithelial connective tissue of nodular deposits of dense hypocellular connective tissue collagenized with focal mixoidal changes.
Several articles have recently been published outlining the potential use of saliva as a diagnostic fluid. We have collected unstimulated whole saliva from the patient according to a standard protocol and it was analyzed by a top-down proteomic approach.
Results: Clinical follow-ups were scheduled every 6 and 12 months, respectively. Based on the histopathological findings the diagnosis of hereditary gingival fibromatosis was made. The analysis of salivary biomarkers suggests that the salivary concentration of inflammatory markers in patients with gingival fibromatosis is upregulated than that found in healthy patients.
Conclusions: The aim of this study is to present a multidisciplinary management of a syndromic child with hereditary gingival fibromatosis: a team of paediatricians, dentists, oral pathologists and biochemists can work together to achieve a comprehensive diagnosis and treatment of rare diseases.

Interceptive treatment with elastodontic devices

Carla Lauria[1], Pietro Condrò[1], Veronica Calzini[1], Annamaria Carbone[1], Prof. Gaetano Lerardo[1]

[1]Sapienza Università di Roma - Dipartimento di Scienze Odontostomatologiche e Maxillo Facciali UOC Odontoiatria pediatrica

Aim: The aim of the early orthodontic therapy is to intercept some kinds of malocclusion and to address the treatment to remove the responsible factors. Therefore, it's possible to restore the normal skeletal development and the right dental eruption, taking advantage of natural forces of growth. The main anomalies that must be treated at an early stage are anterior and posterior crossbite and all the malocclusions caused by bad oral habits. Bad oral habits like an improper tongue position during rest and swallowing, thumb sucking, and mouth breathing can cause excessive overjet and open bite. Thanks to an interceptive treatment with elastodontic functional devices it's possible to eliminate these interferences and obtain a balanced system of forces.
Methods: Elastodontic devices are preformed functional orthodontic devices made of elastomeric silicone, with both dental and skeletal action, available in different sizes and models (according to the specific case). The choice of the appropriate size measure is made through the use of a special ruler, measuring the four upper or lower incisors, directly into the mouth, therefore model casts are not needed. The Occlus-o-guide can be used in different stage and it is available in many series. It is a single block which contacts both arches with eruptive niches. It can be used in case of increased overbite, increased overjet, and Class II. The HabitCorrector consists of a shelf to elevate the tongueand itis used in case of bad oral habits, open bite, increased overjet and Class II. The Class III is a new device used to treat at an early stage Class III malocclusion. The application of these elastodontic devices will be active during daylight hours, instructing the patient to use the device gradually for 2-4 hours, and passive overnight.
Results: Thanks to the structure of the Occlus-o-guide, anomalies can be solved by the intrusion of the anterior teeth, the molar extrusion and the mandibular advancement. The Habit Corrector promotes anterior extrusion stopping molar extrusion, lingual repositioning, and mandibular advancement if needed. The correct placement of the tongue is essential to expand properly the palate and prevent or/and correct malocclusion. Likewise using the Class III device the lingual placement is important, it induces the correction of the anterior crossbite helping the forward movement of the jaw, it prevents the advancement and overdevelopment of the mandible and helps the displacement in the posterior direction of the lower dentation.All these effects can be obtained with these devices in 6-12 months, in some cases they avoid the use of other mobile or fixe devices or simplify and minimize any other treatments.
Conclusion: If preceded by a correct diagnosis of occlusal and functional alterations, early preventive treatment with elastodontic devices results in avoiding dysfunctional forces acting on the skeletal pattern, thus reaching a balance between bone basis and muscular components. These devices have other several advantages: time-saving for the patient and for the dentist, comfort, easy oral hygiene, cooperation detector that allows to control the frequency of use.

Ozone therapy for early childhood caries (ecc) treatment

Luppieri Valentina[1], Baccichetto Anna[1], Chermetz Maddalena[1], Cadenaro Milena[1]

[1]Department of Medical, Surgical and Health Sciences, University of Trieste, Pediatric Dentistry Postgraduate Program, Trieste, Italy.

Aim: to evaluate the effectiveness of ozone therapy on in vivo treatment of ECC-affected teeth. The tested hypotheses were that ozone therapy would arrest the caries progression, modify the salivary bacterial count and reduce the ECC-related hypersensitivity improving thus the patients' quality of life.
Methods: the study was designed as a preliminary observational in vivo study. 8 subjects aged 4 to 5 years were enrolled according to specific inclusion criteria and patients' parents signed the informed consent. 82 ECC-affected teeth were treated with 4 weekly 60-s ozone applications using an ozone generator (Ozone DTA, Sweden&Martina) set on program n. 6 as recommended by the manufacturer. Patients were evaluated at the following intervals: before treatment (T0), after each ozone therapy session (T1, T2, T3, T4) and at 1, 2 and 3 months after treatment (T5, T6, T7). At T0, all the affected teeth were photographed and the dentine's quality was classified according to the Affected Dentine Scale (ADS). The Visual Analogue Scale (VAS) was used to evaluate the ECC-related hypersensitivity and the salivary bacterial count was measured using a saliva test (Saliva Check Mutans Test, GC). Patients' parents were also asked to fill in an anonymous Early Childhood Oral Health Impact Scale (ECOHIS) questionnaire. At T4, photographs of the treated elements were taken, the salivary test was performed again and a new ECHOIS questionnaire was submitted to patients' parents. Any variation of the dentine's quality and of the ECC-related hypersensitivity was recorded at T5, T6 and at T7. The ADS score and the salivary tests results were statistically analyzed using non-parametric tests.
Results: statistically significant differences were detected for the the salivary tests results and the ADS score respectively between T0 and T4 ($p<0.05$) and between T0 and T5 ($p<0.05$). The average hypersensitivity values, evaluated according to the Visual Analogue Scale, were significantly reduced at T4 in comparison to T0 and this reduction remained constant over time. The questionnaires' results showed that after treatment patients' parents noticed an improvement of the ECC-related symptoms and observed a positive change in their children behavior and social attitudes. On the contrary, an increment of parental distress and psychological and financial impact of the pathology on the quality of family life was detected.
Conclusions: the results showed that ozone therapy could be considered a valid aid for ECC treatment. By reducing the salivary bacterial count and improving the dentine's quality it seems to arrest the caries progression, decrease the ECC-related hypersensitivity and improve the patients quality of life. In addiction, being a completely painless and non-invasive technique it can be used as a first approach therapy to ECC-affected uncooperative children in order to gradually get them used to traditional dental treatments.

Direct restorations in pediatric dentistry: preliminary data of a randomized clinical trial comparing traditional composite versus bioactive composite.

F. Marianelli[1], S. Romilio[1], R. Gennai[1], L. Lardani[1], G. Derchi[1], M.R. Giuca[1]

[1]School of Specialization Pediatric Dentistry, Unit of Paediatric Dentistry, Department of Surgical, Medical and Molecular Pathology and Critical Care Medicine, University of Pisa, Pisa, Italy

Aim: The aims of this prospective clinical study are (1) to evaluate and compare the clinical performance of Activa BioActive Pulpdent composite (PULPDENT™ Corporation Watertown, USA) and a Bulk-Fill composite (Ivoclar Vivadent Schaan, Liechtenstein) over a 3-month period in paediatric patients; and (2) to investigate the clinical efficiency of two different composites.
Methods: The inclusion criteria for the patients were: the presence of two class I carious lesions on two contralateral elements of the same dental arch and the selection of healthy individuals.
90 class I and II composite restorations were placed on a total of 45 deciduous teeth by a clinician in department of Paediatric dentistry University of Pisa. For each patient, one of the two lesions was treated with Activa BioActive, while the other was treated with the Bulk-Fill composite. The choice of which one of the two lesions was to be restored with one composite or the other was randomized by a second clinician before all of the appointments: two opaque envelopes were prepared for each patient (one with Activa BioActive written inside, the other with Bulk-Fill); during the appointment, the left side tooth was always restored first, and one of the envelopes was opened in order to know which material had to be used. The other tooth received a restoration with the remaining material. Both restorations were performed with the same protocol and were bonded with the same self-etch bonding system (Adhese Universal, Ivoclar Vivadent Schaan, Liechtenstein). The restorations were then evaluated in accordance with the modified

US Public Health Service criteria (USPHS) in which an excellent quality is indicated with an Alpha score, an acceptable quality with a Bravo score, a low quality with a Charlie score and an unacceptable quality with a Delta score. The evaluation was done at baseline and after 3 months by a third clinician who wasn't involved in the placement of the restorations or in the randomization process.
Results: Only 3 of the 90 experimental restorations had to be replaced in 45 patients; the total failure rate was 1,0 % after 3 months. At baseline, 88.5% to 100% of the restorations were rated as excellent (Alpha). No statistically significant differences between the Bioactive material and the Bulk-Fill composite were observed during the study, although numerical differences were observed regarding surface roughness, anatomic form at the margin, marginal integrity, and occlusal integrity.
Conclusion: Numerical differences, although not statistically significant, were noted on the recorded clinical parameters. Acta Bioactive Pulpdent composites demonstrated a very high success rate (97.4%) after 3 months. Neither the size of the restorations nor the tooth type seemed to significantly affect the clinical outcome of the restorations. A longer period of observation and in vitro analysis of the deciduous teeth are encouraged in order to confirm these preliminary results.

Oral features in childhood cancer survivors

S. Massa Micun, V. Vallone, R. Ninivaggi, R. Guagnano, L. Bello, P. Defabianis

University of Turin, Department of Surgical Sciences, C.I.R. Dental School, Section of Paediatric Dentistry

Aim: The incidence of childhood cancer has increased during the past decades and the development of new successful therapies has improved considerably. Although childhood cancer survival rate has improved, concerns remain regarding long-term consequences and treatment.
The aim of this study was to investigate oral conditions in paediatric patients in remission from cancer with standardized criteria and methods.
Methods: 27 cancer survivors aged from 5 to 17 years (mean age 10.8 yrs) and 29 healthy children matched by age and sex were included in our study. All cancer survivors have been treated at the Department of Oncology at Regina Margherita Children Hospital and referred to the Paediatric Dentistry Unit at the Dental School for dental evaluation. All patients have been treated for cancer before the age of ten (chemotherapy, radiotherapy, BMT) and have been off-therapy for at least two years (time needed for the appropriate assessment of long-term oral alterations).All patients underwent a complete dental examination: DMT and dmft indexes, stimulated saliva flow rate, pH and buffer capacity were evaluated. U Mann-Whitney test and Kruskal-Wallis test were used to evaluate DMFT and dmft indexes, T-Student test and ANOVA test were used to analyze saliva flow rate, pH and buffer capacity.
Results: The sample consisted of 15 patients (55%) treated for Acute Lymphoblastic Leukaemia, 3 (11%) treated for Acute Myeloid Leukaemia, 1 (4%) treated for Hemophagocytic Lymphohistiocytosis, 2 (7%) treated for Lymphoma, 1 (4%) treated for Hepatoblastoma, 1 (4%) treated for Juvenile Myelomonocytic Leukaemia, 2 (7%) treated for classic Medulloblastoma, 1 (4%) treated for Ewing-PNET's Sarcoma and 1 (4%) treated for Abdominal Rhabdomyosarcoma. 19 patients were treated only with chemotherapy, 8 received chemotherapy associated with radiotherapy and 12 underwent bone marrow transplantation (BMT).DMFT index turned out to be significantly increased in patients treated for cancer in comparison to healthy patients (p-value = 0,001); no significant difference was found as far as dmft index was concerned. Salivary flow rate turned out to be significantly higher (p-value = 0,001) in healthy patients compared to cancer survivors, with no significant difference as far as salivary pH, buffer capacity and different treatment options were concerned.
Conclusion: According to the results of our study, cancer survivors are susceptible to remarkable decrease in salivary flow rate as long-term effect of antineoplastic therapy resulting so in an increased risk of caries development. This aspect highlights the importance of developing prevention programs aimed at improving the life quality of these patients.

Nutritional advice to reduce the risk of caries in pediatric patients

I. Mazzon, A. Zuccon, S. Mazzoleni, G. Litta, A.G. Signoriello, F. S. Ludovichetti

Department of Neurosciences, Dental Clinic, School of Dentistry, University of Padova, Italy

Aim: Caries is an infectious, transmissible, chronic-degenerative disease with a multifactorial etiology that affects hard dental tissues. In recent decades, a reduction in the prevalence of this disease has been recorded, even though it remains one of the most common diseases in the pediatric population. In 1962, Keyes formulated a model in which he determined the necessary presence of three risk factors in the caries pathogenesis: cariogenic bacterial flora, a diet rich in fermentable carbohydrates and individual

susceptibility. Diet therefore plays a determining role as a predisposing risk factor in caries. The aim of this thesis is to implement the basic knowledge of dental hygienist, providing a series of nutritional advice to reduce the incidence of caries in children.
Materials and methods: The research has been carried out in the PubMed - Medline database, in some scientific journals, websites and books related to the subject. The professional figure of the hygienist has been analyzed, from the legislative and functional profile.
Results: From the analysis of the modern literature, a series of nutritional recommendations were defined, in particular of the pediatric patient, in order to reduce the risk of caries. The ideal diet is based on food balance: it is important to balance the nutrients in order to promote the intake of micronutrients and macronutrients in the right quantities, avoiding excesses or deficiencies that can harm both at the systemic level and at the oral cavity level. In the early childhood phase, parents' collaboration is fundamental to ensure that hygienist's advices daily applied. The pediatric patient should be persuaded both with nutritional and educational advices. During oral examinations, all the communication and motivation techniques should lead him to understand the importance of good oral hygiene practices and good feeding habits.
Conclusion: Nutrition plays a primary role in the prevention of systemic and oral pathologies. Approaching the motivational role of the dental hygienist with a further attention to food risk factors completes and strengthens his pedagogical function, especially in pediatric age. A pediatric patient, if motivated and addressed to good oral hygiene instructions and good feeding habits, will experiment lower chances to present both systemic and oral disease, in the case, carious pathology.

Clinical use and acceptance of digital impression technique in young orthodontic patient: a pilot study

M.Oricchio, M. Aprile, C. Pala, G. Rosati, F. Cosimi, E. Medici, A. Mascia, G. Denotti

Università di Cagliari, Italy

Aim: Nowadays the use of Intraoral scanning systems in dentistry has increased dramatically. Digital scanners have comparable efficiency with conventional impression methods and they are able to obtain high quality and reliable impressions. Optical impressions can offer a variety of advantages for patients in general and especially for young patients. In fact In pediatric dentistry the conventional impression can be a potential problem for the acceptance of dental treatments in children especially in sensitive subjects, for example those with a strong gag reflex. The aim of this study is to assess the young orthodontic patient acceptance of an intraoral scanner used for full arch impressions
Methods: The study sample consists of 15 patients from 6 years old to 12 years old that required upper and lower full arch impressions for their orthodontic treatment. Digital impressions were taken with 3 shape trios dental intraoral scanner. After impression taking patients confort and acceptance were measured using a five point visual analogic scale (VAS), ranging from "very annoyng" to "very easy" which correspond to a score from 1 to 5.
Results: Data indicated that the majority of patients receiving intraoral scans have shown excellent acceptance of this impression technique .
58,6% of the sample (11 patients) had score 1, 16% of the sample (3 patients) had score 2, only 5,3% of the sample (1 patient) had score 3, no patient had a score of 4 and 5 .
Conclusion: Digital impression technique with intraoral scanner is very well accepted by young patients, it eliminates the need for materials and impression trays which are often unwelcome to the patient. The results are in agreement with the scientific literature that proves that this technique have shown several advantages for the clinician and for the patient itself like the reduction of patient stress and discomfort, the reduction of gag reflex and the possibility to easily transfer digital data to the dental technician. In conclusion the results of this pilot study encourage to improve the statistical sample in order to provide statistically significant data.

Amelogenesis imperfecta: case report

J. Padalino [1-2], V. Maurino [1-2], P.M. Pasini [1-2], A. Cugnu [1-2], M.Dani [1-2], L. Azzi

[1] Dipartimento di Scienze Chirurgiche e Morfologiche, Università degli Studi dell'Insubria, Asst Sette Laghi, Ospedale di Circolo Fondazione Macchi, Varese , Italy
[2] Scuola di Specializzazione in Odontoiatria Pediatrica, Università degli Studi dell'Insubria, Asst Sette Laghi, Ospedale di Circolo Fondazione Macchi, Varese, Italy

Aim: Imperfect Amelogenesis (IA) represents a heterogeneous variety of clinical and genetic conditions from which tooth enamel may suffer. In patients suffering from IA, tooth enamel is characterised by hypomineralization and, very often, by hypoplasia too. From a clinical point of view, it is possible to have discolourations, hyper sensibility and shape anomalies. Moreover, because

of its fragility, enamel may be subjected to wear and tear and to fracture. Imperfect Amelogenesis (IA), presents a various aetiology: it depends on hereditary causes associated with genes in autosomal recessive form, it is related to the sex and even to a regular assumption of antibiotics during the prenatal, perinatal and postnatal periods. This pathology shows different prevalences, according to the population: in Sweden, for instance, a study showed a rate of 1 : 700, in another one in the States, the rate was 1 : 14.000. However in both studies this disease revealedboth aesthetic (discolourations)and structural problems (hypomineralization and hypoplasia). Consequently, the aim of this study is to present a definitive standard document able to treat and to solve this pathology.

Method: a young girl aged 13, suffering from IA. Symptons : hypomineralization and hypoplasia of enamel at element 1.1 and 2.1. Discolouration and dental sensibility. After a diagnostic arrangement , we proceeded with a dental mousse treatment made of CPP- ACP (casein phosphopeptide, amorphous calcium phosphate) used as a topic mask for a month 2 times a day for 20 minutes.

Results: after 30 days of this treatment, we noticed significant improvements concerning dental sensibility. However, although this previous phase inhanced a remineralization process,didn't solve aesthetic problems concerning the shape. Because of the age of our patient, we decided to start a reconstruction using composite materials and not a protesic reconstruction. We used masks for medical purposes after a diagnostic wax-up on a model in articulator. Thanks to the previous remineralization treatment, it was easier to fix composite materials.

Conclusions: in serious patients suffering from I A, with hypomineralization and hypoplasia of enamel, we recommend to start with a remineralization treatment, then ,in order to solve aesthetic problems refrring to the shape or/ and to the discolouration, we suggest an aesthetic reconstruction with composite materials in case of young patrients, a more invasive pretesic reconstruction in aged ones.

Can we rely on children self reported tooth-brushing frequency to assess their oral hygiene level? And how do mothers' oral health-related knowledge influence children oral hygiene?

Papa C.[1], Sangianantoni G. [1], Salerno C. [1], Desiderio F. [1], Quaraniello M. [1], Ingenito A. [1], Ferrazzano G.F. [1]

[1]Department of Neuroscience, Reproductive and Oral Sciences, School of Pediatric Dentistry, University of Naples, Federico II, Naples, Italy

Aim: Most studies of tooth-brushing behaviors rely on self-report or demonstrations of behaviors conducted in clinical settings. That is the reason why it is important to determine the feasibility of objective assessment of tooth-brushing behaviors in the homes. This allows also to determine the correct fluoride intake and to plan individual preventive interventions for each patient, especially high-risk child. According to current literature, there is a statistically significant relationship between the parents' tooth-brushing habit and the children's tooth-brushing, and between the parents' frequency of tooth-brushing and the children's frequency of tooth-brushing. Furthermore, maternal tooth-brushing behavior is a strong predicator of children's brushing behavior. In fact, parents are shown to be the most popular source of oral health knowledge for children, followed by dentists, school teachers, and media. The aim of the present study was to test the correlation between self-reported tooth-brushing frequency and oral hygiene level assessed by the Simplified Oral Hygiene Index (OHI-S) and the Visible Plaque Index (VPI) in children. Another issue was to determine whether mothers' oral health-related knowledge was associated to the children clinical indexes (OHI-S and VPI).

Methods: The trial was carried out among a sample of 40 children, aged from 6 to 12 years old, attending the Department of Paediatric Dentistry, University of Naples, Federico II, Italy. Children answered a brief self-administered questionnaire on behavioral characteristics, including tooth-brushing frequency. Mothers also answered a characterization questionnaire on oral health-related knowledge. Calibrated Examiners performed the clinical examination of the patients. Oral hygiene was determined using the Simplified Oral Hygiene Index (OHI-S) and the Visible Plaque Index (VPI).

Results: A significant association was found between self-reported tooth-brushing frequency and the children clinical indexes (OHI-S and VPI). A strong connection was found between mothers' level of oral health-related knowledge and the children clinical indexes (OHI-S and VPI).

Conclusions: Based on the present findings, self-reported tooth-brushing frequency reflects children oral hygiene levels. The results emphasize the important influence of mothers and their cultural background in enhancement of children's dental health. Their active role in conjunction with the potential of self-assessment provides a good basis for establishing and improving self-care among children. However, due to the limited caregivers' knowledge about caries etiology and prevention, oral health education and promotion activities seem necessary both for children and for mothers.

Importance of oral signs in the diagnosis of celiac disease.

Prisco B., De Luca R., Donnarumma M.C., Romano A., Gentile C., Contaldo M., Pedullà M., Minervini G.

Aim: the aim of this work is to emphasize the importance of oral signs in the diagnosis of atypical forms of celiac disease. In most cases celiac disease doesn't manifest itself with a "typical" symptomatology, but rather in atypical or silent forms as defined by Logan's model of celiac iceberg. The typical forms of celiac disease constitute the tip of an iceberg while the submerged body (most of the cases) consists of atypical forms with extraintestinal manifestations. Among the atypical signs and symptoms there are some pathologies of the oral cavity, first of all the recurrent aphthous stomatitis and the dental enamel hypoplasia. Non-specific forms of atrophic glossitis and intra-oral manifestations of dermatitis herpetiformis are also added.
Methods: the research in literature was based on the selection of scientific articles using PubMed as search engine and the following keywords: dental enamel hypoplasia, recurrent aphthous stomatitis, case-finding, pediatric celiac disease, dentistry. Three systematic reviews including 257 articles were selected from the research. In particular, the SAR (Recurrent Aphthous Stomatitis) is distinguished in a minor, major and herpetiform form, it is characterized by the appearance of round and painful ulcers and it has a prevalence among celiac subjects ranging from 3.7% to 41% . Another clinical manifestation of the oral cavity is represented by the dental enamel hypoplasia which is distinguished, according to the classification of Aine, in five degrees (from 0 to IV). The latter shows a prevalence ranging from 9% to 52.5%. In minimal percentages we find nonspecific atrophic glossitis and oral forms of dermatitis herpetiformis.
Results: some authors have hypothesized the presence of analogous immuno-mediated mechanisms in the determinism of intestinal lesions and oral aphthous ulcers. It has been hypothesized that the association between celiac disease and SAR is related to the anemic state that frequently characterizes a celiac subject. The correlation between enamel hypoplasia and celiac disease resides instead in the induction of a state of hypocalcemia (secondary to malabsorption) present at the time of the amelogenesis or the lesions would be the result of an autoimmune aggression with lymphocytic mediation towards the enamel organ . The aspecific atrophic glossitis is due to the anemic state induced by nutritional deficits due to the malabsorption that characterizes the pathology (iron deficiency or vitamin B12).
Conclusion: in the last 15 years, the numerous studies conducted on celiac disease have revealed its highest prevalence compared to previous estimates. It has emerged that in most cases the pathology manifests the absence of typical symptoms and that, frequently, it is associated with other diseases or clinical conditions. Also some oral lesions can be "atypical" manifestations of celiac disease: there is a vast documentation of SAR and the hypoplasia of the enamel in literature. Currently, the most sought diagnostic strategy is called "case finding". It consists in recommending the research of celiac disease serum markers in all subjects presenting risk factors for this pathology. The role of pediatric dentist is very important in selecting cases at risk and in placing the diagnostic suspicion of celiac disease.

Intravenous sedation with propofol for dental treatments in non-cooperative paediatric patients: a preliminary study

Quaraniello M.[1], Cantile T.[1], Desiderio F.[1], Salerno C.[1], Papa C.[1], Ingenito A.[1], Ferrazzano G.F.[1]

[1]Department of Neuroscience, Reproductive and Oral Sciences, School of Pediatric Dentistry, University of Naples "Federico II", Naples, Italy.

Aim: Dental treatments are sometimes perceived as invasive by paediatric patients. Several researches suggest that anxious and fearful children tend to avoid dental treatment, which causes a deterioration of oral health with a higher incidence of untreated dental caries and a greater number of caries than their less anxious and more cooperative peers. Although behavioral techniques can be used to reduce anxiety, there is a part of pediatric patients who are unable to tolerate dental procedures and, therefore, require an alternative approach such as intravenous sedation. Sedative drugs are used in paediatric dentistry to help managing children behaviour during dental treatments. The aim of this study is to evaluate the features of intravenous sedation with propofol for short and minimally invasive dental procedures in non-cooperative pediatric patients.
Methods: 70 patients aged between 3 and 17 were selected. Both healthy but phobic patients and patients with disabilities were recruited. Intravenous sedation with propofol was preceded by premedication with midazolam for OS to avoid the trauma of inserting the needle. All patients received 1.5-4 mg/kg/h of propofol until the desired level of sedation. The patient should be somnolent, but awakened to the verbal call and/or mild nociceptive stimulus. In addition to the infusion, a 10-20 mg bolus may be addicted when an increase in sedation depth is required. Collected data included achievement of the treatments, adverse events (bradycardia, hypotension, desaturation),

side effects (nausea, vomiting, headache, agitation), number of teeth treated, type of dental procedure performed (extraction, tooth filling, scaling), number of procedures for each patient and parents satisfaction for dental procedure.
Results: The procedures were successfully completed in 68 patients (97.1%). A total of 25 children (35.7%) had desaturation during the treatments. No patient had nausea, vomiting or headache after the procedure; 2 patients (2.8%) showed agitation during the awakening. 2.9 teeth were treated on average for each patient. 124 extraction, 84 tooth filling and 27 scaling were performed. The questionnaires filled by the parents showed 100% satisfaction after dental procedures.
Conclusion: It can be concluded that intravenous sedation technique with propofol induces effective and safe sedation, with minimal side effects for paediatric patients during short and minimally invasive dental procedures. However, further studies are required on the efficacy of intravenous sedation with propofol, involving more patients, for routinely use in dental procedures, particularly in paediatric dentistry.

A rare case of pediatric ameloblastic fibro-odontoma in posterior mandible as a complication of tooth eruption

Andrea Alain Orsina[1], Andrea Di Francesco[1], Alice Ronchetti[1], Marta Dani[1], Vittorio Maurino[1], Lorenzo Azzi[3]

[1]Resident, School of Pediatric Dentistry, Università degli Studi dell'Insubria - Varese, Director Prof Lucia Tettamanti
[2]Director of U.O.S. Pediatric Maxillo-Facial Surgery Asst Lariana - Como
[3]Post-doctoral Researcher, Department of Medicine and Surgery, Università degli Studi dell'Insubria

Aim: Ameloblastic fibro-odontoma (AFO) is a benign, slow-growing, expansive tumor that clinically appears as a well-encapsulated benign lesion. It is defined by World Health Organization (WHO) as a neoplasm composed of odontogenic epithelium embedded in cellular ectomesenchymal tissue that resembles dental papilla, with varying degrees of inductive change and dental hard tissue formation. AFO, as in the presented case, may inhibit tooth eruption or displace involved teeth, without altering their vitality.
The patient (female, 8-year-old, caucasian) in mixed dentition presented at our clinic for a referral visit: during an orthodontic evaluation, panoramic radiography showed radio-opaque structure compatible with odontoma, in intimate contact with the upper surface of 47's follicle, which would have compromised its correct eruption. During physical examination no injuries or swelling were appreciable at intra or extraoral level.
Methods: 3D examination (CBCT) denotes a hyperintense mass with an approximate volume of 10x8 mm, extended for the entire width of the mandibular bone in vestibular-lingual sense, while the buccal and lingual cortical bone does not appear to be affected by the lesion. Differential diagnosis is with complex odontoma, calcifying epithelial odontogenic tumor, calcifying odontogenic cyst or cementoma. Procedure is carried out as day-surgery, preceded by antibiotic prophylaxis (Amoxicillin + clavulanic acid). The flap design included a vertical "hockey stick" incision mesial to 46, extended distally with intrasulcular incision, then an oblique one, about 30 mm long, from the distal ridge to 46 apically to the vestibular arch. After the skeletalization of mandibular bone, the osteotomy of the buccal bone distal to 46 is performed: thus, the lesion is exposed.
The lesion, which presents encapsulated, is separated into several sections in order to facilitate its avulsion. Surgery ends with curettage of the internal walls of the lesion, taking care not to damage the gem of 47 present on the bottom of the created socket, which is filled with fibrin glue in order to avoid movements of the tooth; the flap is then sutured. Patient is discharged and reviewed at 15 days for control.
Results: Histologic macroscopic report shows three fragments of bone appearance and consistency, of about 1.5 cm of major axis and one irregular brownish fragment with 0.5 cm major axis. Histopathological report is odontoma with interposed fibroepithelial component of reticular, starry and mixoid stroma, and ameloblastic columnar epithelium. The picture shows no evidence of malignancy, and is suggestive for ameloblastic fibro-odontoma.
Conclusion: AFO is a rare benign neoplasia which does not require, as in this case, surgical reoperation after enucleation, but regular and strict follow-up monitoring the eruptive path of the adjacent teeth. Forty percent of AFOs recur as complex odontomas. which is considered a hamartomatous process, and this raises the possibility of the primary lesions, in these particular cases, actually being developing odontomas. Recurrence in neoplastic malignant lesion (ameloblastic fibrosarcoma, 10% among recurrences), is possible although rare, and it would require a more extensive surgery or mandibulectomy.

Oral conditions in patients with juvenile idiopathic arthritis (jia): a cross-sectional study

G. Rosso[1], A. Sapuppo[1], A. Crupi[1], G. Caserta[1], L. Bello[1], P. Defabianis [1]

[1]University of Turin, Department of Surgical Sciences, C.I.R- Dental

School, Section of Pediatric Dentistry.

Aim: Juvenile Idiopathic arthritis (JIA) is one of the most common chronic rheumatologic disease in childhood. There are several JIA different subtypes, but the most frequent are the systemic, the oligoarticular and the polyarticular ones. In these patients oral health might be at risk because of temporomandibular joint (TMJ) involvement with impact on mandibular growth and masticatory function and upper limb functional disability affecting toothbrushing. The aim of this study was to investigate oral conditions in JIA patients with standardized criteria and methods.
Methods: 19 JIA patients aged from 8 to 14 years (mean age 10.14 yrs), and 19 healthy children matched by age and sex were included in our study. All children have been referred to the Pediatric Dentistry Unit at the Dental School in Turin (Italy) for dental evaluation. The Inclusion criteria considered proper JIA diagnosis with no other current disease at the first dental visit, classification according to ILAR criteria and no professional oral hygiene performed in the last 4 months before dental evaluation. All patients underwent a complete dental examination: DMFT index (Decayed Missed Filled Teeth index), FMBS (Full Mouth Bleeding Score) index, FMPS (Full Mouth Plaque Score) index, dental pockets with 4 to 6 mm PPD (Periodontal pocket depth), saliva pH and buffer capacity were considered. .T-Test was used to evaluate FMBS, FMPS and 4 mm periodontal pockets; Wilcoxon Test was used for DMFT, saliva pH and buffer capacity and 5,6 mm pockets.
Results: The data examined in the two groups of patients did not show any remarkable difference; only the FMPS index turned out to be 53.65% in JIA patients and 56,31% in healthy ones, but it was not statistically significant (p-value= 0,6375).
Conclusion: No significant differences were found in the parameters considered in our study, but this is probably due to the small number of patients included in the two groups. Despite the paucity of research so far, a clear role for paediatric dentists in close liason with paediatric rheumatology team is advisable: regular dental evaluation combined with saliva measurement are highly recommended. Further investigations are required to identify children at risk and propose effective interventional strategies which consider cost-effectiveness relation on oral health condition.

Multidisciplinary management of an impacted upper right central incisor associated with non syndromic supernumerary teeth: a case report.

Salerno C.[1], Sangianantoni G.[1], Papa C.[1], Quaraniello M.[1], Desiderio F.[1], Ingenito A.[1], Ferrazzano G.F.[1]

[1]Department of Neuroscience, Reproductive and Oral Sciences, School of Pediatric Dentistry, University of Naples, Federico II, Naples, Italy

Aim: A supernumerary tooth is any tooth or odontogenic structure that is formed from a tooth germ in excess of the usual number for any given region of the dental arch. To date, there is no indication on the timing of supernumerary teeth development as they occur in the primary, mixed and/or permanent dentitions. Despite the proposal of several theories such as atavism, dichotomy, hyperactivity of the dental lamina, the precise aetiology remains unclear. Supernumerary teeth can be defined as "supplementary" if they closely resemble the teeth of the group to which they belong (molars, premolars or anterior teeth) and as "rudimentary" if they are teeth of abnormal shape and smaller size (conical, tuberculate and molariform teeth). The scientific literature also classifies supernumerary teeth, according to their intraoral position (mesiodens, paramolar, distomolar and parapremolar). Many complications can be associated with supernumerary teeth, such as crowding, tooth displacement, diastema, deep caries, retention or impaction, delayed eruption or ectopic eruption of adjacent teeth, aesthetic problems, neuralgic manifestations, root resorption of adjacent teeth, and dentigerous cyst formation with significant bone destruction. The present casereportdescribesthe clinical management of two impacted supernumerary teeth, which impeded the eruption of the upper right central incisor.
Methods: The intraoral examination, in an 8-year-old boy affected by non-syndromic supernumerary teeth, showed absence of the permanent upper right central incisor, with no evidence of eruption. Radiological investigations revealed the presence of an impacted maxillary right central incisor and two supernumerary teeth, which caused the inclusion of the tooth 1.1. The eruption status of the other permanent teeth was normal. Under local anaesthesia, a muco-periosteal flap was raised on the palatal side. After careful elevation of the flap, the supernumerary teeth were surgically removed with the preservation of the roots of adjacent teeth. The impacted permanent maxillary right central incisor was kept under observation to wait for its natural eruption; however, after 10 months, it was not clinically evident: a maxillary occlusal radiograph revealed that it was slightly impacted toward the left central incisor, and the amount of available space was reduced. Therefore, orthodontic correction of the impaction was implemented. Two-thirds of the crown of the permanent maxillary right central incisor were surgically exposed with a closed eruption technique. The raised flap, which included

the attached gingiva, was fully repositioned in its former position followed by orthodontic traction of the tooth.
Results: In the case reported, the combined surgical and orthodontic treatment resulted in aesthetically pleasant and balanced occlusion, with a correct intercuspidation, a satisfactory overjet and overbite, and alignment of the upper anterior teeth.
Conclusion: The presence of supernumerary teeth has the potential to disrupt the development of normal occlusion, and early diagnosis is crucial to minimise complications such as the development of dentigerous cysts, root resorptionof adjacent teeth, and bone loss. Thus, early multidisciplinary treatment is required for greater hard and soft tissue preservation.

Management of traumatic dental injuries in paediatric age: the importance of adhesion to national guidelines.

A. Salucci[1], G. Di Giorgio[1], A. Perrone[1], N. Petrazzuoli[1], C. Silvestri[2], F. Covello[1]

[1]"Sapienza" University of Rome, Dep. of Oral and Maxillofacial Science Unit of Paediatric Dentistry Dir.: Prof.ssa A. Polimeni

The objective of this study is to evaluate the application of National guidelines for prevention and clinical management of traumatic dental injuries in developmental age published in November 2012 in Italy by the Ministry of Health and updated in February 2018.
Materials and Methods: Italian National Guidelines for Prevention and Clinical Management of Traumatic Dental Injuries in developmental age indicate the strategies for prevention of traumatic dental injuries and health education, the first aid protocol, the certification of traumatic dental injuries and the identification of child abuse. In the present retrospective and multicenter study, 83 patients (54 M, 29 F) who underwent dental injury were selected to assess the management of the traumatic event complied with the protocol provided by the Nationals Guidelines for Prevention and Clinical Management of Traumatic Dental Injuries in developmental age. The study is aimed at first aid doctors, family and hospital pediatricians, private dentists, University and hospitals.Every each health worker involved in the study was sent an evaluation form to be completed, related to dental injury, to standardize the collected data. The reference center has been identified for data collection: University of Rome "Sapienza". All the evaluation forms, completed correctly, were sent to the various reference center, which after collecting them sent the material to the coordinating center (University of Rome "Sapienza") for data processing.
Results: Evaluating the distribution by age we had: that 27.24% (8 F, 10 M) of the enrolled patients were aged 1-5 years, 51.63% 6-10 years (15 F, 33 M), 19,92% 11-17 years (6 F, 11 M). The dental injury occurred in 10.16% at home, 50.81% at school, 28.86% for play, and 9.35% at the gym. The deciduous dentition is involved in 34.96% of the traumas while the permanent dentition is involved in 69.51%.
Conclusions: From the present study it emerged that the National guidelines for prevention and clinical management of traumatic dental injuries in developmental age are not uniformly applied.

Breathing techniques to reduce pain and negative emotions during dental care in school-age children

F. Semprini[1], M. Levi[2], B. Ladniak[1], G. Ottaviani[1], L. Martina[1], C.Preite[1], V. Luzzi[1]

[1]Department of Oral and Maxillofacial Sciences, "Sapienza" University of Rome, Italy
[2]Department of Psychology, "Sapienza" University or Rome, Italy

Aim: Approximately 10% to 20% of the adult population in the western industrialized world report high dental anxiety; moreover, most report this reaction as having developed in childhood. Despite the recognition of children's dental anxiety as a worldwide public health dilemma, to date there is a lack of availability of cost-effective procedures to reduce this problem and the uncooperative and disruptive behaviours associated with it. Indeed, children's dental anxiety strongly interferes with the capacity to provide an effective dental treatment. The introduction of simple breathing techniques associated with the dental treatment could help the child in controlling the symptoms of anxiety and stress, thus improving their compliance.
The overall objective of the present proposal is to study the feasibility of the implementation of a breathing training to reduce children's anxiety during a dental procedure. The present proposal is anticipated to yield fruitful results, on one side by advancing our general knowledge on the correlates of pain and anxiety in school-age children and on the other by improving daily dental practice with this specific age population.
MATERIAL AND MEHODS: The study is conducted at the Pediatric Dentistry Unit of the Department of Oral and Maxillofacial Sciences, "Sapienza" University of Rome. To this aim, we recruited 20 children between 7 and 13 years of age. Exclusion criteria were assessed dental phobia. Age and sex-matched children were randomly allocated to one of two conditions: diaphragmatic breathing or treatment as usual (i.e., distraction by using a cartoon video). Subjective (visual analogue scales) and physiological (i.e., electrocardiography,

skin conductance, and respiration) measures of anxiety and pain were obtained during 3-minutes baseline, dental treatment, and 3-minutes recovery periods. Children's facial expressions were videotaped for the entire dental intervention to derive more objective indicators of momentary pain feelings.
CONCLUSIONS: We hypothesized that the breathing condition would have been more effective than treatment as usual in decreasing both subjective and objective measures of pain and anxiety, and that this would have been also confirmed by facial expression coding. Moreover, we expected that this beneficial effect would have impacted the duration of the dental appointments, with visits of shorter average duration in the breathing group compared to the control group.

Literature analysis and an in vitro study comparing conventional sealants and flowable composites in the sealing of permanent teeth: clinical indications and experimental evaluation.

Signoriello A.G.[1], Ludovichetti F. S.[1], Carollo F.[1], Drago P.[1], Piovan S.[1], Mazzoleni S.[1].

[1]Department of Neurosciences, Dental Clinic, School of Dentistry, University of Padova, Italy

Aim: In a comprehensive approach to the prevention of oral health promoted by the Dentist, the sealing of pits and fissures has proved to be an effective and safe prophylactic treatment in the prevention of caries pathology at the level of occlusal surfaces. Currently, materials such as sealants and flowable composites, are available and clinically applied for this purpose. Due to their low viscosity, elastic modulus and behavior, during the last two decades, literature focused on the use of flowable resin composites as a valid alternative to sealants in dental caries preventive treatments.
The main objective of this study is to evaluate the effectiveness of flowable restorative materials (ISO 4049) used as sealants for pits and fissures, in substitution of conventional resin materials (ISO 6874) properly designated for this application.
Materials and methods: Literature concerning the use of flowable composite materials as sealants and their rheological properties in comparison with conventional sealants was carefully analyzed. Moreover, an in vitro study was conducted at the dental clinic of the University of Padova. In the study, 36 human dental elements (I, II and III molars) were equally divided in two groups: in the first group, three different flowable composites were used to seal pits and fissures, in the second group three conventional sealants were used with the same purpose. Firstly, specimens were immersed in a 0,3% fuchsin solution for 24 hours and then in epoxy resin for 24 hours. After that, each tooth was vertically sliced into 2 parts with a mechanical turner using a diamond precision saw of 0,42 mm diameter. The degree of penetration depth and microleakage of the two categories of materials was evaluated using a Zeiss Stemi 2000-c stereomicroscope connected with a color microscope camera Zeiss Axiocam ERc 5s with magnifications of 10,5X and 25,5X.
Results: Flowable composites reported slightly better microleakage values than conventional sealants, although statistical analysis did not show any significant difference. On the contrary, in terms of penetration depth values, results showed that flowable composites were superior as significant difference was found between the two groups.
Conclusion: The results of this study showed that both categories of materials are suitable for sealing pits and fissures aiming to prevent dental caries. This is in agreement with the literature analyzed during this study: the flowable composites represent an adequate alternative to the use of conventional sealants for the preventive treatment of pits and fissures, especially if applied with adhesive systems.

Indications to sealants in pediatric dentistry

Ludovichetti F. S.[1], Signoriello A. G.[1], Caburlotto M.[1], Piovan S.[1], Zuccon A.[1], Mazzoleni S.[1]

[1]Department of Neurosciences, Dental Clinic, School of Dentistry, University of Padova, Italy

Aim: As in every fields of medical professions, there are several and continuous innovations in pediatric dentistry too. New materials, techniques and protocols are discovered periodically, questioning the methods previously implemented. Sealing of furrows and fissures have been affected by this process, often causing confusion at the time of the clinical procedural choice. This recent study involves the analysis and synthesis of the most modern and authoritative articles regarding the different techniques of isolation, sealing materials, use of etchant and use of adhesive. This researchwill help the dentist and the hygienist in the decisional process of sealants application. **Materials and methods:** In this study, a sistematic literature review was carried on, analyzing several sites of scientific publications as: PubMed, Cochrane, MedLine, Ingenta, Research Gate and the scientific research platform of the University of Padua. The keywords used, according to different combinations, were: sealant, effectiveness, pits and fissure, seal, sealing, adhesive, enamel pretreatment, etching, prevention, caries, retention, isolation, guide line, prevalence. The exclusion criteria were:

articles with more than 10 years (filter not applied for epidemiological investigations and historical data); studies not in english or not in italian. The articles obtained were mainly reviews published in relevant journals. "In vivo" clinical studies based on an evaluation over time, regarding effectiveness of techniques and materials and retention were evaluated. Epidemiological studies published on the websites of the major national dental and statistical organizations (SidP, SIOI, ISTAT) and publications on dental sites and journals have been considered.
Results: The results emerging from this careful analysis show that the first and second permanent molars of all individuals in the developmental age have to be sealed. Moreover this study puts in evidence that prevention has the maximum effectiveness for the subjects with high risk of dental caries. According to the 2016 ADA guidelines, sealing is also indicated in the carious prevention of deciduous elements and sealing premolars could also reduce the incidence of caries.
Conclusion: Currently, sealings are still necessary according to the updated guidelines in 2013. The general trend, however, suggests that in the future they could lose the important role they have in prevention, due to a general improvement in people oral hygiene and health. Nevertheless, an excellent field isolation still plays a fundamental role in the sealing prevention therapy.

Morphostructural analysis, saos-2 cell viability and ph evaluation of two calcium silicate-based cement

Simone Staffoli[1], Maurizio Bossù[1], Alessandro Salucci[1], Gianni Di Giorgio[1], Antonella Polimeni[1]

[1]Sapienza University of Rome Department of Oral and Maxillo-Facial Sciences Unit of Pediatric Dentistry

Aim: The aim of this study was to evaluate the bioactivity of Pro Root MTA (Dentsply, USA) and Biodentine (Septodont, France) after contact with human osteoblast-like cells(Saos-2). Cell viability was assessed by the mitochondrial dehydrogenase enzymatic (MTT) assay. A Ph analysis during the two different cement setting time was performed to evaluate the clinical effect on the pulp of the tested materials.
Methods: Human osteogenic sarcoma cells, SaOS-2, were cultured in Dulbecco's Modified Eagle's Medium (DMEM;Euroclone,Pero, MI, Italy), supplemented with 10% fetal bovine serum (FBS) and antibiotics, and were maintained in a humidified incubator with 5% CO2 at 37 °C. Cell viability was determined by using MTT assay. Briefly, 5x104 SaOS-2 cells were seeded on Biodentine or MTA Proroot disks and cultured for 24 , 48 and 72 hours. Tetrazolium salts (MTT: 3-(4,5-dimethylthiazol-2-yl)-2,5 diphenyltetrazolium bromide, 5 mg/mL suspended in PBS), was added to each well and incubated for 4 h. The formazan crystals are extracted from the cells with a solubilizing solution (DMSO). An ELISA reader (Thermo Fisher, Phadia AB, Uppsala, Sweden) was used to measure the optical density at a wavelength of 570 nm and reference length 630 nm. The results were expressed as optical density values. pH measurement The pH was assessed with pH indicator strips at 24, 48 and 72 hours.
Results: The cells exposed withthe two bioceramic materials showed differences in terms of viability at 24h, 48h and 72h but not statistically different.
No differences between the PH after the cement setting at 24h, 48h and 72h was detected: P>0.1.
Conclusion: Bioceramic cements revolutioned endodontic procedures. The biggest limit of ProRoot MTA is the low manipulability so, a new cement was introduced in the market (Biodentine) in order to obtain an easier manipulation. Despite the tests reveal comparable results,the possibility to use a material in a humid clinical condition is a big advantage for the clinician especially in pediatric dentistry. Cell Viability and PH value was comparable between the two tested materials. Further study are necessary to well evaluate the exact role of calcium since, according with the existent literature, MTA shows better clinical outcomes especially in pulp capping procedures.

Oro-dental manifestations in patients affected by celiac disease: possible diagnostic criteria

Suttora L.[1], Zanchi C.[1], Orzes N.[1], Franco A.[1], Not T.[1], Cadenaro M.[1]

[1]Department of Medical Sciences, University of Trieste; IRCCS Burlo Garofolo, Trieste. Department of Medical, Surgical and Health Sciences, University of Trieste. Gastroenterology and digestive endoscopy, Policlinico of Udine.

Aim: Celiac disease (CD) is an immune-mediated systemic disorder triggered by exposure to dietary gluten and characterized by the presence of small intestinal enteropathy. The first aim of this study was to investigate the correlation between CD and the associated oral manifestations to understand if the dentist could have a primary role in the diagnosis of CD. An early identification of the disease is indeed essential in order to prevent CD's complications. The oral signs examined in the study were the following: enamel defects (ED), recurrent aphthous stomatitis (RAS), dental caries, teeth eruption delay and geographic tongue. The second aim was to understand if there was a direct correlation between

the ED and other CD clinical signs and symptoms and laboratory values (i.e. time of gluten exposure, concentration of anti-ttg antibodies, serum calcium, vitamin D, and PTH levels).
Methods: Patients were divided in four groups: group A+, celiac adult patients; group A-, adults without diagnosis of CD; group B+, celiac children; group B-, children without diagnosis of CD. Data from each patient were collected by a single operator. Each visit was divided in five consequential phases: A) collection of the informed consent from the patient; B) identification of the exclusion/inclusion criteria; C) collection of personal and anamnestic data; D) dental visit; E) collection of laboratory data - obtained from the medical records of each patient-. Patients were visited and each hard and soft tissue's lesion of the mouth was clinically recorded and photographed. Data were statistically analysed through Fisher's and Mann-Whitney's Tests.
Results: 276 patients were visited. Patients with CD had more ED than healthy patients (Fisher test, p =0.0126). A statistically significant difference was found between group A+ and A- (p =0.0350). Third degree lesions (according to Aine classification) were significantly more frequent in patients with CD (p =0.0284). Children with CD showed a delay in primary teeth replacement compared to healthy children (p =0.0053). RAS was statistically more frequent only in adults with CD (p=0.0360). Caries and geographic tongue prevalence was similar in all groups. In celiac patient ED were not correlated with other CD clinical sign and symptoms or laboratory values.
Conclusions: The recognition of oro-dental signs or symptoms associated with CD, like ED (especially third degree according to Aine classification), RAS and delayed dental eruption in children could lead to early diagnosis of CD, especially of the silent form. A timely diagnosis, in fact, can help to prevent serious complications of this disorder. Dentists, during dental routine visits, perform a central role in identifying patients at risk who should be referred to a gastroenterologist for more specific diagnostic tests.

Direct restorations in pediatric dentistry: preliminary data of a randomized clinical trial comparing the classic glass ionomer cement versus an alkasite material

C. Tselemegkou[1], F. Pardossi[1], E. Giannotti[1], L. Scarpata[1], M. Pasini[1]

[1]Specialization school in Pediatric Dentistry, Unit of Pediatric Dentistry, Department of Surgical, Medical and Molecular Pathology and Critical Care Medicine, University of Pisa, Pisa, Italy

Aim: The aim of this prospective clinical study is to observe the differences in the clinical performance of restorations performed on deciduous teeth using two different materials: Glass Ionomer Cement (Fuji IX GP,GC EUROPE) and Alkasite Material (Cention N, Ivoclar Vivadent AG, Liechtenstein) over a 3 month period.
Methods: The study took place in the department of Paediatric dentistry at the University of Pisa. Were included 45 children between 5 and 9 years old with at least two caries on controlateral elements of the same arch (first upper or lower deciduous molars, or second upper or lower deciduous molars) and with lesions Class II according to the classification of Black. Patient selection was based on predetermined inclusion and exclusion criteria. For each patient, one of the two lesions was treated with GIC, while the other was treated with the Alkasite Material. Both lesions were treated by the same clinician starting from the one on the first quadrant (5) if the caries were on the upper arch or the fourth quadrant (8) if the caries were on the lower arch removing all the carious tissue and using the same burs for both cavities. The choice of the materials was randomized by a second clinician before the appointments: two opaque envelopes were prepared for each patient (one with GIC written inside and the other with Alkasite Material). The remaining material was used on the second quadrant (6) if the caries were on the upper arch or third quadrant (7) if they were on the lower arch. The two materials were prepared according to the indications of the manufacturers. In the follow-up appointment at 3 months the quality of the restorations was evaluated according to the SQUACE (Semi quantitative clinical evaluation) and the evaluation tables provided by the FDI with the acquisition of photographs. The evaluation was done by a third clinician who wasn't involved in the whole process. The assessment of the quality of the restoration is divided into three "sections": aesthetic properties, functional properties and biological properties. For each, a certain number of aspects are listed and five available scores are assigned. The first three scores (1 to 3) suggest the acceptability of the restoration, while the last two (4 and 5) imply the need to repair or replace the restoration.
Results: All 45 children were presented at the follow-up appointment. The restorations performed with the Alkasite Material presented shiny surface, color stability and traslucency and a great marginal adaptation preventing infiltrations. In addition, being a non porous material it is better cleansed than GIC. Only 1 of the 45 restorations performed with the Alkasite Material had to be replaced (97,8% success) against the 100% success of GIC. The comparison of

these two materials has no statistically significant differences at 3 months follow-up in terms of percentages of restoration failure.
Conclusion: The Alkasite Material presented a better clinical performance in comparison to GIC but as the differences are not statistically significant at 3 months follow-up, a longer period of observation and in vitro analysis of the deciduous teeth are necessary in order to confirm these preliminary results.

Gingival fibromatosis with hypertrichosis: a case report

F. Villamaina Scorrano, R. Santoro, C. Cecere, A. Di Santi, F. Loffredo, L. Nastri, L. Laino, G. Minervini

Multidisciplinary Department of Medical-Surgical and Dental Specialties, University of Campania "Luigi Vanvitelli", Naples, Italy

Aim: Gingival fibromatosis is a rare and heterogeneous group of disorders characterized by pathological growth of gingiva with a slow and progressive increase. Fibromatosis can be diffuse or localized. This pathology may be associated with other conditions such as hypertrichosis characterized by abnormal growth of terminal hair in female subjects. In this study we want to describe a case of Gingival Fibromatosis associated with hypertrichosis in a 17 years old girl.
Methods: The patient comes to our observation referring pain, profuse gingival bleeding and a substantial increase of gingival volume responsible of an impaired mastication and adversely affecting her social life. The extraoral examination shows an excessive hair growth on the arm and face. Parents of girl report that gingival increase started and developed gradually, in particular observing a correlation with permanent teeth eruption. They refer that Hypertrichosis is congenital and cases of Gingival fibromatosis do not exist in their family nor previous drug use that can be associated to this disease. The intraoral examination shows, instead, generalized Gingival Hypertrophy in the upper jaw and mandible. The hypertrophic tissue covered the dental crowns for 2/3 of the surface. At palpation, the exuberant tissue appeared with an elastic and hard consistency. Others Pathological conditions exist in this patient like upper labial frenulum with low insertion, dental malocclusion and poor oral hygiene. The patient undergoes gingivectomy and gingivoplasty surgery and frenulectomy of the upper median frenulum. Surgical treatment was performed under local anesthesia using electrosurgery for better management of intraoperative bleeding because of the size and nature of the tissue to be removed. The different kinds of surgery were performed in 2 stages with a distance of 2 weeks from each other to improve the comfort and compliance of the patient in following the post-operative prescriptions. The first phase involved the upper arch and the second the lower one. A biopsy sampling was performed during surgery. After surgery drugs therapy is administered for 10 days consisting of mild antiseptic mouthwashes, antibiotic therapy and periodontal wraps. The histopathological diagnosis was compatible with Gingival Fibromatosis. One week later a follow-up visit was made to assess the healing.
Results: After one month from the last post-surgery check-up, the patient is examined and shows a return to normal gum shape and a progressive re-epithelialization of gingival tissue. The patient is checked every three months to monitor any transformations.
Conclusion: Gingival Fibromatosis is a rare condition often associated with other diseases or syndromes. The trigger mechanism of this disease is still unknown today. Surgery is necessary in order to improve these patients oral function and quality of life. Since a recurrence cannot be ruled out, it is very important to monitor patients with close follow-ups.

Intrusive luxation of permanent incisors: evaluation and prognosis.

Pizzi S.[1], Caramaschi E.[1], Sponcichetti A.[1]

[1]Università degli Studi di Parma - Dipartimento di Medicina e Chirurgia, Parma, Italy

Aim: The management of intrusive luxation in the permanent dentition is controversial. Intrusion is defined as the axial dislodgment of the tooth into its socket and is considered one of the most severe types of dental trauma. This kind of trauma is an uncommon injury but it is considered one of the most severe types because of the risk for damage to the pulp, to the periodontal ligament and to the alveolar bone. Furthermore, treatment outcome is often unpredictable because of the large number of injury related variables, which influence choice of treatment and prognosis. A review was performed to evaluate intruded teeth on the base of root development and degree of intrusion, to investigate important factors and identify the right treatment of teeth with intrusive luxation.
Methods: Were performed hand and electronic searches on database like PubMed/MEDLINE, Embase, US Clinical Trials, and ISRCTN. Root resorption as primary outcome; marginal bone defects and/or pulpal changes as secondary outcomes were evaluated as periodontal results in patients with one or more intruded permanent teeth after surgical repositioning, orthodontic repositioning or spontaneous re-eruption.
Results: No significant difference between surgical

repositioning and spontaneous repositioning for root resorption. For secondary outcomes, spontaneous repositioning was significantly better than surgical repositioning and orthodontic repositioning. Subgroup analyses showed no significant differences among treatments in teeth with completely formed roots and a better prognosis when spontaneous repositioning was performed in teeth with incompletely formed roots.

Conclusion: Given that infection can be controlled by endodontic therapy, it appears that spontaneous eruption results in the fewest complications in immature teeth, regardless of the degree of intrusion. In teeth with immature root development, no active treatment appears to result in fewer healing complications. Spontaneous re-eruption is possible, even in severely intruded teeth with open apices. Significant correlations to the treatment outcome were root development and degree of intrusion. Healing of the periodontal ligament will determine prognosis. When a normal ligament is obtained during healing or when surface resorption is obtained, the tooth can be preserved for a long period. When progressive replacement resorption (ankylosis) develops, most teeth can remain in position for about 10 years. When inflammatory resorption develops, the tooth will be lost within a short time. The available evidence does not allow us to conclude on the best treatment for traumatically intruded teeth. Guidelines for treatment are currently not based on strong evidence. More reliable evidence is needed.

Case report: peripheral giant cell epulis in a pediatric patient

J.Padalino[1], S.Rania[2] , R.Pertile[2], M.Santoro[1]

[1]Scuola di Specializzazione in Odontoiatria Pediatrica, Università Insubria Varese
[2]P.O. Gallare, ASST-ValleOlona

Aim: Gingival enlargement is one of the frequent features of gingival diseases. However, due to their varied presentations, the diagnosis of these lesions becomes a challenge for the clinician. These lesions can be categorized in relation to their etiopathogenesis, location, size, extent, etc. Giant cell lesions are a group of varied lesions that contain a multitude of multinucleated, osteoclast-like giant cells within connective tissue stroma. Giant cell lesions comprised 9.29% of all oral lesions, can be central, if they lie within the jaw bone, or peripheral if they lie within the soft tissue. The aim of this article is to try to define a protocol to diagnose and to treat these lesions in pediatric patients.

Methods: A female patient of 10 years old presents a red - purple lesion of 1,5cm on the vestibular gengiva of 4.4 - 4.5. It's painless. The OPT doesn't show any loss of mandibular bone. The diagnostic ipotesis is epulis or granuloma. The surgery has been programmed in local anesthesia and the lesion has been removed with diode laser. The result of biopsy was peripheral giant cells epulis. After 7days we removed sutures.

Discussion: Gingival enlargement is one of the frequent features of gingival diseases. However due to their varied presentations, the diagnosis of these lesions becomes a challenge for the clinician. They can be categorized based on their etiopathogenesis, location, size, extent, etc. Based on etiopathogenesis, enlargements could be inflammatory, drug influenced, those associated with systemic conditions or diseases, neoplastic or false enlargements. According to location, enlargements could be marginal, papillary or diffuse. Based on distribution they can be localized or generalized. Localized enlargements could be further divided into three subtypes, "isolated, discrete" or "regional". Based on etiopathogenesis, enlargements could be inflammatory, drug influenced, those associated with systemic conditions or diseases, neoplastic or false enlargements. According to location, enlargements could be marginal, papillary or diffuse. Based on distribution they can be localized or generalized. Localized enlargements could be further divided into three subtypes: "isolated, discrete" or "regional". "Isolated" enlargements are those limited to gingiva adjacent to single or two teeth. "Discrete" lesions are isolated sessile or pedunculated, tumorlike enlargements. "Regional" enlargements refer to involvement of gingiva around three or more teeth in one or multiple areas of the mouth. "Generalized" enlargement refers to involvement of gingiva adjacent to almost all the teeth present. Giant cell lesions are a group of varied lesions that contain a multitude of multinucleated, osteoclast-like giant cells within connective tissue stroma. These include giant cell granulomas which may be central, if they lie within the jaw bone, or peripheral if they lie within the soft tissue. The differential diagnosis of PGCG includes pyogenic granuloma, fibrous epulis, inflammatory fibrous hyperplasia, peripheral ossifying fibroma, peripheral odontogenic fibroma, and papilloma. In children, reactive oral lesions like PGCG may exhibit a rapid growth rate and, within several months of initial diagnosis, reach significant size. These soft tissue nodules may sometimes be quite aggressive and cause bone resorption, interfere with eruption of teeth and its movement of varying degrees. Radiographs aid in confirming that PGCG does not represent a central bone lesion with cortical perforation along with soft tissue extension, but from the oral mucosa. Early detection results in decreased risk of tooth and bone loss. Histopathological examination confirms the diagnosis.

Conclusions: The PGCG of the oral cavity is more commonly seen in the mandibular arch, clinically manifesting as a firm sessile or pedunculated nodule. It usually arises in response to local irritation, mainly from the gingival connective tissue, periodontal membrane, or periosteum of the alveolar ridge. The choice of treatment is influenced by clinical behavior of the lesion. The patient's age, site, and extension of the growth are also contributing factors. Early detection in children enables conservative management, resulting in decreased undesirable loss of oral structures.

Dentoalveolar trauma in pediatric patients with disabilities

Sebastiano Cutrupi[1], Marzia Petrocelli[1], Francesco Maria Cassandro[1], Anna Maria Baietti[1]

[1]Dentistry Operative Unit for Severe Disability – Bellaria Hospital-Ausl Bologna

Aim: Our study describes the therapeutic protocol used at the Dentistry Operative Unit for Severe Disability – Bellaria Hospital-Ausl Bologna for pediatric patients affected by dentoalveolar trauma; and report of a case of dento-alveolar fracture in a 14-year-old patient with Asperger's syndrome.
Methods: Pediatric patients (0-14 years) with disabilities who come to our Unit, suffering from dentoalveolar trauma are managed with conservative treatment in the case of syndromes that allow a modest degree of collaboration as for some forms of autism, the Down syndrome, some forms of epilepsy, cardio vascular pathologies, hematological pathologies. For the diagnostic therapeutic framework we follow the classification of the WHO of 1992 and the treatment guidelines according to Ellis (1945) and Spinas (2002). The diagnostic framework includes clinical objectivity, orthopantomography x-ray and/or intraoral x.ray, CT scan of the jaws in case of complex trauma. In according to the IADT guidelines of 2007 a clinical and radiographic follow-up is performed at one week, 2-3 weeks, 3-4 weeks, 6-8 weeks, 6 months and 1 year, 5 years. The non-conservative treatment is used for cases in which the severe disability does not allow any collaboration for the diagnosis, treatment and follow-up of these pathologies. We report a case of dento-alveolar fracture in domestic facial trauma with complete dislocation of 22 tooth and mobility of 21 tooth in a 14-year-old female patient with Asperger's syndrome. A thin layers CT scan and orthopantomography x-ray were performed. The patient was subjected, in collaboration with maxillo-facial surgeons, to dental repositioning surgery with reduction of alveolar bone fracture and fixation with titanium plate and screws and dental stabilization with dental splint from 13 to 25 teeth. The patient was discharged two days after the surgical procedure with antibiotic and anti-inflammatory home therapy and with the prescription of a liquid/creamy diet for 4 weeks. At 4 weeks after surgery we performed vitality tests of 21 and 22 teeth, they result negative so we performed a root canal therapy on 21 and 22 teeth after intraoral X-ray. At 2 months from surgery and after orthopantomography x-ray we performed an apicectomy of 21 and 22 teeth and we removed titanium plate and screws. The patient is currently in bimonthly follow up.
Results: The timeliness of the diagnostic and therapeutic framework has allowed, in the case reported an immediate aesthetic restoration and a gradual functional restoration of a permanent frontal dental group.
Conclusion: Our study shows how pediatric patients with severe disabilities but with a modest degree of collaboration allow the adoption of a therapeutic protocol similar to the one adopted for patients without health vulnerability affected by dentoalveolar trauma obtaining good results in terms of aesthetic and functional restoration.

Management of odontogenic periorbital cellulitis in a pediatric patient

Carlo Paolo Vellan[1]; Anna Maria Baietti[1]

[1]AUSL Bologna, Scuola di Specializzazione in Odontoiatria Pediatrica, University of Milano

Aim: Infection of dental origin is one of the most common disease affecting the orofacial region. The cause of odontogenic infection is generally the endogenous oral flora and it is typically polymicrobical. Early recognition and management of these infections is crucial due to the rapid systemic involvement in order to minimize associated risks. The treatment of these odontogenic infections in children continues to be a challange for the clinicians. The extension of odontogenic infections into the orbit can occur via a variety of pathways. Root apices of upper teeth are anatomically proximal to adjacent muscle, connective tissue, and sinuses. The most common route of spread is through the maxillary sinus into the inferior orbit via orbital fissure or defect in the orbital floor. This study describes a case of periorbital cellulitis resulting from an odontogenic abscess in a pediatric patient.
Methods: A 14 years old patient with severe left periorbital and face swelling, high fever and pain has been hospitalized in the Pediatric Department of the Maggiore Hospital in Bologna, and treated with double parenteral antibiotic therapy (Amoxicillina

with clavulanic acid and Clindamicina). Intraoral examination, orthpantomography and three dimensional computer tomography confirmed that the origin of the dental abscess was the first left molar. The tooth was removed and the abscess drained.

Results: The inflammatory parameters improved, with resolution of the fever. The surgical management removed the tooth that caused the infection and reduced the compression of anatomical spaces together with adequate drainage. On day 3 of hospital admission, the patient was in good general condition, the surgical wound showed no signs of infection, and the inflammatory parameters were found to have normalized. A multidisciplinary management, involving paediatric, paediatric dentist, oral surgeon and radiologist determined a favourable clinical outcome.

Conclusion: The most common cause of odontogenic infection, as well as periorbital cellulitis, is dental caries involving the pulp. An early diagnosis and treatment are fundamental to avoid significant complications and to reduce the length of hospitalization. This case report demonstrates the foundamental role of oral prevention in childhood.

Orthognathodontics

Extraction of the deciduous canines as an interceptive treatment: case report

Perrotta S, Adaimo R, Manisera E, Baiano R, Petrucci P, Valletta R.

Department of Neuroscience and Oral Sciences, Section of Orthodontics and Temporomandibular disorders, University of Naples Federico II,Naples, Italy

Aim: As reported in literature maxillary canine impaction is often encountered in orthodontic clinical practice. The frequency ranges from 1.7% in the general population to 4.3% in the population of subjects referred to oral surgery or orthodontics departments. The palatally displaced canine could determine the impaction of the permanent canine and other consequences such as the resorption of the roots of the neighbouring permanent teeth. To avoid the impaction of permanent canines the interceptive treatment is recommended by the extraction of the deciduous canines, to promote the eruption of malpositioned canines. The aim of this study is to describe the successful management of displaced permanent canines by the interceptive extraction of the corresponding deciduous canines.
Methods: The 13 years old female patient came in our department with a dental-skeletal Class I malocclusion and orthognathic profile. By means a clinical observation it was not present the mobility of the deciduous canines and the dental bumps of the permanent canines were not detectable. The x-ray evaluation showed a bilateral maxillary canine impaction in sector 3 and 4 according Ericson and Kurol's classification. Treatment plan consisted in the extraction of the deciduous canines, and waiting for the spontaneous eruption of the upper canines. Panoramic radiographs were evaluated at initial observation (T1) and after an average period of 18 months (T2). The patient did not receive any additional orthodontic or surgical therapy beyond the extraction of the deciduous canine.
Results: The eruption of impacted canines becomes spontaneous in a time window between 6 and 18 months as described in literature. Favourable and greater changes of the intrabony position of the maxillary permanent canine (in terms of uprighting the long axis of the canine and distal movement of the canine crown) were obtained and a spontaneous tooth eruption into the dental arch was observed.
Conclusion: The early diagnosis of the ectopic canine is important to reduce the risk of the inclusion of the permanent canine or the ectopic eruption. The persistence of the deciduous canines implicates an accurate evaluation of the localization of the permanent canine, whose the eruption becomes difficult both space deficiency in arch and transversal skeletal contraction. In conclusion, the extraction of the upper deciduous canines represents a valid interceptive tool to the spontaneous eruption of the upper permanent canines in a period ranged 6 to 18 months, as reported in scientific literature.

Food texture as a possible risk factor for malocclusion

F. Agostini, F. Pasquali, A. Blasi, G. Runci, C. Romeo

Postgraduate School in Orthodontics - Catholic University of the Sacred Heart, Rome, Italy

Aim: This study aims to assess if there is a correlation between food texture and malocclusion in a growing subject population.
Methods: A sample of 100 patients (57 females and 43 males, mean age of 7.77) has been observed in the Department of Orthodontics of Fondazione Policlinico

A. Gemelli (Rome). Syndromic patients and those who had previously received extensive orthodontic treatment were excluded. Each patient was evaluated from a dental and orthodontic point of view by the help of ROMA Index and the type of malocclusion was identified by distinguishing problems on the sagittal, vertical or transversal plane, and the crowding. Intra-examiner reliability was assessed on the records of 20 children collected by the same operator during two different sessions; another collaborator independently collected a third record for each of the 20 children to allow the assessment of inter-examiner reliability. The reproducibility of the Index was evaluated by using the K coefficient as a measure of concordance. The parent/guardian of each subject was given a questionnaire about the child's eating habits. Through this tool the habits of taking certain foods during the week have been investigated: 32 categories of foods, 16 considered "soft" and 16 considered "hard". The weekly intake frequencies for each food were then calculated and added together, in order to place each patient in group H (prevalence of hard foods) or in group S (prevalence of soft foods), depending on the predominant result. In order to evaluate the statistical significance ($p<0.05$) of the differences between the groups, a multivariate analysis was conducted to verify the influence of covariates (food texture) and the dependent variable (signs of malocclusion).

Results: 70 subjects mainly took soft foods and all of those patients had at least one type of malocclusion. The distribution of orthodontic problems was 35.1% class II, 4.8% class III, 31.9% increased overbite, 14.6% open bite, 7.6% cross-bite and 19.6% dental crowding. 30 subjects mainly tookhard foods. The distribution in this group was 27.4% class II, 13.7% class III, 25.5% increased overbite, 15.6% open bite, 4.7% cross-bite and 10.5% dental crowding. As regards intra- and inter-examiner reliability the data collected by the two examiners revealed a high level of agreement. K values range from 0.643 to 1.00 with respect to intra-examiner agreement ($0.00<p<0.002$), and from 0.773 to 1.00 regarding inter-examiner agreement ($p=0$).

Conclusion: The role of food texture in the diet is little known as a risk factor for malocclusion.The percentage of prevalence of malocclusion has been shown to be greater in those who prefer less consistent foods. Nevertheless, statistical analysis results were not significant. Further studies will help to clarify the role of food chewing in the development of occlusion.

Comparative analysis of passive play and torque expression in self-ligating and traditional lingual brackets

Paolo Albertini[1], Valentina Mazzanti[2], Francesco Mollica[2], Luca Lombardo[1], Giuseppe Siciliani[1]

[1]Postgraduate School of Orthodontics, University of Ferrara, Ferrara, Italy
[1]Department of Engineering, University of Ferrara, Ferrara, Italy.

Aim: Torque expression is influenced by many factors concerning wires or brackets, such as material properties, dimensions, precision, edge bevels, teeth position and angle of torsion. The lack of control between slot and wire is known as the angle of "play". This angle represents the degrees of rotation that a rectangular wire must be twisted to engage the slot and generate a biomechanical torque. The aim of this study is to determine and compare the play and torque expression of self-ligating and traditional lingual brackets, with square and rectangular slots, when engaged with archwires of different size, cross section and material.

Methods: Five different lingual bracketswere selected for the study: In-Ovation L (DENTSPLY GAC, Bohemia, NY, USA), Harmony (American Orthodontics, Sheboygan, WI, USA), eBrace (Riton Biomaterial Co., Guangzhou, International Bioisland, China), STb and Alias (ORMCO, Orange, CA, USA). Five lingual brackets per type were welded to metal supports with their slots perpendicular to the support axis, in order to cancel out tip and torque values. Three different archwires were selected for the study, except for Ebrace and Harmony which provided the analogous archwires sequence. Each archwire was then engaged in a 'torquing key', a type of pliers purposely designed to clamp the wire at 6 mm apart. The purpose of this key was to transfer the information that is created between archwires and slots, facilitating the reading of the play and through geometric calculations analyzing the possible clinical situations. To assess the real play between the different archwires and lingual bracket slots, load-deflection tests was performed using an Instron 4467 dynamometer (Instron, Norwood, MA, USA) featuring a 100 N load cell and a testing strip. The vertical displacement in height from the slot to the torquing key, connected through the archwire to the slot, determines the play in degrees. Engaging the archwire, the torquing key rod was spontaneously lowered with respect to the horizontal plane due to 'passive' play. Knowing the distance (d) between strip height and bracket height, and fixing the torque (K) at 5 Nmm, 10 Nmm and 20 Nmm, we were able to identify the loaf (F) at which the archwire expressed moments of 5 Nmm, 10 Nmm and 20 Nmm (the extremes of the clinically efficacious range), by means of the formula $F = K / d$.

Results: Regarding full thickness SS archwires, the lowest passive play was found in STb brackets (2,66° ± 0,89° with 0.018x0.018 SS), which is statistically better than ALIAS brackets (4,44° ± 0,75° with 0.018x0.018 SS), which is statistically better than In-

Ovation L brackets (6,14° ± 3,22° with 0.018x0.018 SS), Harmony brackets (7,76° ± 2,94° with 0.018x0.025 SS) and eBrace brackets (9,46° ± 3,94° with 0.025x0.017 SS). STb and ALIAS brackets showed the best results as passive play, but by increasing the torsional load to the greatest torsional load clinically applicable, there were no statistical differences between these two type of brackets and In-Ovation L and Harmony brackets.

Conclusion: STb and ALIAS brackets generated the highest moment as passive play; STb and In-Ovation L brackets expressed the highest moment at the greatest torsional load clinically applicable. These measurements allow to understand the accuracy of lingual systems and at the same time the entity of overcorrections to be applied in the setup in order to obtain high quality orthodontic treatments.

Psychosocial impact of dental aesthetics in juvenile idiopathic arthritis adolescents

Bucci R., Rongo R., Amato A.,Valletta R., D'Antò V.

Aim: The concept of quality of life as multidimensional construct embraces a biopsychosocial model of health in which symptoms, physical functioning, emotional and social well-being are embedded. The quality of life is particularly crucial for patients suffering from chronic diseases, including juvenile idiopathic arthritis (JIA). JIA is the most common form of chronic arthritis in children and adolescents. The disease causes pain, morning stiffness, and fatigue affecting normal lifestyle of children and their parents. Since many previous researches showed that malocclusion not only affects function and aesthetics, but it also has important social, psychological and financial repercussions, the aim of this study was to investigate whether the existence of a systemic pathology affecting also the stomatognathic system (JIA) can influence the psychological profile and alter the perception of dental aesthetics in adolescents.

Methods: A consecutive sample of adolescents with diagnosis of JIA, aged between 13 and 18 years of age, has been recruited among the patients attending the clinic of Pediatric Rheumatology of the University of Naples Federico II (Italy). All the subjects were invited to fill-in written questionnaires, with the help of their parents and the constant supervision of a clinician to ensure the correct comprehension of the questionnaires. The questionnaires used were as follows: Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ), Perception of Occlusion Scale (POS), Aesthetic Component of the Index of Orthodontic Treatment Need- (AC-IOTN), Symptom Checklist-90 (SCL-90), Pediatric Quality of Life Inventory (PedsQL)andRosenberg Self-Esteem Scale. Furthermore, a clinical examination was performed and the malocclusion was rated using the Dental Aesthetic Index (DAI). The sample was divided into four subgroups according to the DAI and an Analysis of Variance (ANOVA) was used to assess wheatear there was any difference in the psychological variables according to the different severity of malocclusion. The significance level was set at $P<0.05$.

Results: The sample comprised 50 subjects, 20 males (mean age 14.9 ± 1.6 years) and 30 females (mean age 15.1 ± 1.9 years). The total sample presented a mean age of 15.0 ± 1.7 years. Of the 50 patients, 31 individuals presented a diagnosis of oligoarticular arthritis, 18 individuals presented a diagnosis of polyarticular arthritis and 1 individual presented a diagnosis of systemic arthritis. No significant differences were found in all the analyzed variables among the different malocclusion severity subgroups, divided according to the DAI.

Conclusion: The psychological profile and the perception of dental aesthetics in adolescents with JIA are not influenced by the severity of their dental malocclusion. Therefore, orthodontic treatment aiming to only improve the dental aesthetics must be done with caution, since no clear impairment of the psychological and social life of these individuals have been observed due to the malocclusion.

Surgical–orthodontic approach in dentoalveolar trauma: a case report

M. Caizzi, L. Coppola, E. Angelino, A. Balian, A. Malerba, L. Strohmenger

Pediatric Dentistry Departement, Dental Clinic "G.Vogel", ASST Santi Paolo e Carlo, University of Milan, Italy

Aim: Traumatic events of the oral and maxillofacial district which involve frontal teeth are common in daily dentistry clinical practice. The prevalence of dento-alveolar traumas is estimated to be 30%, with greater involvement of male gender, in pediatric and adolescent patients. The most frequently affected teeth are the central upper incisors followed by the upper lateral incisors and the lower incisors. Among the predisposing factors we find:

1. Dental factors (cavities, enamel dysplasias, etc.)
2. Dento-facial factors (open bite malocclusion, prognathism, etc.)
3. Systemic factors (age, stress, epilepsy, sports practice, etc.)

We present a relevant case report: B.Q.M. is a 10-year-old male patient with a chromosome 15q trisomy, epilepsy from the age of 6 months in pharmacological therapy with topiramate, retarded mental development. In April 2017 he came in the E.R. of the San Paolo

Hospital (Milan) because of a facial trauma due to a car accident. During the clinical examination it was noticed:
- swelling and soft tissue edema;
- fracture of the frontal mandibular alveolar process;
- vestibular dislocation and extrusion of the teeth 3.2, 3.1, 4.1, 4.2;
- absence of the tooth 7.3.

Methods: In the first instance X-rays examinations were carried out:
- Ortopantomography: to evaluate the state of the teeth involved and possible consequences interesting jaw bones; moreover, it was possible to exclude the intrusion of the tooth 7.3.
- Computed tomography: to evaluate the fracture of the alveolar bone defining its extension.

The surgical-orthodontic treatment was performed in a deep sedation condition with administration of sevoflurane, midazolam, atropine. Then, after a local anesthesia with 2% mepivacaine and vasoconstrictor (adrenaline), it was performed:
- Reduction of the fracture of the mandibular alveolar process;
- Stabilization of the teeth involved by orthodontic splinting with adhesive method (composite and steel wire 0.020). In particular, a vestibular splinting of the elements 8.3, 4.2, 4.1, 3.1, 3.2, 7.4, 7.5 has been performed. Antibiotic and analgesic therapy with topical applications (gel with chlorhexidine) have been prescribed.

Results: Periodic checks (1, 2, 4, 6, 10 weeks) were performed in which splinting stability, soft tissue healing, mobility and vitality of the teeth were evaluated. After 6 weeks the splinting was removed: the teeth 4.2, 4.1, 3.1, 3.2 were positive on the cold vitality test with mobility of grade I and local lesions were absent. After 10 weeks: teeth maintained their vitality and had physiological mobility. It was not possible to continue with a long-term follow-up due to the transfer to South America of the patient who was advised to undergo subsequent and routine odontostomatological checks.

Conclusion: This case report underlines the importance of multidisciplinary approach in the treatment of dentoalveolar trauma. Surgeons and Orthodontists have to take care of the same patient who usually comes frightened and aching because of trauma. In order to guarantee patient's comfort and a successful treatment, it was decided to use deep sedation. Orthodontic splinting of the teeth involved and surgical reduction of alveolar fractures are the gold standard in the treatment of this kind of trauma. In addition, periodic controls with a correct follow-up play an important role in the final outcome and, therefore, in the optimal resolution of the case. In particular, our little patient has restored the function and the aesthetics of the interested anatomical district.

Anatomical dento-alveolar characteristics of lateral incisor agenesis patients with different amount of incisor proclination

A.M. Bellocchio,Paola Spinuzza*, L. Rustico*, A. Lo giudice*, E. Gatto*, A. Militi*, M. Portelli*, M. Farronato, G. Farronato,R. Nucera*

Department of Biomedical and Dental Sciences and Morphofunctional Imaging, Section of Orthodontics, School of Dentistry,University of Milan .Director Prof. G Farronato
*Department of Biomedical and Dental Sciences and Morphofunctional Imaging, Section of Orthodontics, School of Dentistry, University of Messina, Policlinico Universitario "G. Martino", Messina, Italy.

Aim: The aim of this study was to evaluate, in subjects with agenesis of the lateral incisors, the residual space for implant insertion in relation to the occlusal conditions of the patient. The distance between the root of the central incisor and the canine has been assessed. The hypothesis is that the distance between the root of the central incisor and the canine can be influenced by the torque of the anterior maxillary sector.

Methods: The sample included CBCT records of 30 subjects with central incisor agenesis (mean age 19,31 ± 3,1) retrospectively evaluated.
All CBCT examinations were performed with i-CAT CBCT scanner (Imaging Sciences International, Hatfield, Pa). Each exam was converted into DICOM format and processed with OsiriX Medical Imaging software.
In sagittal Vision was assessed the cephalometric angle ANS ANP API + normal place at 103 ° +-2 °. The sample was divided into two groups: group A (ANS ANP API + > 105 °) and group B (ANS ANP API + < 101 °). A best-fit scan able to detect both the roots of central and lateral incisor was select and outcomes measurements were performed on this specific scan. On this reference scan the axes of central incisor and lateral incisor were identified and a bisector was calculated. Two outcomes perpendicular to the bisector were measured evaluating the distance between central and lateral incisor at the level of bone crest and at the level central incisor apex. The convergence between lateral and central incisor roots was also measured. Differences between the two groups were evaluated with inferential statistics.

Results: The two evaluated groups showed significant differences in terms of distance between the apexes ($p<0.01$) and convergence between lateral and central incisor roots ($p<0.01$). Pooling together the date from both groups a positive correlation was found between roots convergence and incisors proclination.

Conclusion: When evaluating treatment options in case of lateral incisor agenesis, clinicians should take into consideration that the option strategy to open/keep lateral incisor space could be more challenging, in

terms of implant placement, in patients with proclined incisors.

Qualitative evaluation of different palatal sites for orthodontic mini-implants (omis) placement: a systematic review

Bertoldo Serena[1], Squillace Francesca[2], Ersilia Barbato[3]

[1]Student, Department of Maxillofacial Sciences, School of dentistry, "Sapienza" Univeristy of Rome, Rome, Italy
[2]DDS, Department of Maxillofacial Sciences, School of dentistry, "Sapienza" Univeristy of Rome, Rome, Italy
[3]DDS, PHD, M.Sc Full Professor, Department of Maxillofacial Science, School of dentistry, "Sapienza" Univeristy of Rome, Rome, Italy

Aim: To investigate the potential sites for a successful insertion of orthodontic mini-implants in the palatal surface through a systematic review of studies.
Methods: An electronic search was conducted in the Cochrane Central Register of Controlled Trials (CENTRAL), Web of Knowledge, Scopus, MEDLINE and PubMed systematic review. An extensive search strategy was performed that included key words: "miniscrew" – "mini-implants" – "OMIs" – "palatal sites" – "optimal sites" – "success". A manual search was also performed. The restriction criteria were the language (only English articles were included), the period of publication (were included articles between January 1980 and January 2019) and the type of study (Randomised Clinical Trials (RCT), prospective Non-randomised Controlled Studies (NRS) and Controlled Clinical Trial (CCT)).
Results: Of the 780 articles identified by the search, 430 were excluded due to language criteria, 380 were excluded due to the type of study, 33 were excluded due to the period of publication and 17 articles remained. The most favorable palatal area for orthodontic OMIs insertion, is the Paramedian area between the distal surface of the canine and the distal surface of the second premolar, 3 - 4 mm distal to the incisive foramen. This area corresponds to the region of the third palatal ruga. Paramedian area must be preferred over the surrounding areas, despite the great bone characteristics of Midpalatal suture because there is a substantial standard deviation in latters, due to the individual variability and furthermore in the Midpalatal area it is important to avoid the insertion of OMIs in adolescents or child, to prevent possible developmental disturbances of the midpalatal sutures. The reason why the Paramedian area is favorable, is for its optimal properties: high bone density, increased cortical bone thickness , thinness of the soft tissue and adequate distance from the roots. When it is impossible to insert the OMIs in this area owing to specific anatomical or clinical impediment, the best alternative is the palatal alveolus between the maxillary second premolar and first molar. However this area has more risks than the previous one: it is near the major palatine foramen that, with its dense vascular bundle, can be problematic. Moreover moderate quality of evidence indicates that there is greater risk of root contact in this area which significantly contributes to the failure of OMIs.
Conclusions: OMIs could be placed in various sites and every one of those has its potential anatomical advantages and limitations. The anterior palate appears to be the best sites for OMIs placement and it is optimal for supporting various orthodontic treatments. The best alternative is the alveolus region between the roots of the second premolar and first molar. Nevertheless it is important to evaluate carefully critical factor such as the individual interroot distance and the design of the screw. Results should be interpreted with caution because of methodological drawbacks in some of the included studies.

"Asymmetry index" for the fotogrammetric evaluation of facial asymmetry degree

Blasi A.[1], Strappa C.[2], Di Tonno L.[2], Pasquali F.[1], Candida E.[2]

[1]Dentistry Student, Catholic University of Sacred Heart, Rome, Italy
[2]Post-Graduate Student in Orthodontics, Catholic University of Sacred Heart, Rome, Italy

Aim: The aim of the study is to evaluate facial asymmetry through a three-dimensional image to establish the individual grade of asymmetry, in order to create a reproducible index. This study aim is to introduce and validate a new method, based on 3D stereo-photogrammetry, that objectively quantifies asymmetry.
Methods: The protocol of the study obtained the approval from the Agostino Gemelli Foundation ethical committee in March 2018. According to other studies about this topic, 50 patients, 14 males and 36 females, were selected from the Orthodontic Clinic of Catholic University of Sacred Heart in Rome. The range of acceptable ages was from 18 to 40 years old in order to evaluate patients that completed their skeletal growth; moreover they shouldn't have craniofacial deformities or have done previous orthodontic treatments. During the preliminary visit, for each patient, 3D images of the face were obtained with 3dMD Trio-system (Atlanta, GEO, USA); then the images were processed with Geomagic Control 2014 (64 bit) Software, they underwent the mirroring analysis on 16 facial landmarks, significant for the anthropometric analysis described by Farkas, and patients were divided in symmetrical (mean deviations lower than 0,7 mm) and asymmetrical (mean deviations equal or bigger than 0,7 mm). Eventually, the Asymmetry Index was calculated for

each landmark, as well as mean, standard deviation and maximum and minimum values. Moreover, a diagram for the evaluation of face asymmetry was created through the Asymmetry Index mean of symmetrical and asymmetrical patients with Excel 2016.
Results: The mean for the Asymmetry Index varied from 0,06 to 1,83 for the symmetrical patients, whereas for the asymmetrical ones varied from 0,08 to 3,27. The results of this study, according to Alqattan M. et al., suggest that landmarks located along the median line have a smaller Asymmetry Index than the bilateral landmarks.
Conclusions: Facial asymmetry can be accurately and objectively quantified using landmark and surface-based approaches. In fact this study showed that bilateral landmarks have a higher grade of asymmetry than the median landmarks. The Asymmetry Index diagram allows a more precise and reproducible evaluation of the patient facial asymmetry degree. Further investigations on a wider sample are suggested in order to obtain an even more accurate diagram including more grades of asymmetry.

Cephalometric floating norms for the β angle and MMBP-Wits

Sara Bleta, Giuseppe Perinetti, Michele Ceschi,Alessandro Scalia, Luca Contardo

Department of Medical, Surgical and Health Sciences, University of Trieste, Trieste, Italy

Aim: The importance of an accurate measurement of sagittal jaw relationship, that is, skeletal class, is critical to orthodontic treatment planning. The ANB angle, β angle, and MMBP-Wits are among indices of sagittal jaw relationship. All of these indices are subjected to geometrical distortion, especially from facial divergence, making the use of floating (individualized) norms necessary. The aim of this study is to provide floating norms for the ANB angle, β angle, and MMBP-Wits according to facial divergence to obtain individualized cephalometric norms related to each facial type.
Methods: Lateral head films were obtained from 119 subjects (74 females and 45 males; mean age, years; range, 8.2–14.0 years) with well-balanced and pleasant profile and a near-ideal occlusion. A customized digitization cephalometric regimen and analysis with cephalometric software was used for all cephalograms examined. Multiple regression models were employed to quantify the association of the ANB angle, β angle, and MMBP-Wits each with other four angular cephalometric parameters including SNA, SN/PP, SN/MP, and NSBa angles. The β angle and MMBP-Wits were associated with the SNA and SN/MP angles; the ANB angle was associated with all the four other cephalometric variables.
Results: All the three cephalometric parameters of anteroposterior maxillomandibular relationship had significant association with the SNA, SN/PP, SN/MP, and NSBa angles with ranging from 0.183 to 0.212 for the MMBP-Wits and ANB angle, respectively. In particular, the SNA, SN/MP and NSBa angles were positively associated with the ANB angle, while the SN/PP angle was inversely associated. On the contrary, both the β angle and MMBP-Wits were significantly associated with SNA and SN/MP angles. These explanatory variables showed positive and inverse association with β angle and MMBP-Wits, respectively. Regression equations were thus derived for the β angle and MMBP-Wits as follows: β angle = 0.438 β SNA angle + 0.274 β SN/MP angle – 13.525, and MMBP-Wits = –0.321 β SNA angle – 0.219 β SN/MP angle + 30.743. With the use of such equations, floating norms for the β angle and MMBP-Wits (but not ANB angle) have been obtained for most common situations of SNA angle (from 74° to 90°) and SN/MP angle (from24°to 44°).
Conclusions: The ANB angle is subjected to significantly more geometrical distortion as compared to the β angle and MMBP-Wits. Floating norms have been provided to individualize the reference value for both the β angle and MMBP-Wits.

Association between generalized joint hypermobility and temporomandibular disorders: a review of the literature

A. Boboc[1], A. Carrino[1], D. Jamshir[2], A. Impellizzeri[3], E. Serritella[3], G. Galluccio[4]

[1]DS, Post graduate student, Sapienza University of Rome
[2]DS, Sapienza University of Rome
[3]PhD Student, Sapienza University of Rome
[4]Associate Professor, Sapienza University of Rome

Aim: Temporomandibular joint disorders (TMD) have a multifactorial etiology. Joint Hypermobility (JH) is an increase of joints mobility over physiological limits and has been reported as a predisposing factor to the development of signs and symptoms of TMD. The term Generalized joint hypermobility (GJH) used when multiple joints are affected. A relationship between TMD and GJH has been suggested in numerous studies and the supposed sequence of events in this association is that the temporomandibular joint (TMJ), among the hypermobile joints, caused by a looseness of the ligaments, may lose the physiological relationship between condyle and the Glenoid fossa and be overloaded, resulting in degenerative changes which may become manifest as internal derangements and/or inflammation. The purpose of this study is to get a

literature review focused on the association between JH and TMD.
Methods: We conducted an electronic search using PubMed and Cochrane Library from 2000 to 2018. The keywords used were: Temporomandibular joint disorder AND generalized joint hypermobility AND joint laxity AND assessment methods AND diagnostic criteria AND reproducibility. Papers were included in the analysis if the study population was clinically relevant, there was a group control and the GJH was assessed with the Beighton score. Only articles written in English were included in the study. Case reports have been excluded.
Results: Search returned 58 results, on the basis of the relevance were selected 21 studies. Some studies found a significant positive association between TMD's signs and symptoms and GJH ($p<0,05$), while other studies could not demonstrate a statistically significant relationship ($p>0,05$). Numerous studies present in literature reported the prevalence of TMDs is higher in subjects with symptoms of articular hypermobility suggesting that GJH would be a risk factor positively associated with TMDs. Contrarily, other authors suggest that there is no clear evidence of the association between JHS and TMDs and indicate that one limit could be the relatively small number of patients enrolled in these studies.
Conclusion: Based on the results of this research, even if many articles reported an association between GJH and TMD, the exact relationship between GJH and TMDs has not been established yet. This lack of conclusiveness also may be due to: the use of different clinical assessment methods of GJH and that among the different authors which use the Beighton score there is a lack of consensus of a GJH diagnostic cut off level and that there isn't a protocol of the performance of the test; that GJH is influenced by age, gender and ethnicity; and different diagnosis methods of TMD. All these factors can limit the ability to make cross-study comparisons. A clinical relevance is that Hypermobility of the joint is not a modifiable risk factor but individuals with TMD associated with GHJ should be carefully evaluated by inter-disciplinary specialists as these factors could change the therapeutic approach and may eventually have impact on the prognosis of TMDs. Also, patients with GJH should be counselled regarding the possible effects of joint laxity on the TMJ and a simple screening with Beighton test makes possible to: teach patients preventive measures based on functional self-control and self-limitation; make caution during therapy; inform the patient of his/her predisposition for intra-articular pathology before undertaking any type of mouth or jaw therapy.

Class III treatment with skeletal and dental anchorage: a review of comparative effects

G. Borghetto, R. Clemente, L. Contardo, C. Greco, R. Di Lenarda, G. Perinetti

Department of Medical, Surgical and Health Sciences, School of Dentistry, University of Trieste, Trieste, Italy

Aim: Facemask (FM) is the common appliance for the treatment of skeletal Class III patients with maxillary retrusion, as it stimulates maxillary advancement and prevents mandibular development. One of the limitations in maxillary protraction with a conventional tooth-borne type appliance is the loss of dental anchorage. Several studies reported that the use of FM in combination with tooth-borne anchorage appliances induces the following skeletal and dental changes: forward movement of the maxilla, downward and backward rotation of the mandible, closing rotation of the palatal plane, proclination of the maxillary incisors, mesialization and extrusion of the maxillary molars, and lingualization of the mandibular. The aim of this review is to examine the effectiveness of interceptive treatment of Class III malocclusions using skeletal anchorage and to verify if the treatments with temporary anchored devices (TADs) produce greater maxillary advancement than tooth-anchored maxillary protraction and/or reduce some dental side effects.
Methods: Articles were identified through a literature survey carried out as a result of the following databases: PubMed, SCOPUS, LILACS, SciELO, and the Cochrane Library. The survey covered the period from inceptions to the last access on 01 November 2017 with no language restrictions. The studies retrieved had to be RCTs or either prospective or retrospective CCTs. They had to include healthy growing subjects treated for skeletal Class III malocclusion by the use of a FM, with or without maxillary expansion, in the control group, and by the use of skeletal anchorage though either (palatal/buccal) maxillary or mandibular miniscrews/miniplates in the experimental group. Studies without a control group or with the untreated group were excluded. The eligibility assessment was performed independently by two blinded authors and quality analysis of the included studies was performed.
Results: Nine articles were included (4 prospective CCTs, 4 retrospective CCTs, 1 RCTs), published between 2010 and 2016. The sample sizes ranged from 20 to 60 subjects with an average of 44,5 and with a prevalence of females treated. The age of patients at the beginning of the therapy was between 8,1 ± 1,5 years and 11,9 ± 1,8 years. All treatments finished with the achievement of a positive overjet (>2 or >4 mm). In some cases, an overcorrection has been reached up to the second molar class. Dentoalveolar changes were seen in all the studies. In particular, a significant proclination of the upper incisors was documented in the group treated with a dental anchorage FM, as compared to that treated with skeletal anchorage. Comparing the two methods, almost all the studies indicated a greater

maxillary advancement in the group treated with skeletal anchorage. The analysis of the quality of the studies shows that only one study had a high quality, four medium/high, three medium and one low.
Conclusion: Facemask therapies induce a correction of skeletal Class III malocclusion through a combination of skeletal and dentoalveolar effects. Those with skeletal anchorage produce greater maxillary protraction, reducing undesirable dental effects. In both groups, the best skeletal effects occur in pre-pubertal age but in the group with skeletal anchorage, responses are obtained even near the pubertal peak.

Fixed and removable orthodontic retainment disposable: a systematic review

Martina Sonia Bua (DDS)*, Maria Teresa De Grazia (DDS)*, Gianluca Meazza.**

*Department of Biomedical, Surgical and Dental Sciences, University of Milan
** European University of Valencia

Aim: The aim of the study is to analyze the knowledge so far about retainement orthodontic disposables and which of them are more often used in clinical practice.
Methods: Many studies available from 2010 till now reveal the success of orthodontic treatment mainly depending on teeth retainement into correct position after disposable removing. Binda et all. Demonstrated that consequent orthodontic treatment modifications are less common in adult patients, and it is also assumed that clinical pattern tends to return to the past conditions in 70% of cases after the treatment. This step of the treatment is followed by using removable or fixed retainement disposables such as acrylic expansor, Haas, Hyrax, quad-helix, and glue stain strain. Commonly used removable disposables are Hawley ones, and the acrylic thermoplastic mask, largely used during these last years. Even if the majority of orthodontists seem to prefer a fixed retention, because of the effects of removable disposable are influenced by patients' compliance. Another study from Lithuania reveals the retainement disposable more appreciated is metallic strain sticked with 6 anterior teeth. The majority of orthodontists used to apply this method, combining fixed and removal disposables in different clinical situations. Nonetheless there's no agreement among orthodontists about the need of any retainement, choosing a kind of retainement or another, and determine how much time to wear it after orthodontic treatment.
Results: 1.There is no agreement among the orthodontists concerning the need for any retention, choosing the type of a retainer, or determining how long retainers should be worn after an orthodontic treatment. 1.VFR e Hawley sono i due apparecchi removibili più utilizzati ad oggi per la contenzione. 2.Many orthodontists prefer to use a fixed system for the retainement of the 6 superior and inferior teeth mixing the treatment with removable disposables. At the time being there's no study showing absolute efficacy from a type of treatment or another and their timing.
Conclusion: Orthodontic Materials and methods keep on change, and producers often suggest new options. Nevertheless, an increasingly number of surveys and protocols, and trends about orthodontic retaining, realized in many countries can reveal orthodontists habits and behavior about. Further studies are necessary to evaluate secure protocols conservation. At the time being only mechanical retention is used after orthodontic treatment, with the intent to maintain teeth in their correct position till support tissues remodeling, so that research activities should be directed to explain mechanical reasons of relapse.

Maxillary impacted canine after trauma: a case report

Del Prete S., Sottile G., Carreri C., Agresti D., Barbato E., Galluccio G.

Department of Oral and Maxillo-Facial sciences, School of Dentistry, "Sapienza" University of Rome, Rome, Italy

Aim: The aim is to provide useful information to clinicians in order to allow immediate diagnosis and management of impacted maxillary canine after trauma. This case report explores the unexpected change of Orthodontic treatment plan following a trauma occurred in the maxillofacial area. Impaction of permanent teeth represents a clinical challenge with regard to diagnosis, treatment plan, and prognosis. Maxillary canine impaction affects approximately 1-2% of the population. Several etiologic factors for canine impactions have been proposed: local, systemic or genetic. A trauma occurred to the face is one of the local factors which comes more rarely. It could cause a displacement of the unerupted canine or the dilaceration of its developing root.
Methods: This case report presents a case of post-traumatic impaction of a maxillary canine in a young patient with skeletal Class I malocclusion and dental Class II/2 malocclusion with deep bite associated. Five dental panoramic x-rays show the patient's clinical history, since March 2010 to January 2017. The young patience refers a trauma to the chin, that occurred in May 2015. According to his deep bite malocclusion the lower teeth (especially the central incisors) traumatized the palatal mucosa. The change of position of the upper left canine is evident in the radiography after trauma. The canine disimpaction was planned and performed

using two TADs (Temporary Anchorage Devices) with 1,8 mm of diameter and 8 mm of length and a TMA arm. The miniscrews were interradicular placed, palatally between the upper first and second premolar and between the upper second premolar and the first molar. The necrosis of the two central lower incisors required an endodontic treatment.

Results: This case report underlines how the direction of eruption of a tooth may change due to external factors, such as trauma. This sudden change requires the development of a new treatment plan following a multidisciplinary approach: orthodontic, surgical, endodontic and periodontal considerations are essential for a successful treatment. The disinclusion is acquired through surgical exposure and Tads' insertion (on February 2016). Furthermore, the treatment is still in progress, with an orthodontic self-ligating multibrackets appliance for impacted canine repositioning and complete alignment.

Conclusion: Therefore, due to the unexepected changes that may occur throughout the therapy, a clinician must always be ready to modify and elaborate a new treatment plan. This approach allows the clinician to overcome the unforeseen changes and reach a successful therapeutic result. Trauma may lead to abnormality in the path of eruption of canines, which may result in their impaction or ectopic eruption. It is important to collect an accurate clinical history to evaluate the possible causes of tooth inclusion and choose the correct treatment.

Palatal volume and area assessment on digital casts generated from CBCT scans

Rossella Carrino[1], Shereef Shahen[1], Gennaro Carrino[1], Reham Abdelsalam[2], Melania Selene Scerra[1], Letizia Perillo[1]

[1]Multidisciplinary Department of Medical-Surgical and Dental Specialties, University of Campania Luigi Vanvitelli, Naples, Italy
[2]Department of Orthodontics, Al Azhar University, Cairo, Egypt

Aim: To develop a reproducible method to measure the changes of palatal volume and area through superimposition using maxillary expansion digital cast models generated from Cone-Beam Computed Tomography (CBCT) scans.

Methods: 10 pre- and 10 post-expansion dental cast models of patients treated by rapid maxillary expansion through Haas expander were selected. Dental cast models were scanned by the same CBCT machine and parameters, X-ray intensity, imaging time and voxel size. DICOM-formatted images were imported into CAD software. Several steps were performed for palatal volume measurement. First, CBCT scans were converted into a triangular mesh only to be used for superimposition. Superimposition was performed using a fully automated surface-best fit of the whole area of pre- and post-expansion palatal surfaces after the exclusion of teeth. The two superimposed CBCT scans of digital models were then recorded as linked files and used as one. Second, a gingival plane was constructed only on the pre-expansion record. The most gingival points on the lingual surface of canines, premolars, and the disto-lingual cusp of the first molars were identified. The software drew two imaginary lines intermediate between the canine, premolar, and molar gingival points, one for the right and another for the left side. The software made a projection from the canine and molar gingival points to these two lines. The four points were constructed by the projection of the right and left canine and molar points on the two lines. The gingival plane was constructed connecting the mid-canine point and the two molar projection points, right and left. Three borders were constructed to localize the volume selection: gingival plane extended until its contact with the oral structures; distal plane, which was perpendicular to the gingival plane passing through a line connecting the two molar projections; and a lateral border. The remaining border was the palatal surface superior to the gingival plane and anterior to the distal plane. Third, all air space was selected as a zero-radio density and the model surface was selected, and then the two border planes, the lateral closing border, and palatal surface localized this selection of air and palatal surface inside only. Volume and area were then calculated for the pre- and post-expansion records. Superimposition was performed using a fully automated surface-best fit of the palatal surfaces on the digital cast models. A gingival plane, identified only once on superimposed casts, and a distal plane with the lateral closing border and the palatal surface were used to localize this selection of air. Pre- and post-expansion palatal volume and area records were measured by the main investigator three times and by three different observers to evaluate inter and intraobserver reproducibility. Means, standard deviations, coefficients of variation, and intraclass correlation coefficients for inter- and intra- observer reproducibility were evaluated.

Results: The low confidence interval indicated a good precision of the proposed method. The sample size was enough accordingly to the consistent range of the confident interval. The level of intra- and inter-observer agreement was very strong (ICC ≥ 0.953, p-value <0.0001) for all measurements. The coefficient of variation, which gives a measure of the variability of results regardless the means, did not exceed 4.42% and was not correlated to palate size variation, showing low variability (0.47-4.42%) across the range of the mean.

Conclusion: Palatal volume and area measurements based on this proposed superimposition method were reproducible. This novel approach represents a valid alternative to the other methods currently used to evaluate palatal volume and area.

Dentoalvelar and skeletal effects of preformed appliances: a literature review

A. Carrino, A.M. Boboc, E. Quarta, F. Germanò, F. Squillace, E. Barbato

Department of Oral and Faxillo-Facial Sciences , School Dentstry, "Sapienza" University of Rome, Rome Italy

Aim: The aim of the present study is to conduct a systematic review of the literature on preformed appliances, highlighting the effects of these devices, often used as an alternative to the classic functional devices and clarify the current level of evidence on this subject.
Methods: The research was based on the PRISMA guidelines, using three different database: Medline/Pubmed, Cochrane Database of Systematic Review and Google Scholar until January 2019. The methodological quality of the included papers was assessed using the AMSTAR scale (Assessment of Multiple Systematic Reviews), Jadad scale (to evalue RCT studies) and NOS scale (Newcastle-Ottawa quality assessment scale cohort studies). For each study a level of evidence was assigned following the classification system modified by the "Oxford center for evidence based medicine levels of evidence". Papers were evaluated on the basis of the following parameters: dental and skeletal age of the sample under study, presence of skeletal diagnosis, presence of dental diagnosis, duration of the treatment, device used and cephalometric variations before/after treatment.
Results: We initially identified 110 references, excluded 14 as duplicates and 62 more on the basis of their title and abstract. From the 34 records that remained and were assessed for eligibility, 21 studies were excluded. Thirteen studies were finally identified. Based on the levels of evidence, the studies displayed a discrete level of evidence, except for one study whose level can be considered strong. All the studies evaluated the dental age but none that skeletal and diagnosis was only dental. The duration of the cohortal studies was variable and not standardized (but always at least a year). All papers analyzed the effects of the preforms through cephalometric measurements but the authors often considerate different values. These studies showed that preorthodontic trainer application induced basically dentoalveolar changes as a significant reduction of overjet. In second classes patients, in particular those with division I, an increase of the mandibular length (Co-Gn) and of the total facial height could be obtained.
Conclusion: Despite the presence of a limited literature, based so far on studies of good quality, according to the scales of AMSTAR, JADAD and NOS, the revised works agree in saying:
- patients who can be treated with preformed equipment must be well selected;
- their treatments must be performed near the growth peak to have effects comparable with functional devices;
- the duration of treatment must be at least one year;
- The effects obtained are mainly dento-alveolar.

Attachments' detail reproduction due to the resin composite used in orthodontic treatment with aligners

Beatrice Castellano, Francesca Pasquali, Anna Blasi, Giorgio D'Ettorre, Rosita Tauro

School of Orthodontics, Catholic University of the Sacred Heart, Rome, Italy

Aim: As aligner systems have developed, manufacturers began to encourage the use of auxiliary elements, such as attachments, to maintain their esthetic appearance while achieving difficult tooth movements. According to the results of a biomechanical analysis, the attachment's force system most important factors are their position and their configuration. This study was designed to evaluate the most suitable composite resin to use for reproducing the correct configuration of the programmed attachment in the treatment with aligners.
Methods: The materials considered in the study were a flowable resin, a dental restorative material and an orthodontic composite, with different viscosity degrees. Attachments were created on 3 in vitro models of extracted teeth. Once scanned the impressions, on each virtual model were added 25 attachments of different shape, to obtain the templates necessary to make the attachments. Before the attachments preparation, dental enamel was opportunely treated. For each model was chosen one of the analysed resin. The realized attachments were then scanned, with an accuracy of 10 µm. The resultant STL files were superimposed, by taking as landmarks the palatal area and the occlusal teeth surfaces, with the ones of the initial virtual planning, through Geomagic software. The aligned scans were then compared using a colour scale. The parameters, calculated to make a comparison between the created attachments and the ideal ones, were: the maximum deviation in defect, the maximum deviation in excess, the overflow and the volume's difference. More than these measurements comparing the 3 above-mentioned groups, it was analysed the difference of volume between all the ideal and realized samples.
Results: To test for differences among the 3 groups a one-way ANOVA was used. No statistically significant results were found between the 3 groups with the exception of the overflow; just in that case, there was a difference in group means. To investigate this result a Bonferroni post-hoc test was conducted. A significant difference ($p<0.05$) was found between the flowable

resin and the orthodontic composite. Moreover, no difference between the volume of ideal and realized attachments was recorded.
Conclusion: The results suggest that every resin used is appropriate for this procedure, just the orthodontic composite may request more time to remove the overflow. Since it is a low learning curve procedure it is possible to believe that the present results are not influenced by the operator variability.

Becker muscular dystrophy: a challange with clear aligners

F. Cazzato, V. Ventura, A. Gramuglia, S. Meuli, P. Gallenzi

Fondazione Policlinico Universitario A. Gemelli IRCCS, Roma, Università Cattolica del Sacro Cuore, Institute of Dentistry and Maxillofacial Surgery. Dean: Prof. Massimo Cordaro, Italy

Aim: Becker muscular dystrophy is a rare genetic disease, it is X-linked recessive, it is characterized by altered expression of the dystrophin protein, thus leading to a progressive degeneration of muscle fibers. The pathognomonic features are muscle weakness with loss of balance and coordination, breathing and heart problems, gastroesophageal reflux and cognitive disorders. Becker diseases may be associated with low collaboration so that dentist is unable to perform dental treatment, especially orthodontic therapy. We aim to re-establish a proper occlusion and function, by Invisalign® technique, in a teen patient with Becker muscular dystrophy.
Methods: A 15-years-old male with Becker muscular dystrophy presented to our attention with aesthetic problems about upper left canine position. He was in permanent dentition with Angle's molar class I on both sides. On the right side, the occlusion was characterized by an Angle's canine class II with a slight diastema between upper canine and first bicuspid. On the left side, the lateral incisor presented a slight palatal inclination whereas the upper canine was mesio-rotated and buccally displaced. In the lower arch, anterior crowding was noticed. The values resulting from the pre-treatment lateral cephalometry showed skeletal class I with a mild hyperdivergent profile. It was decided to perform leveling and alignment of both arches by Invisalign® technique using clear aligners. The therapy lasted 4 months: 18 aligners per arch were applied with a weekly change. The treatment did not involve the use of attachments or elastics.
Results: After 4 months of therapy with clear aligners, the upper right canine was repositioned and the diastema between upper canine and first bicuspid was closed. On the left side upper incisor was aligned whereas the upper canine was partially derotated and extruded. In the lower arch it was obtained the resolution of crowding through proclination of frontal teeth.
Conclusion: In conclusion our study showed that clear aligners are a promising option for orthodontic treatment in a syndromic patient. Moreover, with clear aligners it is possible to maintain oral hygiene in a patient with low compliance caused by cognitive disorders in relation to genetic disease. This treatment approach opens a new door for the treatment of syndromic patient and allows clinicians to push their judgment and experience forward modern technologies.

Ortho-perio integrated treatment in a periodontally compromised patient

Chiara Ceratti, Salvatore Batia, Gionata Bellucci, Davide Cavagnetto, Mikhail Romani, Susanna Ferrario Paola Beretta, Matteo Landi, Cesare Lacaita

Dipartimento di scienze biomediche, chirurgiche e odontoiatriche, Fondazione IRCCS Ca' Granda - Ospedale Maggiore Policlinico. Università degli Studi di Milano, Italy

Aim: The purpose of this work is to describe the combined periodontal-orthodontic treatment of a single intrabony defect using periodontal regeneration techniques and transparent orthodontic aligners. The close and complex relationship between periodontal tissues and tooth movement processes makes it necessary to use a multidisciplinary ortho-perio approach.
Methods: The subject case was a 43-year-old patient with an intrabony vertical defect of 8 mm medial to element 1.1 and the presence of a diastema between elements 1.1 and 2.1. We initially proceeded with non-surgical periodontal treatment that included oral hygiene sessions, scaling and root planing. Three months later, and as the interdental space was > 2mm, we performed the periodontal regeneration with modified papilla preservation Technique (MPPT). After cleaning and removing the granulation tissue off the defect, in the area affected by bone resorption heterologous bone grafting and biomaterials were applied. The bone defect was then filled with deproteinized bovine bone (DBB, Bioss S Geistlich); whilst the derivative of the enamel matrix, amelogenine (EMD, Emdogain Straumann) was chosen as the biomaterial and growth factor to promote wound healing. A primary closure of the flaps has then been created using a 5/0 ePTFE suture. Six months after the surgery, orthodontic treatment began, with the aim of promoting bone remodeling and improving the aesthetic function. This was planned to close the diastema between elements 1.1 and 2.1. A treatment made of 6 transparent aligner masks of the upper jaw only was then selected as suitable for the patient. The patient was instructed to carry the transparent aligners for 20/22 hours a day and to replace the mask every 30 days.

Results: The controls were performed 7 months after surgery and 1 month from the beginning of the use of the transparent aligners. When compared to the initial depth of 8 mm, at the periodontal control survey, a bone gain of 4 mm medial to element 1.1 and the diastema closure between elements 1.1 and 2.1, was observed.
Conclusion: The therapy in place has given the desired results: the prognosis of the element 1.1 is favorable thanks to the monthly maintenance schedule and the instructions of daily oral hygiene that was explained to the patient. Modern orthodontics should be considered as a pivotal branch of the adult patient's inter-disciplinary treatment. The use of multidisciplinary therapies allows to optimize the quality of the final result in an increasing number of patients. In this context, the potential of orthodontic treatment is always assessed, which allows to achieve higher level objectives thanks to the improvement of periodontal tissues. A better understanding of the close relationship between orthodontic treatment and periodontal health will help in bringing the best possible results for needy patients.

TSME: transversal sagittal maxillary expander in treatment of Class III malocclusion patients

Chiara Ceratti, Mikhail Romani, Davide Cavagnetto, Andrea Fama, Cecilia Puddu, Laura Mantovani, Andrea Abate, Maurizio Festa, Roberto Biagi

Dipartimento di scienze biomediche, chirurgiche e odontoiatriche, Fondazione IRCCS Ca' Granda - Ospedale Maggiore Policlinico. Università degli Studi di Milano, Italy

Aim: The aim of this study is to evaluate the efficacy of the Transversal Sagittal Maxillary Expander (TSME), in the treatment of patients with class III malocclusion.
Methods: 30 patients (17 females and 13 males), between 6 and 20 years old were included in the study. They all presented transverse and sagittal maxillary hypoplasia with posterior and anterior cross-bite, dental class III, and normo or deep vertical dimension. All the patients have been treated by TSME appliance. TSME expander has two molar bands that are applied to the dental elements 1.6 and 2.6, one 11 mm transverse screw, and two steel palatal bars of 1.1 mm in size extending to the palatal surface of elements 1.1 and 2.1. These bars contain two 8 mm screws located halfway between the bands and the back incisal side. The protocol of activation included a first phase of transverse activation with two quarter turns per day, for 15 days in which the diastasis of the median palatine suture and the corrects occlusal relationships were obtained. This was followed by a second phase of slow activation of the sagittal screws of a quarter turn every seven days, to obtain a postero- anterior direction displacement of the pre-maxilla until hypercorrection was reached. The appliance was then kept in place for six months in order to stabilize the result achieved.
Results: In all the patients a correction of the posterior and anterior cross bite were obtained. The overbite and overjet were within the norm. TSME has effectively shown its orthopedic action in the median palatine and premaxillary sutures with relative both transverse and sagittal palatal expansions. Another peculiarity of this expander is producing a buccal inclination of the superior frontal teeth. Moreover the TSME, once the transversal and postero-anterior diameters of the upper jaw have been expanded, allows a mandibular bone "physiological" replacement, instead forcing the mandible back as shown in postero-anterior mask therapy.
Conclusion: The TSME is a successful therapy for mild skeletal classe III, maxillary hypoplasia, class II division II, anterior crowding and therefore decreased length of the upper jaw. The patient's aesthetics remains unchanged during the period of the treatment and the compliance required is minimal.

Reliability of the interproximal reduction during clear aligner treatment

M.C. Chiarenza, V. Grassia, F. d'Apuzzo, M.E. De Felice, L. Nucci, G. Parente, L. Perillo

University of Campania "Luigi Vanvitelly, Neaples, Italy

Aim: The reduction of interproximal enamel (stripping) is a frequent procedure used during orthodontic treatment. It's indications are the lack of space, the dental-dental discrepancy (Bolton index), the correction of the shape and size of the teeth that needs coronoplasty. Treatment with transparent aligners, which includes computerized planning of orthodontic movements, has changed the stripping approach. Through a software it is in fact possible to program from the beginning the extent of the enamel reduction and above all the precise moment of the therapy in which to carry it out. Therefore, acting a correct stripping procedure as programmed during the virtual treatment planning is one of the most important requirements to reach the resolution of the malocclusion. The aim of this study was to compare the magnitude of the interproximal reduction performed during the aligners treatment with these that was programmed by the software during the initial planning and therefore to define the predictability of this procedure.
Methods: A total of 30 consecutive patients were selected from Luigi Vanvitelli University of Campania Orthodontics Program, treated with clear aligners. The pre- and post-treatment digital models were acquired using the Trios intraoral scanner (3Shape, Copenhagen, Denmark), the digital configuration was developed

using Clin Check (Align Technology, California, USA). Patients had been instructed to wear aligners for 22 hours a day. For each patient we analyzed the upper and lower arches before (T0) and after stripping (T1). All measurements were performed by the same operator using the Orthoanalyzer software (3Shape, Copenhagen, Denmark). For continuous variables a Student-t test was performed in order to consider the planned and executed stripping.

Results: In 17 patients, stripping was scheduled in both arches, in 8 patients only in the lower arch and in the other 5 only in the upper arch. On average the reduction of the enamel programmed in the upper arch was 1.15 mm (SD 1.19), after the treatment the amount of enamel removed was 0.56 mm (SD 0.67). In the lower arch, the planned stripping was 1.48 mm (SD 1.07) while 0.89 mm was performed (SD 0.91). The difference between the amount of enamel removed and planned was on average 0.59 (SD 0.67) in both arches. When the planned stripping was compared with the actual amount of enamel removed, a statistically significant difference was found respectively $p = 0.022$ in the upper arch and $p = 0.026$ in the lower. The predictability of stripping in the upper arch was estimated at 50.90% while this value was 39.68% in the lower one.

Conclusion: The result shows that, during a treatment with aligners, the amount of interproximal reduction performed in clinical practice is less than that expected at the start of treatment with a virtual configuration. The predictability of the amount of enamel removed in the lower arch is less than that of the upper arch.

A case report of Sleep-Disordered Breathing (SDB) patient treated with modified monoblock (MM)

Alice Chiavaroli, Giulia Ricca, Saveria Loberto, Roberta Lione, Chiara Pavoni

University of Rome Tor Vergata, Department of Orthodontics, Head: Prof.ssa Paola Cozza

Aim: Sleep-disordered breathing (SDB) is a general term for breathing difficulties occurring during sleep. SDB may be defined as a disorder characterised by prolonged increased upper airway resistance, partial upper airway obstruction, or complete obstruction that disrupts pulmonary ventilation, oxygenation, or sleep quality. There is a large variability in the symptoms of SDB directly related to increasing upper airway resistance. It represents a "continuum" of respiratory disorders from primary snoring to obstructive sleep apnea (OSA). Some children compensate the airway obstruction by sleeping in the "knee-chest"position and with their neck hyper-extended to give the best chance of maintaining their airway while asleep. This form of breathing may change the growth pattern of the face and lead to morphological and functional alterations in the organism.

Mouth breather children develop abnormalities, such as speech disorders, facial deformities, abnormal body posture and inadequate positioning of the teeth.

Oral appliances and functional orthopedic appliances have been used in children to shift the mandible forwards, enlarge the upper airway and improve respiratory function in patients who have OSAS and craniofacial anomalies.

The purpose of this case report was to evaluate the craniofacial changes induced by functional treatment of mandibular advancement with special regard to the oro- and naso-pharyngeal sagittal airway dimensions in a subject with dentoskeletal Class II malocclusions.

Methods: A 9-year-old female was referred to the orthodontic department by her pediatrician. The patient showed aClass II malocclusion characterized by ANB of 8°, overjet of 9 mm, full Class II molar relationships, deep overbite, normodivergency, no adenoidectomy or tonsillectomy, absence of previous orthodontic treatment and the absence of craniofacial syndromes. Mode of breathing was defined by an otorhinolaryngologist according to complete physical examination. The parents completed a modified version of the paediatric sleep questionnaire, PSQ-SRBD Scale, by Ronald Chervin 22 (the Italian version in 22 items form) before and after the treatment. The questions sought information about child's daytime symptoms (including sleepiness, irritability, tiredness, school problems, morning headache, oral breathing, and nasal stuffiness) and night-time symptoms (including habitual snoring, apnea, restless sleep, and nightmares).

The patient's face was symmetrical, with a convex profile. The lips were competent, and the patient displayed good oral hygiene with no periodontal problems. The treatment protocols consisted of a modified monoblock (MM) made by a construction bite that positioned the mandible anteriorly in an edge to edge incisor relationship. The central screw was activated only once a month to follow maxillary transversal growth. Appliance was checked at regular recall. The patient was instructed to wear their appliance fulltime. During treatment, the absence of acrylic on the occlusal surface of posterior mandibular teeth encouraged them to erupt. The MM appliance also incorporated a Tucat's pearl on a sliding wire to determine the reference point for the tip of the tongue.

Results: Significant changes in sagittal airway dimensions were induced by functional therapy of mandibular advancement in a subject with Class II malocclusion and SDB. After orthodontic treatment, the patient showed a significant reduction in diurnal symptoms.

Conclusion: Orthodontic treatment is considered to be a potential therapeutic approach for SDB in children. Orthodontists are playing an increasingly important role in managing snoring and respiratory problems by oral mandibular advancement devices.

Orthodontic treatment in Class II: differences between Herbst and Tads in the role of lower incisors proinclination

Francesca Coccia, Lucrezia Sparasci, Cristiana Romeo, Shaiban Reema, Giovanna Runci

Postgraduated School in Orthodontics – Catholic University of the Sacred Heart, Rome

Aim: The purpose of this study was to analyze the control of lower incisor proinclination during second class treatment due to orthodontic fixed appliance, with and without using temporary anchorage devices (TADs). Our aim is the comparison between the effects made by Herbst with skeletal anchorage and dental anchorage on the position of lower incisors, in growing patients with class II malocclusion.
Methods: A sample of 6 pediatric patients (3 males and 3 females) with mean age of 13 years (Dev. St. 0,75) has been retrospectively observed. Inclusion criteria were: permanent dentition in the dental arches (from first molar to first molar). Exclusion criteria were: patients with syndromes or malformations, patients with occlusal interferences, that might cause functional alterations, like dental cross bite, open bite or history facial trauma and those who had received extensive orthodontic treatment and extractions of any permanent teeth. 3 patients were included in the study group, and a mandibular advancement protocol was applied through Herbst, with the application of TADs (Temporary Anchorage Devices) for the control of the lower incisors proinclination. 3 patients, instead, were included in the control group, which provided a mandibular advancement protocol exclusively through Herbst. Has been applied, to all patients in both groups, a fixed orthodontic braces in both dental arches with stainless steel inflexible arches 0.19x0.25 for a good control of torque. In a study group, TADs were applied among canine and lateral incisor in third and fourth quadrants and fixed with orthodontic ligature on lateral incisors. Most important measurement was the entity of lower incisor proinclination at the end of treatment, valued by using overlap of CBCT images done at the time zero, before starting orthodontic treatment, and then when it was completed.
Results: Orthodontic orthopedic appliances were used for several years to solve problems in orthodontic complex cases. One of the collateral effects that were observed is a vestibular inclination of lower incisors. So, if this is not controlled, the possibility of relapse and also damages as loss of periodontal support configurated by gingival recessions and dental mobility, could be high. Every case that was examined showed a lower incisors proclination: this was high in case treated with Hebst without skeletal anchorage in women and the end of the growth, meanwhile it was insignificant in patient treated with combination of Herbst and TADs.
Conclusion: Using Herbst with TADs, so taking advantage of skeletal anchorage, could be considered as a solution or even as standard and prospective protocol to correct skeletal class II malocclusion. The main advantage of this association is the control of unwanted dentoalveolar movements in lower arch to minimize the risk of excessive proinclination of anterior teeth. That makes possible optimizing the effectiveness of the treatment in growing patens, increasing a skeletal reaction and reducing unwanted effects. This a new approach to improve clinical practice and solve very complex cases with excellent results, using modern technologies and instruments in orthodontics.

Use of the pm plane as a reference plane in the evaluation of pre- and post- treatment in patients with craniofacial dysostosis

Emanuela Coppotelli, Debora Loli, Melissa Panetta, Chiara Vompi, Gabriella Galluccio

Sapienza University of Rome, Italy

Aim: The study was performed to evaluate, in patients with craniofacial dysostosis, the occlusal, skeletal and facial changes after osteodistraction of the middle third of the face. The hemifacial hypoplasia that characterizes these patients is a skeletal defect that occurs in the three planes of space and needs a three-dimensional correction. The election treatment is the Le Fort III osteotomy associated with external rigid distraction (RED) and post surgical orthodontic occlusal refinement.
Methods: A cephalometric method based on Enlow PM plane, passing through the point Se (the highest point of the spheno-ethmoidal suture) and the PTM point (the lowest point of the pterygo-maxillary fissure) was used. The landmarks were taken as a reference for the detection of the vertical values because it does not undergo spatial changes after surgery. The before and after surgery lateral X-Rays of twelve patients were compared to test our cephalometric protocol: ten angles and eleven linear distances were evaluated. The cephalometric tracings were performed on the lateral cephalometric and analyzed with a digital cephalometric program. Angular and linear values were examined before the osteodistraction (T0), and at the end of the distraction and surgery (T1).
Results: 12 patients affected by craniofacial dysostosis (8 affected by Crouzon syndrome and 4 by Apert syndrome), who underwent Le Fort III surgical intervention and application of the external hard distractor (RED), were selected in our study. The cephalometric method examined 11 linear and 10 angular values at the time T0 and T1 referring them to the PM reference plane. The Enlow PM plan, used

in order to compare pre- and post-treatment values in patients with craniofacial dysostosis, does not undergo changes in the three planes of the space. The choice of the PM vertical plane is due to the limits of the most common plans in the cephalometric analysis of patients with craniofacial dysostosis at the time T0 and T1.
Conclusions: The cephalometric comparison before and after osteodistraction of syndromic class III, using as reference the Enlow's PM plane, has confirmed the data present in current literature, consisting in forward and downward movements of facial middle 3rd, with clockwise rotation of the splanchnocranium and increase of the facial heights. Patients might require further orthodontic treatment after osteodistraction to correct the inclination of the occlusal plane, the vertical discrepancy between the dental arches, the anterior open bite and the remaining dental occlusal alterations.

Tandem Skeletal Expander (TSE) and mapa protocol for absolute adult palatal expansion

Francesca Cremonini[1], Giuliano Maino[2], Emanuele Paoletto[3], Giuseppe Siciliani[4], Luca Lombardo5[1]

Postgraduate School of Orthodontics, University of Ferrara, Ferrara, Italy
[1]Resident
[2]Visiting Professor
[3]Orthodontic technician,
[4]Professor and Chairmain
[5]Adjunct professor

Aim: The aim of the paper is to describe the Tandem Skeletal Expander (TSE) and to show two adult patients whose transverse maxillary deficiency has been successfully treated with a pure skeletal anchorage maxillary expansion protocol.
Methods: Two 25-year-old patients presented a skeletal transverse maxillary deficiency and posterior crossbite. To overcome biomechanical problems linked to the shape of palatal vault and the high resistance of the adults' maxillary suture, a bone-borne rapid palatal expander with two expansion screws, one in the front and one in the back, was developed. In both cases, four miniscrews were inserted in the palatal vault using the MAPA System, a miniscrew insertion guide designed specifically for palatal applications. The optimal site for miniscrew insertion was identified on the CBCT scan, superimposed onto the STL files of the digital model. The system enables a safer miniscrew insertion's procedure and ensures a bicortical engagement, which guarantees a greater resistance in supporting the expander device. The Tandem Skeletal Expander (TSE) was constructed using a Polyvinyl Siloxane (PVS) impression of the upper arch. The expansion protocol included two activations per day, until resolution of the transverse deficiency.
Results: The CBCT taken after the completion of the maxillary expansion confirm that the expansion was entirely achieved by skeletal modification. On the three-dimensional skull model, the separation of the mid-palate suture has been measured: the amount of expansion change from a maximum of 6.10mm in the anterior region to a minimum of 5.71mm in the posterior region. Moreover, superimposition of the initial and final upper dental casts showed that no buccal tipping and no bending of the molars have occurred. Transverse expansion was achieved by a purely skeletal, almost symmetrical, expansion of the anterior and posterior areas of the palate. Now that the transverse deficiency has been resolved, both patients are ready to continue the second phase of treatment according to the original planning.
Conclusion: These clinical cases show that the combination of an "absolute" skeletal anchorage and the use of a new expansion device (TME) is an effective method in the expansion of the maxilla in adult patients.
A digital planning of the miniscrews' insertion and the use of a surgical tridimensional guide (MAPA system) made the procedure extremely respectful of the anatomical structures, easy for the clinician and minimally invasive for the patient.

Patient borderline - Surgery or just orthodontics? Case report

C. D'Amelio, N. Lupidi, M. Macri'

Department of Oral Medical Sciences and Biotechnology, University G. D'Annunzio Chieti-Pescara (Italy), School of Specialization in Orthodontics, Director Prof. Felice Festa

Aim: The 28-year-old patient, a student, comes to visit our department for reasons of pain in the temporomandibular joint (TMJ) right from about 10 years after a yawn, he felt headache, sense of heel and cervical pain. Currently he has pain during chewing, especially on the right and limited opening. It presents a bad dental occlusion: open bite, narrow palate, narrow premolar diameters, class I, lower crowding, posterior and curved posterior condyles and loss of physiological lordosis. A therapy with muscle relaxation plates was performed for about two months, with anti-tampering protocol with passive aligners of 0.7 mm. The protocol consists of exercises for strengthening the paravertebral musculature and exercises for the tongue explained here: it starts with hands on the cheeks, teeth in contact with masseters in maximum contraction, release the masseters without detaching the teeth, relaxed masseters and arched discluse (check that you do not exceed 1.5 mm of vertical size) and the tip of the tongue on the lingual surface of the upper incisors. After this

therapy of muscle relaxation and after 3-4 months of staging, it was decided to proceed to the pre-surgical invisalign technique plus extraction of the four wisdom teeth. The invisalign technique began on 28-03-2018 and ended on 05-02-2019 with a total of 23 aligners.
Methods: The patient was treated with passive bite for about 2-3 months, and then decided to switch to the Invisalign technique. All examined with a Cone Bean exam and the Dolphin softower.
Results: The patient who seemed to be surgical at the end, after careful studies and various simulations, did not turn out to be any more, and a good compromise was reached.
Conclusion: After treatment with passive aligner the symptomatology reported at the beginning by the patient has completely disappeared. At the end of treatment with Invisalign the bite was closed, the patient went into the III molar class with sliding forward of the jaw as planned from the beginning of our treatment. The profile appears harmonious. There has been a recovery of cervical lordosis, the condyle is exactly in the center of the glenoid cavity, lower crowding has been resolved and the diameters of the premolars have been reported in the norm. After the first phase with Invisalign we will proceed with a finishing alignment phase for the last details and close the last spaces, so as to make it a perfect case.

Aligner use for dento-alveolar open bite treatment in adult patients. a review

M.L. Favale[1], M. Dari[1], C. Vompi[2], E. Serritella[3], E. Barbato[4], G. Galluccio[5]

Sapienza University of Rome, Italy
[1]DS, Post graduate student
[2]DS
[3]PhD Student
[4]Full Professor
[5]Associate Professor

Aim: Vertical control is one of the most important phases during orthodontic treatments. Such control needs increased attention during open bite (OB) treatment. Open bite is a vertical alteration of normal occlusion, characterized by anterior or posterior space between the teeth, during occlusion contact. Many causes can lead to open bite malocclusion, like bad habits, or genetic/familial factors. Open bite malocclusion is classified in skeletal open bite, dentoalveolar open bite or combined form. A proper diagnosis guided the treatment. Surgical treatment is more indicated for a skeletal open bite; instead, dental open bite can be treated with a combination of anterior teeth extrusion and, posterior teeth intrusion. Traditionally multibracket therapy is the first choice to treat dentoalveolar OB in adult patients. A new therapeutic option is the aligner treatment. Today, aligners could be used in more complex cases, like open bite treatment. The aim of this review is to estimate the efficiency of aligner treatment in dento-alveolar open bite adult patients.
Methods: A research was made on PubMed and Cochrane with the following keyword: "Open Bite" and "Aligner"). In addition, we made a hand search on relevant citations and references found in the selected articles. The following inclusions criteria were used to select appropriate articles: patient's age between 20 to 40 years, articles written in English, studies from January 2000 to December 2018. We excluded studies on syndromic patients and patients with a skeletal OB. The researchers identified 20 titles, of which 14 were excluded at the first stage, according to the exclusion criteria. The remaining 6 articles fulfilled the initial inclusion criteria, was read in full text.
Results: Many studies show that new aligner's material, the introduction of optimate attachment and inter-arch elastics get the aligners more efficient. Overbite is more controlled during aligner treatment, thank to occlusal appliance thickness, that in addition to biting force transmitted an intrusive action on the posterior teeth. Many studies show that the aligner doesn't have good control on teeth extrusion, because appliance cannot get a sufficient force. Guarnieri et al. have added attachment on upper and lower incisors to increase appliance extrusive force. One of the Main contra-indication on aligner treatment is an overbite higher than 2mm. Multibracket appliance leads to an incisors pro-inclination, that in addition to elastic use can produce an Open bite, caused by a posterior teeth extrusion. That is an unexpected consequence during an open bite treatment. During the Aligner treatment, the teeth are blocked together by the alliance, which produces less unexpected effects than multibracket treatment. OB can be treated with aligners with a combination of upper and lower incisors retro-inclination and intrusion and better vertical control without a posterior teeth extrusion. Studies show that no difference was found on occlusal stability and long-term relapse on Open Bite treat by the fixed appliance and by aligners.
Conclusion: More studies have to be made to support aligner use as alternative to the fixed appliance to treat complex malocclusion ad OB. Some studies says that aligner use on OB treatment is not recommended, but there are a lot of case report that show it is possible to treat OB in adults patients. New aligner material and auxilia use (as inter-arch elastics or bite ramps) seems to allow more predicable treatments. Often the studies in literature are case report and presente much bias as poor number of patients, so we don't have scientific supported results. Adult patients have esthetic needs, so often it's required an invisible treatment. So it's cold be an interesting field for future studies.

Surgically Facilitated Orthodontic Therapy (SFOT) for optimal interdisciplinary results: a case report

F. De Angelis, E. Barbato

Department of Oral and Maxillofacial Sciences, Sapienza University of Rome, Italy

Aim: Surgically facilitated orthodontic therapy (SFOT) uses corticotomy to stimulate the regional acceleratory phenomenon and upregulate bone remodeling and tooth movement. It also generally includes guided periodontal tissue regeneration and/or dentoalveolar bone augmentation. Restorative-driven interdisciplinary therapy frequently requires orthodontic therapy to optimally address the underlying dentofacial problems.
Methods: A healthy, 22-year-old female was visited at the UOC of Orthodontics of the Department of Oral and Maxillo-facial Sciences - Sapienza University of Rome. She had a Class II Division 1 malocclusion complicated by agenesis of the upper right lateral incisor and permanence in the arch of the upper right deciduous canine which caused a complete transposition of the maxillary right canine into the position normally occupied by the upper right lateral incisor. The patient performed a Cone-Beam Computed Tomography (CBCT) as a diagnostic tool. Two therapeutic alternatives were proposed to the patient: 1) extraction of the upper right deciduous canine and insertion of an implant, preceded by Guided Bone Regeneration (GBR) and subsequent prosthetic adhesive restoration of 1.3; 2) extraction of the upper right deciduous canine, fixed orthodontic treatment, corticotomy and the subsequent distalization of the upper right canine with implant insertion in place of upper right lateral incisor. It was decided to proceed with orthodontic-surgery. The upper and lower bonding were performed followed by atraumatic extraction of the right deciduous canine and corticotomy surgery associated with GBR. Miniscrews were inserted for skeletal anchorage and after 16 weeks the distalization of right canine was reached. An implant (Biohorizonsâ, 12x3 mm) was inserted in site of the upper right lateral incisor using dynamic guided computer surgery with Navident system (Navident®, ClaroNav Inc.) with "Trace and Place protocol" by which it was possible to perform both implant programming and intervention in total safety. The prosthetic restoration was made of monolithic zirconia with layered ceramic.
Results: The combination of the surgical-orthodontic procedure and the new technology of dynamic implant surgery has made it possible to reduce working time and phases, obtaining a good aesthetic and functional result in 16 weeks as demonstrated by radiographic investigations. The occlusal stability has been controlled, demonstrating a long-term success.
Conclusion: Limitations in traditional orthodontic techniques and the length of requisite treatment times often create barriers to clinicians and patients' willingness to accept orthodontics as part of the overall treatment plan. The SFOT procedure has been shown to accelerate maxillary canine distalization, reducing the treatment time by 50% when compared to conventional orthodontic tooth movement. Using SFOT procedures, an interdisciplinary team can modify predictably the dentoalveolar-complex. Teeth, alveolar bone and skeletal components are addressed properly to maximize ideal functional and aesthetic relationships, while greatly reducing treatment time and increasing stability of the result.

Prevention and treatment of dental or dento-alveolar Class II malocclusion: a systematic review

Maria Teresa De Grazia[1], Eleonora Angelino[1], Martina Sonia Bua[1], Gianluca Meazza[2]

[1]DDS, Department of Biomedical, Surgical and Dental Sciences, University of Milan, Italy
[2]European University of Valencia, Spain

Aim: The aim of the study is to identify the most effective and efficient orthodontic devices for the treatment of the Class II according to facial biotype, when the patient is in growth stages. To this end, we have analyzed different types of devices described in literature, used for correction of dental or dentoalveolar Class II, in particular the distalizers with intraoral skeletal anchorage and/or dental one or extra-oral anchorage (TEO).
Methods: The literature was searched through Medline and PubMed databases. The inclusion criteria applied were: date of publication of the articles from 2000 to 2017, articles in English and Spanish, dental or dentoalveolar Class II, the patient in his growth stages, studies published in high impact scientific journals. Seventy-two studies were considered suitable for our search, nine of which were systematic reviews.
Results: An average molar distalization of 3.98 mm is achieved through dental anchorage devices; instead, applying a skeletal anchorage device, the average molar distalization accomplished is 5.54 mm. Regarding the loss of anchorage, assessed at the first premolars level, the average data collected were -3.87 in dental anchorage studies, and -1.85 mm in skeletal anchorage ones. The data concerning the distalization varies widely, because it is conditioned by the patient cooperation, while no loss of anchorage occurs at the first premolars level.
Conclusions: Nowadays, to solve a dental Class II, the orthodontist has several treatment options at his disposal. All protocols evaluated (dental anchorage - skeletal anchorage- extraoral anchorage) have proven

to be effective and efficient in the distalization of the first upper molar. A significant or complete reduction of anchorage loss with a greater amount of distalization has been observed in the skeletal anchorage device compared to the dental anchorage. The most effective devices in brachyfacial patients seem to be the distalizers with both skeletal and dental anchorage, and extraoral low-pull (cervical) traction appliances, whereas in dolichofacial patients appear to be extraoral high-pull traction ones. Choosing the most suitable treatment for young patient depends on the correct diagnosis at cross, sagittal and vertical levels. The role of the pedodontist should be to intercept the possible malocclusions in the young patients as soon as possible, in order to start an early treatment, able to prevent or combat the increasing of malocclusion during growth.

The Twin Block of Clark for the correction of the dento-skeletal Class II malocclusion in early treatment: a retrospective study

Maria Teresa De Grazia[1], Eleonora Angelino[1], Martina Sonia Bua[1], Gianluca Meazza[2], Floriana Pintucci

[1]DDS, Department of Biomedical, Surgical and Dental Sciences, University of Milan, Italy
[2]European University of Valencia, Spain

Aim: The aim of this retrospective study is to assess the Class II malocclusion and evaluate cephalometrically, and compare skeletal and dentoalveolar changes following the use of Clark's Twin Block appliance.
Methods: An analysis of cephalometric radiography of 20 children between the ages of 10 and 11.9 with Class II Division 1 (mean 11.3 years ± SD 3.32) treated with Twin Block appliance was performed before and after the treatment. These results were compared with the ones obtained in other similar studies. A retrospective study of literature search and selection of original articles and relevant clinical cases on the results obtained with Twin Block and other functional devices was carried out. Only studies published in high impact scientific journals, and studies and cephalometries that meet the criteria of efficacy of diagnostic accuracy and therapeutic effectiveness, have been included. The selection of the included articles is based on the type of study, sample number, reference method, and number of observers, statistical method and results obtained. Studies published in scientific journals and considered as articles without impact factor, and whose full text was not available have been excluded. In the section of literature review on Twin Block, the cephalometric results of studies that did not meet the criteria of efficacy of diagnostic accuracy and therapeutic effectiveness have been discarded.
Results: The appliance shows significant cephalometric effects on craniofacial structures: the maxilla (SNA) was restricted sagitally (Head gear effect). A significant mandibular sagittal advancement (SNB) and a considerable increase in mandibular length were observed. Profile and facial aesthetics improve through the considerable reduction of maxillomandibular skeletal relation (ANB and WITS appraisal). Pronounced correction of overjet and overbite was seen.
Conclusion: This study concluded that Twin Block is suitable to treat Class II malocclusion with a retrognathic mandible. The rapid functional correction of the malocclusion is achieved through the transmission of occlusal forces favorable to the inclined planes that cover the posterior teeth .The most important difference between the appliances usually used concerns the esthetic and comfort for the patient. However, the success of the treatment depends on the individual patient cooperation. The best time to start the treatment of Class II dentoskeletal is during peak pubertal growth corresponding to phase 2 of cervical maturity and the MP3 stage of ossification at the level of the phalanges of the fingers.

COsts/benefits of cross-bite therapies with function generating bite managed by post graduate students in orthodontics at the Dental School-University of Torino

A. de Palma[2], M. Sorchi[2], E. Agastra[2], A. Cedrone[2], A. Ciannamea[2], E. Coda[2], E. Gianello[2], A. Mainardi[2], R. Masia[2], M. Rinaldi[2], M. Zerbino[1], E. Madiai[1], C. Lavazza[3], T. Castroflorio[4], A. Deregibus[4], M.G. Piancino[4]

University of Turin, Italy
[1]DDS Resident
[2]DDS Resident, Post Graduate Student in Orthodontics
[3]Dental Student
[4]MD DDS PhD, Aggregate Professor

Aim: The purpose of this study is to present orthodontic cases with cross bite treated by post graduate students in orthodontics at the department of Orthodontics-Dental School-University of Turin. A functional investigation with recording of chewing patterns was carried out on all patients treated with the functional appliances Function Generating Bite.
Methods: 10 patients treated at the department of Orthodontics-Dental School-University of Turin, diagnosed with different type of cross bites have been selected. Diagnose has been made on essential data: gnathostatic models, orthopantomography, teleradiography and cephalometry in postero-anterior and latero-lateral projection, intra-oral and extra-oral photographs. The patients showed the following malocclusions: 2 left unilateral posterior crossbite, 3 right unilateral posterior crossbite, 1 total crossbite, 1

left cross bite and right brodie, 2 anterior crossbites, 1 anterior and right posterior unilateral crossbite. All patients have been treated with the functional appliances Function Generating Bites and chewing patterns recorded before and after orthodontic correction. The appliances were individually manufactured and made of acrylic resin and resilient stainless steel, with posterior metallic resilient stainlessteel bite planes preventing teeth from intercuspal contact and with expansion springs. The simultaneous action of the bites and the expansion spring realizes a bodily movement of the teeth and the most suitable correction of the malocclusion. At the end of treatment, the buccal cusps of the upper teeth, which were previously in crossbite, overlapped the lower teeth, thus providing the appropriate physiological stimuli from peripheral receptors and proprioceptors. Mandibular movement was measured with a K7-I, Myotronics Inc. Tukwila, Washington, USA) which measures jaw movements within an accuracy of 0.1 mm. Multiple sensors in a lightweight array (4 oz) track the motion of a magnet attached to the midpoint of the lower incisors. The kinesiograph was interfaced with a computer for data storage and subsequent analysis.
Results: All patients corrected the malocclusion within a period of 6 ± 2 months after the beginning of the therapy. Furthermore the orthodontic correction, the functional balance has been obtained in all cases with a non-cariogenic and low cost appliance. The benefits on the child's function and growth has been obtained non-traumatically, avoiding side effects. The collaboration required from the child and his parents can easily be obtained thanks to the fact that the appliance is easy to wear and manage, it is non-cariogenic, non-pain, low cost and highly effective.
Conclusions: The orthodontic functional appliances Function Generating Bite managed by the post-graduate students represent a valuable device for early therapies of patients with cross-bites managed by limited-experienced orthodontists without side effects, to the aim to improve and balance the functional movements and the basal growth during development.

Treatment of a Class III subdivision malocclusion by using Clear Aligners and one lower bicuspid extraction: a case report

V. De Simone, R. Adaimo, P. Petrucci, F. Sostenuto, V. D'Antò

Department of Neurosciences, Reproductive Sciences and Oral Sciences, School of Orthodontics and Temporomandibular Disorders, University of Naples "Federico II", Naples, Italy

Aim: To evaluate the results obtained in a patient with Angle Class III malocclusion, subdivision right, treated with clear aligners and extraction of 4.4. The objectives of the case reported are to assess if this therapeutic alternative can lead to a valid occlusal relationship and to a better smile esthetic and facial profile in a patient that refused the surgical treatment, and to show the intraoral changes that contributed to the correction.
Methods: This case report describes the management of a 19-year-old male, dolicofacial typology, with a dentoskeletal class III malocclusion. Clinical examination showed a Class III facial pattern, with a deviation of the chin to the left. The intraoral examination revealed a full Class III molar and canine relationships on the right side and a Class I on the left side, with dental crossbite (23-33), and a reduction of the overjet and the overbite. The maxillary dental midline was coincident to the facial midplane and the mandibular dental midline was deviated to the left. With the main purpose of a dental compensation, a treatment with Airnivol® aligners was proposed. Treatment plan included the extraction of a lower right bicuspid (4.4) in order to obtain the space required to achieve a canine class I relationship on the right side and the correction of the lower midline deviation. The treatment required 20 aligners for the upper arch and 44 aligners for the lower arch and the use of class III elastics (right side), in the night. The patient was instructed to change the aligners every 10 days.
Results: Total treatment duration was approximately 20 months (including the finishing phase). The intraoral photographs and dental casts show a bilateral Class I canine occlusion, correction of dental crossbite (23-33) and normal overjet and overbite at the end of the treatment. Lower dental midline was centered with respect to the upper. The facial photographs show improvements in the facial profile. Patient compliance in using removable aligners was crucial for success.
Conclusion: Clear aligners therapy can be considered a valid alternative for adult patients that refuse orthognatic surgery and choose a treatment aimed to dentoalveolar compensation.

Cephalometric analysis of craniofacial morphology in patients with bilateral and unilateral complete cleft lip and palate

Valentina Montanari, Giovanni Bruno, Alberto De Stefani, Antonio Gracco, Edoardo Stellini

University of Padua, Department of Neuroscience, Dental School, Padua, Italy

Aim: Cleft lip and palate is one of the most frequent congenital deformity of the oral and the facial area. Cleft is a missed closure or an incomplete closure of the superior lip and palate and it can be unilateral or bilateral; if there is an unilateral cleft, it can be both in the right side and in the left side. Cleft lip can have

different levels of severity: it can concern only the vermilion of the upper lip, or it can be a complete split. Cleft palate, instead, can concern the hard palate only or the soft palate too. The aim of this study is to examine the cephalometric analysis of both the groups of patients with unilateral and bilateral cleft lip and palate and to verify if there are associations or differences between the data.

Methods: This is a retrospective study. Lateral radiographs were used to get the cephalometric evaluation and all the radiographs were evaluated by the same operator. 129 patients between five and fifteen years old were evaluated in the study: 33 patients with bilateral cleft lip and palate, 41 patients with unilateral cleft lip and palate in the right side, 55 patients with unilateral cleft lip and palate in the left side. The cephalometric parameters analyzed were: saddle angle, articular angle, gonial angle, upper gonial angle, lower gonial angle, anterior cranial base, posterior cranial base, ramus height, corpus length, SNA, SNB, FMA, anterior face height, posterior face height, overbite, overjet, IMPA, U1-SN, U1-FH. Statistical analysis was performed on the data obtained to compare bilateral and unilateral groups.

Results: Compared to normal values, patients with cleft lip and palate (both unilateral and bilateral) have lower values of anterior cranial base, posterior cranial base, ramus height, corpus length, SNA, SNB, anterior face height, posterior face height, oberbite, overjet and a retroinclination of the upper and lower incisor (U1-SN, IMPA). Even if they have lower values of posterior face height (HFP) and anterior face height (HFA), the measure HFP/HFA results correct. The value of the lower goniac angle compared to normal values, instead, is bigger in patients with cleft. Data shows that between patients with unilateral cleft lip and palate and patients with bilateral cleft lip and palate, there is not a big dissimilarity of the values.

Conclusion: There are not an important difference between the data of the groups examined. Instead, a lot of parameters of all patients with cleft lip and palate (both unilateral and bilateral) are very different compared to normal values.

Rapid Palatal Expansion (RPE): meta-analysis of long-term effects

L. Di Benedetto[1], G. Matacena[1], R. Cannavale[1], P. Chiodini[2], L. Perillo[3],E. Madiai[1], M. Zerbino[1], A. Deregibus[1], T. Castroflorio[1], M.G. Piancino[1]

[1]Department of Surgical Sciences, C.I.R. Dental School, University of Turin, Turin, Italy
[2]Medical Statistics Unit, University of Campania Luigi Vanvitelli, Naples, Italy
[3]Department of Surgical and Dental Specialties, University of Campania Luigi Vanvitelli, Naples, Italy

Aim: Rapid palatal expansion (RPE) is a widespread orthopaedic procedure used in several clinical situations. The aim of the study was to provide a systematic review and meta-analysis of transverse intercanine and intermolar width changes after RPE and long-term effects.

Methods: A systematic literature search was conducted until January 2018 on original studies with RPE treatment. Original articles were searched through six databases until January 2018: PubMed, Web of Knowledge , Scopus Scientific Electronic Library Online and Latin American and Caribbean Health Sciences (LILACS). To evaluate the methodological quality of the studies selected, we used a modified version of the Newcastle-Ottawa Quality Assessment Scale (NOQAS) for cohort studies. This quality scale was implemented by each reviewer to better evaluate the overall quality of each eligible study (http://www.ohri.ca/programs/clinical_epidemiology/oxford.asp). Authors included only studies with a quality score of 2 or more. Intercanine and intermolar distance were evaluated for each retrieved study at the start of RPE (T1, median age 9.2 years) and at the end of treatment (T2). The long-term evaluation was conducted on a subset of articles with 5-year follow-up (T3).

Results: Eighteen studies T1-T2 and five studies T3 were selected. Regarding the intercanine distance the RPE was associated with an increase in intercanine width of 3.72 mm between the start of RPE (T1) and the end of treatment (T2) (95% CI 3.12; 4.32 mm), significant heterogeneity was found ($P < 0.0001$; $I2 = 94.3\%$) and with a relapse of –0.81 mm (95% CI –1.22; –0.40 mm) of intercanine width between the end of treatment (T2) and a long-term follow-up mean of 9.95 years (T3), significant heterogeneity was found across estimates ($P < 0.0001$; $I2 = 95.8\%$) . Regarding the intermolar distance, the RPE was associated with an increase in intermolar width of 4.85 mm between the start of RPE (T1) and the end of treatment (T2) (95% CI 4.28; 5.42 mm), significant heterogeneity was found ($P < 0.0001$; $I2 = 93.4\%$) with a relapse of intermolar width of –0.47 mm between the end of treatment (T2) and a long-term follow-up mean of 9.95 years (T3) (95% CI –0.79; –0.15 mm), significant heterogeneity was found across estimates ($P < 0.0001$; $I2 = 87.5\%$). Meta-regression analysis showed that at younger age, the amount of anterior expansion is similar to posterior. With increasing age, the anterior opening diminishes significantly more than the posterior, being half of the posterior at 15 years. All the long-term studies reported the simultaneous use of fixed appliances overlap- ping with the RPE action, and that the majority of the retention protocol reported the use of an upper removable appliance 24 hours a day for at least 2 years.

Conclusion: Considering the widespread use of RPE in growing children with and even without crossbites, and the importance of the stability of the treatment, a careful balance between the real long-term benefits and side effects, both dental and medical, should be considered before using this type of therapy.

Management of a patient with inclusion of a permanent mandibular incisor due to an odontoma: a case report

M.Altilia, D. Dibetta, A. Ferrazzano, C. Malara, F. Rende

Department of Healt Science, Magna Graecia University of Catanzaro, Italy

Aim: The aim of this study is to report the treatment of a patient with inclusion of mandibular central incisor due to an odontoma. The primary treatment objectives for this patient were to, maintain Class I canine/ molar relationship bilaterally during treatment, and correct dental relationship without unfavorable profile change.
Methods: The ten years old patient presented an odontoma in symphyseal area that caused the inclusion of right permanent incisor. The treatment plan at first provided the traction of a nonerupted mandibular element in arch after asportation of odontoma. After a period of traction the tooth erupted in ectopic position and an inadeguate quote of attached gingiva was evidenced, so the extraction of the tooth was chosen as most indicated treatment. The alignment was complited with a sequence of archwire. A segment of light elastomeric chain was placed between lower right lateral incisor and left canine to close the diastema. After the execution of Bolton analysis was found a slight tooth-size discrepancy that could be solved by the interproximal reduction of the four maxillary incisors. Furthermore the triangular-shaped crowns of the maxillary central incisors indicated interproximal reduction.
Result: The active treatment time was 46 months. The facial profile was maintained , treatment objectives were achieved. The posttreatment extraoral photographs showed a pleasing smile with a favorable smile arc. The patient was satisfied with the treatment results. In the panoramic radiograph, no sign of apical resorption or damage to the teeth was seen. At the end of treatment the mandibular dental midline became the center of the remaining central incisor. Thus the maxillary midline coincided with the center of the remaining mandibular central incisor. It was reported that this situation does not compromise aesthetics or function. At the 3-year follow-up, the patient had a stable occlusion, with the results of the orthodontic treatment maintained.
Conclusion: This case revealed the clinical effectiveness of one incisor extraction in properly selected cases. A series of factors should be contemplated before considering incisor extraction as a treatment option. Advantages of mandibular incisor extraction treatment are: decreased treatment time, long time stability in the mandibular anterior area, and preservation of soft-tissue profile. The possible disadvantages of this method are: unpleasant open extraction space, coincidence of the mandibular and maxillary dental midline is lost, a black triangle may form caused by the loss of the interdental papilla and extraction of mandibular incisors may compromise the ideal overjet, overbite, and proper intercanine width in cases that do not have a Bolton discrepancy except cases with small maxillary and large mandibular incisors. Therefore, if carefully planned, mandibular incisor extraction can be an effective treatment option that produces functional and aesthetic results with minimal orthodontic intervention.

Management of a patient with skeletal Class II malocclusion and a congenitally missing mandibular incisor: a case report

P. Caravetta, L. Barbara, A. Dieni, D. Dibetta, D. Aiello.

Department of Health Science, Magna Graecia University of Catanzaro, Italy

Aim: The aim of this study is to report the treatment of a patient with dental and skeletal Class II malocclusion and agenesis of one mandibular central incisor, in whom the treatment plan selected included space closure at the region of hypodontia in order to achieve an ideal occlusion.
Methods: A two-phase treatment was planned involving a fixed orthopaedic phase, followed by non-extraction orthodontic treatment with a fixed multibrackets appliance with Roth's prescription. In the initial phase an Herbst Miniscope® appliance, bonded on first maxillary and mandibular molars, was used with the aim of obtaining a good relationship between maxillary and mandibular bone; furthermore a transpalatal bar and a lingual arch were used as anchorage devices. The therapeutic approaches for the management of agenesis of one permanent mandibular incisor are: preservation of the primary tooth as long as possible; extractions of the maxillary first premolars to balance tooth material resulting from the agenesis and the substitution of the first premolars for canines; creation and maintenance of space with fixed prosthesis until completion of the growth; space closure and finalization with three mandibular incisors. The first option was rejected for the loss of the deciduous tooth. The extraction

strategy was also rejected, because it could cause negative effects on the patient's facial profile. In order to choose between the last two treatment modalities, the Bolton analysis was performed and the method of space closure of the mandibular anterior teeth was selected, indeed the tooth-size discrepancy between the dental arches could be solved by the interproximal reduction of the four maxillary incisors.
Results: After 10 months of treatment with Herbst appliance, an improvement of patient's facial profile was achieved because of the changes observed in the position of lower lip and mentolabial sulcus; in addiction a reduction of the initial overjet was obtained. At the end of the treatment, bilateral molar and canine class I were achieved, with appropriate overjet and overbite. The maxillary dental midline was coincident with the facial midline and with the center of the remaining mandibular central incisor.
Conclusion: The treatment of hypodontia of one mandibular incisor with three incisors finalization may be successfully treated, from both occlusal, functional, esthetic and adequate intercuspation's standpoints, by an appropriate dental compensation.

Early orthodontic treatment for Class II malocclusion to reduce the risk of incisal trauma

S. Perrotta, G. Esposito, A. Sagliocca, A. Pango, R. Valletta

Department of Neurosciences, Reproductive Sciences and Oral Sciences, School of Orthodontics and Temporomandibular Disorders, University of Naples "Federico II", Naples, Italy

Aim: Angle Class II is the most frequent malocclusion in growing individuals. Skeletal Class II malocclusion can result from either maxillary protrusion, mandibular retrusion, or a combination of both. Class II division I is characterized by increased prominence and proclination of the upper incisors, in which the bite is likely to be deep. Moreover, the retrognathic profile and excessive protrusion, require that the facial muscles and tongue adapt to abnormal patterns of contraction. Typically, these deformities are treated by using functional appliances. At the beginning of the 20th century, extraoral forces were applied to the maxilla with headgear for the correction of Class II malocclusion. This therapeutic method was a reflection of the belief that prevailed during that era in which the majority of skeletal Class II malocclusions are caused by the protrusion of the maxilla. However, subsequent studies indicated that the incidence of Class II division I malocclusion resulting from the protrusion of the maxilla does not exceed 20% of the total cases of Class II malocclusion, and the majority of these cases are significantly caused by mandibular retrusion. The Class II diagnosis presents difficulties that can be overcome with an aesthetic evaluation through the Fränkel manoeuvre: a procedure by which the mandible of Class II individuals is postured forward in dental Class I relationship. The evaluation provides information concerning the components determining the sagittal discrepancy. McNamara has shown that in 4 out of 5 patients, the Class II malocclusion is the consequence of a mandibular retrusion. The treatment of this malocclusion in developmental age, aims to modify the mandibular growth through the use of functional equipment. The literature shows that the Class II malocclusion division I is associated with an increased risk of incisor trauma, due to the increased overjet (OVJ). Early orthodontic treatment for children with Class II malocclusions and overjet more than 6 mm is recommended as a method of preventing incisor trauma and its related long-term sequelae. The aim of the present case report is to describe the early management of a dento-skeletal Class II malocclusion division I in growing patients to reduce the chance of incisal trauma.
Methods: A 9 years old female patient came in our department with a dento-skeletal Class II malocclusion, a short and retrusive mandible and convex profile. X-ray evaluation and clinical observation confirmed the mandibular deficiency with mesodivergent growth pattern and increased OVJ (6 mm). Treatment planning consisted in: Sander bite jumping appliance (BJA) for 14 hours/day, including sleep time. The BJA consists of two removable plates: an upper and a lower one. The upper plate fits into the inclined plane of the lower plate through the clamps. The BJA allows an anterior displacement of the mandible.
Results: Total treatment duration was 16 months. Class I molar and canine relationship with a normal OVJ and OVB (overbite) were achieved.
Conclusion: To choose the right time to start the orthodontic treatment is important to achieve optimal results. The orthodontic treatment performed in the puberal peak can be effective in correcting Class II malocclusion division I and could reduce the incidence of incisal trauma.

Evaluation of beighton score as a measure for generalized joint hypermobility and temporomandibular laxity: a review

Emanuele Fantasia[1], Leda Miriam Valentini[1], Ludovica Caterini[1], Anazoly Chudan Poma[1], Enrico Maria Pompeo[1], Gabriella Galluccio[3], Ersilia Barbato[4]

Department of Oral and Maxillofacial Sciences, "Sapienza" University of Rome, Italy, School of Dentistry
[1]DDS
[2]DDS Student
[3]DDS, Associate Professor

[4]DDS, PhD, Ordinary Professor

Aim: The aim of the study was to investigate whether or not there is an association between generalized joint hypermobility (measured using the Beighton score) and temporomandibular laxity as within joint disk displacement. Generalized joint hypermobility (GJH) is a disorder characterized by excessive joint movement. The evaluation test and criteria established by Beighton have been used for many studies of hypermobility. The criteria are as follows: 1) Passive hyperextension greater than 90° of the fifth finger; 2). Apposition of the thumb to the volar aspect of the forearm; 3) Hyperextension of the elbow greater than 10°; 4) Hyperextension of the knee greater than 10°; 5) Trunk flexion, placing the palms of the hands on the floor with the knees straight.
Methods: This Review of English-language literature from 1990 to February 2019 was conducted on Pubmed (Medline), Lilacs and Scopus with the words generalized joint hypermobility, generalized joint laxity, temporomandibular disorders and ligamentous laxity to identify all articles reporting on the prevalence of generalized joint hypermobility and its correlation with temporomandibular joint as with temporomandibular disorders. We finally selected 11 articles.
Results: From early 1,179 articles we excluded 92 innot-English language, 100 without abstract, 175 experimental experiences on animals or in vitro, 540 not inherent our topic, we finally selected 11 articles. From a study on over 6,022 children, the prevalence of generalized joint hypermobility (defined as a Beighton score of >4 [i.e., >4 joints affected]) in girls and boys age 13.8 years was 27.5% and 10.6%, respectively. Fortyfive percent of girls and 29% of boys had hypermobile fingers. Another study, on 15-16 years children, observed that the prevalence of GJH is 43%, while that of temporomandibular joint hypermobility is 27,3%, whit a significant reduction of it incidence in the second group. In particular, only three articles analysed the possible relation between GJH, temporomandibular joint laxity and temporomandibular disorders, considering all the possible forms of them: closed-lock, open-lock, articular click, articular pain and/or muscular pain. The frequencies of joint noise and deviation during mouth opening were greater in the hypermobility group (52.9% vs. 38.5% and 76.5% vs. 50%, respectively), but without statistical significance; and none study evidenced a clear correlation between joint hypermobility and articular click.
Conclusion: This review confirms a clear correlation between generalized joint hypermobility and temporomandibular joint laxity, but even if a correlation exist between temporomandibular joint hypermobility and changes in occlusion, major mouth opening or joint noise during opening; not a clear relation exists between temporomandibular joint laxity and disk displacement.

Reliability and accuracy of cephalometric analysis in cone-beam computed tomography. a review

E. Lombardelli[1], L. Musone[2], M.T. Filetici[2], S. Lombardi[2], M. Horodynski[3], A. Impellizzeri[4], G. Galluccio[5]

Sapienza University of Rome, Italy
[1]DS, Post graduate student,
[2]CLMOPD student
[3]DS
[4]PhD Student
[5]Associate Professor

Aim: The aim of this study is to evaluate the reproducibility and reliability of cephalometric landmarks with three-dimensional (3D) cone-beam computed tomography (CBCT) in comparison with conventional two-dimensional (2D) cephalometric radiography.
Methods: The research was made on Pubmed using these keywords: cefalometric AND landmarks AND cbct AND 3D AND reliability. The inclusion criterias used were:
- methodological reliability and reproducibility studies
- studies using CBCT
- articles with a sample size at least of 12 cases
- studies in human or dry skulls
- studies including both skeletal and dental landmarks

The exclusion criterias used were:
- studies using only conventional radiographies or 2D images generated from CBCT
- studies in animals
- case reports and author opinion articles
- studies with a number of observers inferior to 3

Results: Electronic database searches provided 21 articles; excluding repetition the number resulting was 18, of which a final total of 8 titles satisfied the selection criteria and were included in this review. Gribel et al. (Angle Orthod. 2011) in this article investigated the accuracy of craniometric measurements made on lateral cephalograms versus CBCT images. The conclusion of their study is that CBCT craniometric measurements are accurate and can be used for craniofacial analysis. In addition, lateral cephalograms have some limitations due to distorted images. De Oliveira et al. (Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2009) evaluated reliability in 3D landmark identification using CBCT between intra-observer and inter-observer. They found that following a protocol for operator training and calibration offers consistent and reproducible data. Lisboa Cde O. et al. (J Appl Oral Sci. 2015) in this systematic review found an higher reliability of the dental landmarks and the median sagittal line, while the landmarks of the curve surfaces such as condyle, porion and the orbitale presented a lower level of faithfulness. The author found important variations according to the parameters of image acquisition, software, types of visualization and in the anatomic references marked. In their research, Neiva MB. et al. (Angle Orthod. 2015)

investigated the reliability of landmarks identification using two different visualization techniques: 3D reconstruction and multiplanar views. The author found a better reproducibility of cephalometric landmarks using CBCT in multiplanar views than in 3D image reconstructions. Furthermore, the points with lower reliability were the condyle, ramus point and sella turcica, while the most reliable are the ones found on the midsagittal plane.
Conclusion: 2D conventional images may have some issues with distortion and magnification that can lead to cephalometric measurements inaccuracy. Cephalometric landmarks and measurements on 3D CBCT are reliable and can possibly be used as a quantitative orthodontic diagnostic tool. The mid-sagittal plane and the dental landmarks demonstrated the highest reliability. Landmarks with the lowest reliability included those marked on the condyle and other anatomic structures with prominent curvatures.

Evaluation of tooth size in non-syndromic unilateral and bilateral cleft lip and palate patients: a case-control study

Alessandro Frezza, Edoardo Conte, Giovanni Bruno, Alberto De Stefani, Antonio Gracco, Edoardo Stellini

University of Padua, Department of Neuroscience, Dental School

Aim: Cleft lip and palate is the most common craniofacial aberration, with a general prevalence of 7.94 every 10.000 births. Those patients display a higher rate of various dental anomalies such as: tooth agenesis, microdontia, eruption and root development anomalies. Between those anomalies tooth agenesis is the most frequent with a range of prevalence varying from 50% up to 56.9%, while microdontia is attested in percentage from 36.8% to 69.6%. Literature point out a relationship between tooth agenesis and reduction of mesio-distal dimension of tooth upon the general population, in particular a study of Mirabella et Al. demonstrated how patients with missing upper lateral incisor presented a lowered tooth size compared to a control group without agenesis. The knowledge of dental anomalies in patients with cleft lip and palate is important in order to plan an adequate multidisciplinary treatment. The aim of this study was to evaluate the tooth size in patients with cleft lip and palate presenting at least one upper lateral incisor compared with a first control group of general orthodontic patients without agenesis and a second control group with at least one missing lateral incisor.
Methods: In this retrospective study, records of 30 cleft lip and palate patients recruited from the maxillo-facial surgery clinic of the San Bortolo Hospital of Vicenza, beyond 30 patients representing the control group of general orthodontic patients from the Padua Dental Clinic and 40 patients with at least one missing lateral incisor treated by a freelance in Trento were collected and analyzed. Patients were selected according to the following inclusion criteria: no other syndromes, no previous teeth extractions, complete development of dentition (excluded secondo and third molars), and adequate orthodontic records composed of panoramic radio- graphs, cephalograms, and dental casts. Mesio-distal tooth size of all tooth excluded second and third molars has been measured on digital or plaster dental casts.
Results: Non-syndromic patients with at least one missing lateral incisor show a significant reduction of mesio-distal tooth size, especially of the contralateral upper lateral incisor and of the lower bicuspids. Tooth size in cleft lip and palate patients is similar to that of the control group of general orthodontic patients without tooth agenesis.
Conclusions: In this study cleft lip and palate patients don't have a reduction of tooth size dimension towards the general orthodontic population.
Lowered tooth size is a characteristic pattern of patients with missing lateral incisors and not of cleft lip and palate patients.

Upper airways 3D study before and after oral appliance therapy in Obstructive Sleep Apnoea

Umberto Garagiola[1], Lorenzo Cigni[1], Maria Grazia Piancino[2], Paolo Cressoni[1], Rossono Soldo[1], Ettore del Rosso[1]

[1]University of Milan, Department of Biomedical Surgical and Dental Sciences, Fondazione Cà Granda IRCCS Ospedale Maggiore Policlinico, Maxillo-Facial and Odontostomatology Unit – Milan, Italy
[2]University of Turin, Orthodontic Division, Dental School, Department of Surgical Sciences – Turin, Italy

Aim: Obstructive Sleep Apnoea Syndrome (OSAS) shows apnoea or hypopnea due to upper airways stenosis during sleep with its typical symptoms including snoring during sleep and excessive daytime sleepiness. Cone Beam Computed Tomography (CBCT) is useful to reach an accurate 3D volumetric analysis of upper airways. The Oral Appliances (OA) are considered to be an effective treatment for Obstructive Sleep Apnea Syndrome (OSAS). The aim is to detect morphological changes in upper airways using CBCT before and after oral appliance therapy.
Methods: The study included 30 patients (18 males and 12 females). They were diagnosed with OSAS using polysomnography (PSG). Some criteria has been applied to diagnose OSAS: an apnoea-hypopnoea index (AHI) of >5 per hour during sleep and pathological daytime sleepiness. The therapeutic effect of oral appliance was evaluated by using PSG

and when it showed an AHI of <10 or a decrease of >50%. Two types of OA were applied: the Mandibular Advancement Device and Twin Block Appliance. These enlarged the upper airways by holding the mandible forward, at the 60-70% of the maximum mandible advancement and at the minimum vertical position. A CBCT was performed in all the patients.
Results: The mean upper airways' 3D volumetric reconstructions increased significantly during the presence of OA versus the absence of OA ($p<0.01$). AHI diminished significantly during the presence of OA ($p<0.01$). Oral therapy is effective for treating mild and moderate OSA.
Conclusion: the advantage of a 3D evaluation of the upper airway during OA therapy is the accurate visual confirmation of morphological changes in each region of the upper airway and it could increase the compliance and motivation of the patients for the treatment. OSAS treatment methods included surgery, nasal continuous positive airway pressure (NCPAP), weight reduction, drug therapy and, in the mild and moderate OSA, the use of oral appliances. CBCT is useful to detect morphological changes od upper airways, by a 3D evaluation analysis during oral devices' use. The management of the obstructive sleep apnoea syndrome could be challenging. The treatment recommendations should be proposed by a multidisciplinary approach, that involves different specialists: otorhinolaryngologists surgeons, neurologists, sleep doctors and dentists.

Surgery-first approach vs conventional orthodontic surgical treatment of dental and skeletal malocclusions

Umberto Garagiola[1], Lorenzo Cigni[1], Kenzo Nishiyama[2], B. Farhad Naini[3], Kim Seong -Gon[4]

[1]University of Milan, Department of Biomedical Surgical and Dental Sciences, Fondazione Cà Granda IRCCS Ospedale Maggiore Policlinico, Maxillo-Facial and Odontostomatology Unit – Milan, Italy
[2]Kanagawa Dental University, K Dental Medical Corporation - Tokyo, Japan
[3]St George's University Hospital and Kingston Hospital London – London, UK
[4]Department of Oral and Maxillofacial Surgery, Gangneung-Wonju National University - South Korea

Aim: The aim of this study is to assess the benefits, limits and indications of surgery first approach (SFA) and compare main features of convectional combined approach.
Methods: Conventional combined surgical and orthodontic treatment of dentofacial deformity includes a prolonged period of presurgical orthodontic therapy (12-18 months) and often excessively long postsurgical orthodontic period resulting in an extended treatment time (2–3 years) which may be exhaustive for the patient to sustain. In addition, the visual impact of unpleasant fixed appliances and often worsening or aggravation of the existing deformity at dental and soft-tissue level during the pretreatment period, resulting from decompensatory tooth movements may lead to considerable patient dissatisfaction and may lead the patient to give up treatment. The surgery-first approach has been introduced to compensate the previously mentioned untoward effects of conventional orthognathic surgery (prolonged treatment period, unsightly long-term braces visibility, worsened facial deformity) yet, produce equally excellent results if carefully selected and appropriately managed.
Results: Following orthognathic surgery, a period of rapid metabolic activity within tissues is known as the regional acceleratory phenomenon (RAP). By performing surgery first, RAP can be exploited to facilitate efficient orthodontic treatment. This phenomenon is believed to be a key factor in the notable reduction in treatment duration using SFA. The phenomenon of regional acceleration could be utilized to enhance faster tooth movement which considerably reduces treatment duration and may also present difficulties associated with tooth movement. It is very important that the orthodontist and surgeon involved in SFA should closely not only follow the orthognathic surgery principles but also understand the limitations of orthodontic teeth movement and the surgery-first approach.
Conclusion: The surgery-first approach has improved rapidly since its introduction. The indication for the surgery-first approach has widened with technical advancement. However, the limitations of this approach should be considered. Team approach between surgeons and orthodontists is a vital component for successful treatment. The surgery-first approach was developed to improve patient care. The first indication for the surgery-first approach should be patient demand. Patients, generally, do not like preoperative orthodontic treatment. The primary aim of preoperative orthodontics is decompensation and occlusal stability after surgery. The surgery-first approach is basically a team approach between orthodontists and surgeons. Any surgery without a preoperative consultation between surgeons and orthodontists is inadvisable. Based on this consultation, the patients who do not require extensive preoperative orthodontics are indicated for the surgery-first approach. The indications for the surgery-first patient are minimal crowding in the anterior teeth, favorable curve of Spee, and normal range of angle between the basal bone to upper and lower incisors.

Functional fixed appliance in the treatment of Hemifacial Microsomia (HFM): a case report

Kelly Gardini, Benedetta Toni, Ambra Costantini, Oriana Martino, Gabriella Galluccio

Sapienza University of Rome, Italy

Aim: Hemifacial Microsomia is the second most common malformation after the cleft palate and it's characterized by a hypodevelopment of the skeletal, nervous, muscular structures resulting from the first and the second branchial arch. The classification of HFM is based on the OMENS acronym that represents a complete description of the various malformed structures. Treatment depends on age and the specific features and symptoms in each patient. During our thirty-years experience of the HFM treatment, patients classified as M2/S2 by OMENS method could be completely corrected with orthopedic-functional therapy with a functional asymmetric activator (AFA) developed for this malformation. The aim of this work is to show the treatment of an HFM patient with Herbst appliance.
Methods: A female 10 years old patient with right HFM was treated, in the Unit of Orthodontics in "Sapienza" University, by the Herbst appliance, which is a fixed functional appliance used in the treatment of Class II malocclusions in growing patients. At the beginning of the treatment the measurements taken on the panoramic radiography show the skeletal asimmetry , confirming the difference between the right and the left side of the mandible (right Co-Ag 67 mm, left Co-Ag 73 mm). In the postero-anterior cephalometric radiograph, a medial position of the right mandibular ramus can be observed. The Herbst appliance was realized with contralateral disclusion on left side and head to head position of the incisors; bite blocks were applied to guide the inferior midline. The therapy lasted 7 months.
Results: A year later, the comparison between pre and post cephalometric misuration has shown the correction of facial asymmetry and of the monolateral mandibular deficit: we obtained a well balanced growth of both sides, with almost equal values in the Co-Ag measurements (Co-Ag sx=80mm; Co-Ag dx=83 mm). The sagittal and trasversal growth of the mandible in the direction given by the functional appliance has permitted the correction of the skeletal class and of the dental midlines.
Conclusion: According to a right timing action, in order to stimulate the mandibular growth in the correct direction and to stimulate the unilateral deficit with the right amount, the Herbst appliance could be successfully used as fixed therapy in the HFM and in all of the asymmetries due to monolateral mandibular hypodevelopment, and it represents a good alternative to removable functional appliances.

Patient individualized fixed retainer digitally designed: characteristics and clinical advantages

M. Giurdanella, E. Zuccarello, C. Dolci, R. Bertino, A. Costantino, A. Caputo, L. Rustico, A. Militi, M. Portelli, R. Nucera

Department of Biomedical and Dental Sciences and Morphofunctional Imaging, Section of Orthodontics, School of Dentistry, University of Messina, Policlinico Universitario "G. Martino", Messina, Italy

Aim: Retention is a very important phase of the orthodontic treatment. It allows to maintain the results obtained with orthodontic treatment in the long term. Fixed retainer showed to be able to be more effective, compared to removable retainers, maintaining long term results. Digital revolution in dentistry improved appliance design and customization. The purpose of this contribution is to illustrate the advantages of digital approach design and construction of fixed retainers.
Methods: In a series of cases treated with fixed multi-bracket appliances at both dental arches, traditional silicone dental-records (Elite HD, Zhermack, Rovigo, Italy) were taken at the end of orthodontic treatment. Dental impressions were cast with orthodontic high-strenght stone (Ortotipo 4 Lascod, Firenze, Italy). The plaster models obtained were digitized using an extra-oral scanner (Maestro 3D scanner, Age Solutions, Pisa, Italy). By the use of the CAD software Meshmixer (Version 3.5.474, Autodesk, Vallejo, California) a custom fixed retainer was designed with a loom design to leave the interproximal spaces free and allow them to be easily cleaned. The project was then exported as a stl file. The designed retainer was printed with a LCD 3D printer (Phrozen Shuffle, Phrozen, Taipei City, Taiwan) , using appropriate resin (Temporary Cold V, Dental Green, Pesaro, Italy) and the prototype obtained was transformed into a custom-made chrome-cobalt fixed retainer. The artifact was then polished and sanitized. Finally, the retainer was applied clinically through conventional adhesive and flow composite techniques (Filtek Supreme XTE 3M ESPE, Milan, Italy).
Results: Clinical results of treated patients showed that it is possible to create fixed customized retainers with digital techniques. The applied fabrication technique allowed us to successfully treat all the selected cases. This technique has the following clinical advantages: optimal fitting to the patient's anatomy, better cleanability of the inter-proximal spaces through the use of dental floss, possibility to create a retainer with precision preventing occlusal interferences, reduction of chair times of application.
Conclusion: The proposed technique showed to be valid and reproducible in the realization of customized fixed retainers. Patient individualized fixed retainer digitally designed represents an evolution of conventional systems.

Three-dimensional stereophotogrammetric analysis of soft tissue changes of the nasolabial region following rapid maxillary expansion

A. Gramuglia, F. Cazzato, V. Ventura, E. Staderini, P. Gallenzi

Fondazione Policlinico Universitario A. Gemelli IRCCS, Roma, Università Cattolica del Sacro Cuore, Institute of Dentistry and Maxillofacial Surgery, Dean: Prof. Massimo Cordaro

Aim: Rapid Maxillary Expansion (RME) represents an orthopedic and orthodontic procedure aimed at increasing maxillary transverse dimension in growing patients. In orthodontic practice, the rapid maxillary expansion treatment is adopted to expand the maxillary arch, solve skeletal or dentoalveolar cross-bites and arch perimeter deficiency in mild to moderate crowding cases. The rationale underlying the approach is that the heavy orthopedic forces exerted by fixed appliances with a jackscrew can mechanically separate the maxillary segments at the level of the midpalatal suture. These appliances produce orthopedic and orthodontic effects by tipping the posterior teeth buccaly and enable dental extrusion and lateral rotations of the alveolar segments. Since the bone base and soft tissue are closely related, this orthopedic therapy may affect the nasolabial region shape and dimension. Three-dimensional stereofotogrammetry is a technique described to analyze the nasolabial soft tissue changes following RME therapy. Three-dimensional stereofotogrammetry involves the use of several digital cameras that simultaneously capture images of the same object from different viewpoints: software'reconstruction algorithms integrate matching regions in both images to compute the coordinates of all the points that outline the surface frame of the 3D object This study aims to analyse on facial soft tissue effects of RME evaluated by means of 3D stereophotogrammetry.
Methods: Three patients requiring maxillary expansion using RME were recruited. Soft tissue changes were evaluated using 3D facial images obtained with 3dMD Vultus software (Atlanta, Georgia, USA), a face imaging system. The 3D facial images were obtained at the beginning of the treatment (T0) and at the end of the three months retention period (T1). All images were taken with the head in a natural head position and lips closed in a rest position. The patients were treated with a bonded acrylic cap splint RME appliance. The ethical committee of the University Cattolica del Sacro Cuore(Rome,Italy) approved the study with unique protocol ID : 49889/18.
Results: When the 3D facial images at the beginning of the treatment and at the end of the three months retention period were compared in terms of effects on the facial soft tissue, there was no difference between them. The mouth and the alar base width did not show a significant increase.
Conclusion: There were no changes between the 3D facial images at the beginning of the treatment and at the end of the three months retention period. Weak correlations were found between the skeletal and soft tissue changes.

Effect of functional therapy and ohrqol of patients affected by juvenile idiopathic arthritis

Laura Grassi[1], Gaetano Isola[2], Giovanni Matarese[1], Ludovica Nucci[3], Vincenzo Grassia[3], Marco Matarese[1], Letizia Perillo[3]

[1]Department of Biomedical, Odontostomatological, Sciences and of Morphological and Functional Images, School of Dentistry, University of Messina, Messina, Italy
[2]Department of General Surgery and Surgical – Medical Specialties University of Catania, Catania, Italy
[3]Orthodontic Division, Multidisciplinary Department of Medical-Surgical and Dental Specialties, University of Campania "Luigi Vanvitelli", Naples, Italy

Aim: The objective of the study was to evaluate the impact of temporomandibular joint (TMJ) arthritis on the functional disability and quality of life in patients affected by juvenile idiopathic arthritis (JIA). Juvenile idiopathic arthritis (JIA) is a chronic disease of unknown ethiology, with an estimated incidence of 16 to 150 cases per 100 000 children worldwide. Temporomandibular joint (TMJ) arthritis is a common consequence of the systemic disease in patients with JIA.
Methods: Sixty-two consecutive patients with JIA with or without TMJ arthritis and 35 healthy control subjects were enrolled in the study. The demographic data, disease activity and clinical characteristics were obtained from all patients. The functional disability was assessed using the Italian version of the Childhood Health Assessment Questionnaire (C-HAQ). The oral health-related quality of life (OHRQoL) was assessed using the Child Perception Questionnaire (CPQ11-14). Possible determining factors of TMJ arthritis comprised demographic, disease characteristics and scores derived from questionnaires that were assessed by a uni and multivariable logistic regression analysis. All statistical analyses were executed using a software program (SPSS version 17.0 for Windows, Chicago, IL). The parametric approach was used because the data are normally distributed, as verified by the Kolmogorov–Smirnov test. The chi-square test and the t-test were used to compare the categorical and the continuous variables, respectively. A univariable logistic regression analysis was used to assess the influence of the quality of life measurements on TMJ involvement. The same analysis was performed in order to recognize factors distinguishing JIA patients with the presence/absence of TMJ arthritis by using the C-HAQ and CPQ11-

14 domains as exploratory measures. To recognize factors independently associated with TMJ arthritis, multivariable logistic regression was performed.
Results: The demographic data, age and gender distribution, JIA types, drug therapy and the serological values of the sample are presented for a total of 88 patients participated in the study; 32 patients in the JIA +TMJ group,30 patients in the JIA group and 26 patients in the control group. The examined groups were matched for age and gender. Compared with patients without TMJs arthritis, JLA patients with TMJ arthritis presented higher functional disability. The multivariable logistic regression analysis performed showed that female subjects (OR = 1.5, P = 0.041), with a JIA duration over 3.9 years (OR = 2.7, P = 0.033) and presenting higher C-HAQ and CPQ11-14 scores (OR = 2.7, P = 0.012 and OR = 2.9, P = 0.015,respectively) were the greatest determining factors for TMJ arthritis.
Conclusions: JIA patients with TMJ arthritis presented a significant higher functional disability and daily difficulties and lower OHRQoL scores compared with JIA patients without TMJ arthritis. TMJ arthritis was associated with high JIA duration and activity and influenced some activities, such as eating, hygiene, emotional and social well-being, especially in female subjects.

Dental characteristics of patients with sleep-related breathing disorders (OSAS): a literature review

C. Gregorini, F. Massetti, N. Scazzero, P. Fontana, L. Laffranchi, D. Dalessandri, I. Tonni, C. Paganelli

Dental School, Department of Medical and Surgical Specialties, Radiological Sciences, and Public Health, University of Brescia, Italy

Aim: The aim of this study was to analyze dental characteristics of patients with sleep-related breathing disorders (OSAS).
Methods: A review of the literature on the dental characteristics of pediatric OSAS patients was performed on the following search engines: PubMed, Scopus, ISI Web of Knowledge and Google scholar. Inclusion criteria: age between 2 and 18 years. Exclusion criteria: patients with primary immunodeficiency or AIDS, craniofacial syndromes (cleidocranial dysplasia, Silver Russel syndrome), non-syndromic deformities of the maxillary complex (cleft palate, emifacial microsomia), previous surgical treatments of the face and previous orthodontic treatments. The following measurements made on the dental models were considered: upper inter-molar diameter (from the palatal cusp of 1.6 to the palatal cusp of 2.6), lower inter-molar diameter (from the distolingual cusp of 3.6 to the distolingual cusp of 4.6), upper and lower inter-first deciduous molar diameter(between the tips of the mesio-lingual cups of the primary molars), upper incisal inclination (the average inclination of the facial axis of the crown of 1.1 and 2.1 with respect to occlusal plane), lower incisor inclination (the medial inclination of the facial axis of the crown of 3.1 and 3.2 relative to the occlusal plane), left and right Angle classification (I, II, III), overbite (the vertical overlap of the maxillary and mandibular anterior teeth), overjet (the horizontal overlap of the maxillary and mandibular anterior teeth), maxillary and mandibular arch length (from the labial surfaces of the incisors perpendicular to a line connecting the distal surfaces of the second molars), palatal height (depth of the palate posteriorly to the last molar, as the distance farthest from the horizontal line to the palatal apex), maxillary and mandibular arch breadth (the length of the line connecting the cusps of the canines, the mesiolingual cusps of the primary first and second molars and the permanent first molars, and the lingual cusps of the first permanent premolars or the second permanent premolars) and crowding (moderate or severe if there was >4 mm lack of space in the dental arch, and mild if >2 mm, but <4 mm lack of space existed).
Results: Patients with OSA presented short lower facial height with excessive overbite and larger overjet, full or subdivision class II molar relationship and tendency to maxillary and mandibular crowding. No statistically significant difference in the length of the upper arch, in the palatal height and in the mandibular width was found. The distances between the teeth for the first and second deciduous molars and the first permanent molars were significantly narrower than controls.
Conclusions: Patients with OSA did not seem to have a standard facial structure. They had a vertical facial disharmony and dental measurements demonstrated that the patients with sleep-related breathing disorders had a more narrow upper jaw.

Association between condylar morphology and mandibular asymmetry. Cases report

E. Guercio-Monaco[1-2], A. De Stefano[1-2], A. Impelizzeri[2], R. Vernucci[3], G. Galluccio[4]

[1]Professor. Department of Orthodontic, Faculty of Dentistry, University Central of Venezuela
[2]PhD student Faculty of Dentistry. Sapienza University of Rome, Italy
[3]Department of Orthodontic, Faculty of Dentistry. Sapienza University of Rome, Italy
[4]Associate Professor Department of Orthodontic, Faculty of Dentistry. Sapienza University of Rome, Italy

Aim: The mandibular asymmetry is defined when there is an unbalanced regarding to the homologous parts composing to the mandible complex affecting the proportions among the structures.This condition

is relatively common, with a prevalence of 21% to 85%.The etiology of mandibular asymmetries is multifactorial, including genetic, environmental and congenital influences. Temporomandibular joint (TMJ) structural abnormalities are important etiologic factors that may lead to mandibular growth disturbances. Some alterations of condylar morphology can lead to the development of mandibular asymmetry: Bifid or trifid mandibular condyles are extremely rare entities, of unknown etiology, although they have been associated with trauma involving the temporo mandibular joint (TMJ). Although there are cases supportingthis hypothesis, bifid condyle has also been reported in patients with no known history of trauma; Condylar Hyperplasia is a disorder characterized by an excessive bone growth of the mandibular condyle which brings a number of facial, occlusal and functional alterations that may also interfere with the patient's psychosocial development; Condylar hypoplasia is a bone disease characterized by the decreased development of one or both the mandibular condyles. All these alterations of condylar growth lead to the development of mandibular asymmetries that are usually asymptomatic. The objective of this report is to describe three cases of mandibular asymmetry associated with trifid condyle, condylar hyperplasia, bifid condyle and condylar hypoplasia, which were attended by the Orthodontic Department in the Faculty of Dentistry of the University Central of Venezuela. Cases Report: 1- Male patient of 12 years of age, asymptomatic, with a history of facial trauma at 3 years of age. An extra-oral examination revealed a slight mandibular deviation towards the left side. Skeletal and dental Class II patient with deep bite was present.The articular clinical evaluation presented normal-mobility in opening and closing and in excursion movements, as well as the absence of joint noises. The evaluation of Computed Tomography (CT) shows a trifid condyle on the left side. 2- Male patient of 15 years of age, with antecedent trauma at the chin at 4 years of age. Extra-oral examination revealed gross facial asymmetry of the lower third of the face with deviation of the mandible to the left side. Patient showed a skeletal and dental Class I, deep bite and canting the occlusal plane. There was evident reciprocal clicking of the left TMJ and pain associated on palpation of the left TMJ. CT revealed condylar hyperplasia in the right TMJ. MRI showed disc displacement with reduction in left TMJ and disc thinned in right TMJ. 3- Female patient, asymptomatic, 21 years old with severe mandibular asymmetry with deviation on the right side. Skeletal Class III and dental Class I right and left Class III with canting of the occlusal plane. The TMJ evaluation revealed bilateral noises. CT showed a bifid condyle on the left side and condylar hypoplasia on the right side. In MRI, bilateral disc displacement was observed. Conclusions: The relationship between TMJ morphology and facial skeletal deformities was reported from many authors. These cases suggested that mandibular asymmetry was associated with condylar morphology. Understanding the etiology of mandibular asymmetry is extremely important in the management of patients. Early diagnosis of this condition is the key for satisfactory results in such patients.

Simplified protocol for tomographic evaluation of mandibular asymmetry

E. Guercio-Monaco[1-2], A. De Stefano[1-2], A. Impelizzeri[2], R. Vernucci[3], G. Galluccio[4]

[1]Professor. Department of Orthodontic, Faculty of Dentistry, University Central of Venezuela
[2]PhD student Faculty of Dentistry. Sapienza University of Rome
[3]Department of Orthodontic, Faculty of Dentistry. Sapienza University of Rome
[4]Associate Professor Department of Orthodontic, Faculty of Dentistry. Sapienza University of Rome

Aim: Facial asymmetries occur near and even above 20% of the patients who attend consultation of Orthodontics. They are the result of the interaction of multiple factors that influence the growth and development, causing discrepancies in size and position between various structures that make up the complex facial skull that depending on the severity and the potential for adaptation of the individual may compromise your facial balance and function. The etiology is believed to be related to congenital, developmental, or acquired factors. Genetic and trauma-related asymmetries may involve muscles, produce excessive unilateral growth, or adversely affect mandible development. Genetic and trauma-related asymmetries may involve muscles, produce excessive unilateral growth, or adversely affect mandible development. The growth of the skull, maxilla, and mandible are closely related. If growth is altered in one of these areas, the asymmetric growth and development of part of the craniofacial skeleton may result in a chin deviated from the mandibular midline. The advent of computed tomography has greatly reduced magnification errors from geometric distortions that are common in conventional radiographs. The three-dimensional software (3D) recently introduced allows 3D reconstruction and the multiplanar images obtained from the tomography allow the quantitative measurement of the maxillofacial complex, useful to understand the asymmetric structures involved. The aim of the present work was developing a simplified protocol on Cone Beam tomography (CBCT) or computed tomography (CT) images, for evaluation of the morphology and dimensions of bone structures involved in the etiology of mandibular asymmetry, for better diagnosis and treatment planning.
Methods: Based on the review of the literature is

elaborated a descriptive protocol for evaluation of facial asymmetry on CBCT or CT. Different softwares are applied: volumetric reconstructions in 3D, multiplanar and 2D radiological images. Three reference lines were defined to asses facial asymmetry (vertical, horizontal and axial), from which the structures will be studied; anatomical landmarks are located, and linear and angular measurements are obtained. The asymmetry indices of the bilateral landmarks were calculated.
Results: The measurements were recorded in columns showing the right and the left values, respectively and the difference for each pair was recorded in a third column. All measured values were recorded on a chart, and the differences between the right and left side were analyzed. The asymmetry index of each landmark is summarized.
Conclusion: The morphological study of the mandibles structures on CBCT or CT and their interpretation is very important for the orthodontic and surgical diagnostic and treatment planning phases as well as in the postoperative follow-up. The protocol proposed in this work simplifies the identification of structures involved in the facial asymmetry, as well as its severity, facilitates the diagnosis and the multidisciplinary management.

Digital technologies to monitor dental movement in orthodontics

M. Horodynski[1], A. Impellizzeri[2], D. Giovannoni[3], E. Serritella[2], G. Galluccio[4]

[1]DS, Sapienza University of Rome
[2]PhD Student, Sapienza University of Rome
[3]DS, Post graduate student, Sapienza University of Rome
[4]Associate Professor, Sapienza University of Rome

Aim: Several digital technologies are nowadays used in Orthodontics, gradually modifying normal orthodontic practice. The popularity and availability of virtual technology in orthodontics for the replacement of hard-copy records with electronic records is growing rapidly, with a move towards a 'digital' patient for diagnosis, treatment planning, monitoring of treatment progress and results. Making an accurate dental impression is one of the most important procedures in dentistry. The introduction of the intraoral scanner allows us to overcome the disadvantages of the analogical impression, obtaining digital models more precise and accurate.The aim of the study is to demonstrate the validity of the monitoring through intraoral scanner of the dental movements and the real importance, advantages and convenience, to frequently monitor patients with the scanner application. Another aspect of the study is focused on the differences between digital and conventional monitoring.
Methods: In this study we performed a monitoring of dental movement of impacted palatally canines, only surgically treated with a new surgical approach, laser operculectomy, without using any type of orthodontic traction. We analysed the radiographs by performing the prognosis of the eruption's canines on the OPT according to Ericson and Kurol, and we have also reconstructed the root position and the morphology of impacted canines, using software to convert CT files into STL models. Then, we measured, using the software Meshlab to overlay 3D models obtained from CT and from intraoral scans, the values of eruption, exposed palatal and vestibular areas and distances between the cusp of the canines and the palatal zenith of central and lateral incisors. We made the same measurements on the plaster casts with compass and ruler. Then, we compared the two monitoring methods by evaluating the error obtained for each measured data. This comparison allowed us of to demonstrate the superiority in precision of digital measurements. Based on the analysis of the data obtained, we made correlations between the entity of eruption movement and age, type of inclusion and starting inclination of the canines (angle α).
Results: We realized a descriptive and inferential statistical analysis of each data obtained from both conventional and digital monitoring, determining the statistical averages, the percentage increase and performing the T Student Test for paired data. Using digital technologies, we have been able to calculate the real eruption of the impacted canines and to evaluate the characteristics of the dental movement, correlating it to the variability of the sample. From this study it emerged that monitoring with digital technologies is more precise than conventional monitoring.
Conclusion: The advantages of digital monitoring are numerous. It allows us to eliminate the error caused by manual measurement on plaster casts, making real measurements, and to compare over time of the same patient.

Severe Obstructive Sleep Apnea Syndrome solved with an orthodontic mandibular advancement device: a case report

Giuliano Irlandese[1], Alberto De Stefani[2], Giovanni Bruno[3], Luca Mezzofranco[4], Antonio Gracco[5], Edoardo Stellini[6]

[1]University of Padua, Department of Neuroscience, Dental School
[2]University of Padua, Department of Neuroscience, Dental School
[2]University of Padua, Department of Neuroscience, Dental School
[4]University of Padua, Department of Neuroscience, Dental School
[5]University of Padua, Department of Neuroscience, Dental School
[5]University of Padua, Department of Neuroscience, Dental School

Aim: Obstructive Sleep Apnea Syndrome (OSAS) is

a chronic sleep respiratory disorder result from a completed (apnea) or partial (hypopnea) upper airways obstruction, alternating with brief hyperventilations. OSAS is associated with little or no effective respiratory efforts to resume normal ventilation, reduction of arterial oxygen saturation value, alteration in the heart rate, sleep fragmentation and increase in the arterial pressure. These aspects can damage seriously patients' quality of life, and long-term respiratory and cardiac disorders evolve in pathology such as hypertension, ischemic cardiopathy, heart attack, stroke, arrhythmia. There are different types of treatment -surgical and non-surgical therapy- to reduce apnea and hypopnea events of OSAS patients. Continuous Positive Airway Pressure (CPAP) is considered the gold standard therapy for OSAS patients to reduces the symptomatology and the Apnea Hypoapnea Index (AHI), but it is not well tolerated by many patients for the encumbrance and the noise. Mandibular Advancement Device (MAD) is an orthodontic treatment that consists in the application of an intraoral with the aim of advancing jaw and tongue, having as final objective the opening of the pharyngeal air space, thus freeing the passage of air. In most of cases MAD is indicated for mild (5<AHI<15) and moderate(15<AHI<30) degrees, while for severe (AHI>30) degree it is often indicated the CPAP use or surgical treatment. The aim of this case report is to show how it is possible to treat, following the right indications, patient characterized by a severe OSAS degree with mandibular advance device.

Methods: A 61-year-old man affected by severe (54.8 AHI) OSAS came for an orthodontic evaluation after inferior turbinate, pharyngoplasty, uvuloplasty surgery and drug induced sleep endoscopy (DISE) that evaluate a IV degree anterior-posterior collapse in the hypopharynx, II degree circular collapse in oropharynx and IV degree circular collapse in in the nasopharynx.
DISE is a diagnostic system useful to discriminate which patients are candidates for the use of MAD. First polysomnography revealed 54.8 AHI, 82% nadir, 50.5 oxygen desaturation index (ODI), snoring index (SI)168.3/h.

Results: The device was built with an initial activation of 70% compared to the maximum jaw excursion, each activation is 0.1 mm. After four months MAD therapy, a second polysomnography revealed a 21.9 AHI, 89% nadir, 7.7% ODI, 67.9/h SI and the patient referred a better sleep quality, a reduce in snoring, yawning and daytime sleepiness. Nine months after MAD application, the patient made 45 activations and a weight loss of 4 kilograms. A third polysomnography revealed a 1.6 AHI, 91% nadir, 1.6% ODI and 18.1% SI. This is a great result according to the American Academy of Sleep Medicine (AASM) 2014 criteria.

Conclusion: MAD treatment in a severe OSAS patient, with an adequate compliance and DISE evaluation, is a valid alternative to CPAP use. Otolaryngology surgery, orthodontic evaluation and a corrected management of an OSAS adult patient improve the AHI score and oxygen saturation, showing a great outcome for a severe OSAS patient with no compliance to CPAP treatment.

Evaluation of surface of lingual brackets after debonding with confocal

Serif Can Kuskonmaz[1], Giovanni Bruno[2], Alberto De Stefani[3], Antonio Gracco[4], Edoardo Stellini[4]

[1]University of Padua, Department of Neuroscience, Dental School
[2]University of Padua, Department of Neuroscience, Dental School
[3]University of Padua, Department of Neuroscience, Dental School
[4]University of Padua, Department of Neuroscience, Dental School
[5]University of Padua, Department of Neuroscience, Dental School

Aim: Lingual orthodontics, among both young and adult patients, increased in popularity during last years. Recent studies demonstrated that lingual orthodontics could provide treatment outcomes similar to those achieved with labial appliances.The aim of this study was to evaluate the permanence of resin and enamel remains on lingual brackets (Incognito System, 3M Unitek) at the end of orthodontic treatment and after the debonding procedure. This is actually the first study that evaluate the resin remnants on customized lingual brackets.

Methods: The lingual brackets were bonded according to clinical instruction of Incognito System. At the end of the treatment they were removed with the appropriate plier. A total of 101 lingual brackets (26 incisors, 25 canines, 25 premolars,25 molars) were analyzed with a confocal laser microscope (OLS4000). Authors decided to use a confocal laser microscope because of the curved surface of these customized brackets. After the scanning phase, brackets' surface and the area of resin remnants were measured with the software of the microscope (LEXT). The values were calculated as the percentage between the total area and the resin surface as an index of quantity of adhesive on enamel after debonding. Statistical analysis was made using the Shapiro-Wilk test to test the normality of the distribution of the outcome. P-value was considered statistically significant if lower than 0.05.

Results: In order to record and measure the amount of adhesive remaining on tooth and bracket surfaces, the adhesive remnant index (ARI) score was used . This scale allows the allocation of a score (0, 1, 2, or 3) depending on the amount of adhesive detected on the enamel surface (0: no adhesive; 1: less than 50%; 2: more than 50%; and 3: 100% adhesive). After the analyses 13 brackets resulted with no resin surface meaning no adhesive on the bracket, 29 brackets resulted with less than half of adhesive on the surface, 48 brackets

resulted with more than half of adhesive on the surface and 11 brackets resulted with all the surface covered of adhesive. Canines are the brackets with the lower remnants of resin followed by premolars, incisors and molars.
Conclusion: Lingual brackets showed a higher frequency of ARI = 2. The median percentage of bracket surface covered by resin resulted 41%.

Class II subdivision correction with clear aligners: a case report

S. Perrotta, O- Langella, C. Sangiulo, A. Amato, V. De Simone, A. Michelotti, V. D'Antò

Aim: Class II subdivision malocclusion is characterized by a dental Class II on one side and dental Class I on the other side. This type of malocclusion can be classified in two types: Type 1 is characterized by distal positioning of the mandibular first molar on the Class II side, the maxillary midline is coincident with the midsagittal plane and the mandibular midline is deviated to the Class II side; Type 2 is characterized by mesial positioning of the maxillary first molar on the Class II side, the maxillary midline is deviated to the Class I dental relationship and the mandibular midline is coincident with the midsagittal plane. This case report describes the management of an adult female patient with Class II subdivision malocclusion (Type 2), unilateral scissor-bite and dental crowding treated successfully with clear aligners.
Methods: A 32-year-old female came in our department seeking orthodontic treatment. She presented a symmetrical and oval face, slight convex profile and lip competence without signs and symptoms of temporomandibular joint dysfunction. At the intraoral assessment the patient presented a molar and canine Class I relationship on the right side, dental Class II on the left side and upper dental midline deviation on the right side. Clinical examination revealed lower crowding about 4 mm and scissor-bite of upper left molar. The treatment plan consisted in 32 clear aligners with vestibular attachements on teeth (1.4,1.5,2.2,2.3,2 .4,2.5,3.4,3.5,4.3,4.4,4.5) and it needed auxiliaries such as elastics on the left side full time and half time on the right side. In order to promote achievement of Class I, a distalization of the upper left segment was performed. Interproximal Reduction Procedure (IPR) was done between upper bicuspids (2.4 and 2.5). The aligner was changed almost every two weeks. Retention was performed on the lower arch with lower fixed retainer from 3.3 to 4.3 and on the upper arch with a fixed retainer bonded on 1.1 and 2.1.
Results: Treatment objectives were achieved in 12 months. Dental Class I relationship, good overjet and overbite and the coincidence of upper and lower dental midline were obtained.
Conclusion: Clear aligner therapy with appropriate auxiliaries is a valid alternative when is required an asymmetric orthodontic approach such as Class II subdivision in a short time-frame. Furthermore, this system allows an optimal oral hygiene maintenance and excellent aesthetic performing.

Treatment with NPE-2 and REP: comparison of results and efficacy

M. Laurenziello, G. Montaruli, G. Illuzzi, G. Battista, D. Ciavarella

Università degli Studi di Foggia, Dipartimento di medicina clinica e sperimentale, Foggia, Italy

Aim: The rhino-maxillary complex links neuro-cranium and splancno-cranium. This complex has an intramembranous growth. The dislocation in the space takes place through two processes: sutural stress and periosteal remodeling. The Nitanium Palatal Expander (NPE-2) performs a slow and continuous force on maxillary sutures together with the disto-rotation of the first molar. The aim of this work is to compare the traditional expansion with Rapid Expansion Protocol (REP) with the NPE-2.
Methods: Thirty-six patients were enrolled in this study. All patients had a transversal defect, before undergoing the treatment all the patients and their parents were informed about therapy and subscribed an informed consent. Eighteen patients underwent a treatment of expansion with NPE-2 and an equal number with REP, preferring patients treated with NPE-2 in the case of simultaneous disto-rotation of the upper first molars. Analysis of models were performed on digital scans (3-Shape Trios®) before and immediately after treatment.
Results: Effective orthopedic and dental growth were present both in NPE-2 and REP methods. The front width was found to be of high statistical significance (<0,0001****) with differential pre-post (Δ) REP with average data of 4,25 mm and likewise Δ NPE-2 with average data of 4,64 mm. In the same way the post width turned out to be of high statistical significance (<0,0001****) with Δ REP with average data of 4,15 mm and likewise Δ NPE-2 with average data of 4,44 mm. The palatal eight instead resulted a slight and non-significant contraction with Δ REP (mean -0.38 mm) and Δ NPE-2 (mean -0.01 mm). Comparing the differentials (Δ) of two methods, NPE-2 and REP, no statistically significant variables were found.
Conclusion: The expansion of the rhino-maxillary complex is a common orthopedic-orthodontic practice in transversal deficit in growth. The use of REP and NPE-2 in this study, showed that these two

methods are equally effective in solving this defect, choosing the NPE-2 method when the molar needs to be disto-rotation or not.

Evaluation of root resorption following orthodontic treatment using 3D Cone Beam Computed Tomography.

Niccolò Lupidi, Silvia Medori, Monica Macrì

Department of Oral Medical Sciences and Biotechnology, University G. D'Annunzio Chieti, School of Specialization in Orthodontics. Director Prof. Felice Festa

Aim: The aim of this study is to evaluate the External Apical Root Resorption (EARR), which is an unwanted side effect of the orthodontic treatment that usually happens on the surface of the apex and root of the orthodontically moved teeth. It has a multi-factorial etiology, both mechanical and biological. Panoramic and intra-oral radiographies have been used in the past to evaluate the size and presence of such resorptions. The three-dimensional Cone Beam Computed Tomography (CBCT) can give a wealth of information regarding the health of the root of the teeth to the clinician.
Methods: Using 3D models of the Cone beam Computed Tomography images, it was possible to evaluate the amount and presence of EARR for each tooth. The CBCT protocols for low-dosage can achieve good resolution while delivering 35 microsievert of effective dose to the patient. Low dose parameters: FOV 240x190mm, normal resolution quality images, 80kVp, 5mA and acquisition time of 15s. 2D intra-oral and panoramic images were studied and their findings organized into 3 groups: no resorption, resorption and high resorption. The results of 3D models were instead divided in 4 groups: no resorption, small resorption, medium resorption and extensive resorption. It was possible to evaluate resorption levels of the roots and analyze the discrepancies between the root at the beginning and the end of the treatment using 3D models of the Cone Beam Computed Tomography images. It was then compared the prevalence and size of resorption of the teeth when using 2D radiology and then 3D CBCT imaging. The results were catalogued based on presence and amount of resorption. For the CBCT, it was possible to superimpose 3D models and thus accurately evaluate the health and possible resorption of each radicular surface. The 275 teeth that had been selected for the study had all been subjected to orthodontic traction.
Results: From the comparison of the 3D and 2D diagnostic images it was found that when evaluating through 2D imaging, only 44% of the analyzed teeth had visible tooth resorption and 17 teeth could not be measured at all. Using 3D CBCT imaging, it was possible to identify EARR in 69% of the studied teeth.
Conclusion: 3D Cone Beam Computed Tomography displayed a much clearer picture of root resorption for every studied tooth: it was possible to correctly identify the resorption on the apex and on the mesial, distal, palatal, vestibular and lingual surface of each tooth. 3D images were also clear of any aberration created by the path of the sensor in the OPT. Thanks to a Low-Dosage protocol it's possible to employ such diagnostic tool on a wider choice of patients since the effective dose is only 35 microsievert. Its clinical importance is also paired to its usefulness for legal litigations regarding issues that were not diagnosticated earlier or whose presence wasn't presented to the patient in due time.

A case report of moderate Obstructive Sleep Apnoea (OSA) patient treated with mandibular advancement device (MAD)

Michela Malcangi, Elisabetta Cretella Lombardo, Giuseppina Laganà, Roberta Lione, Chiara Pavoni

University of Rome Tor Vergata, Department of Orthodontics, Head: Prof.ssa Paola Cozza, Rome, Italy

Aim: Obstructive Sleep Apnoea (OSA) is characterised by repetitive closure of the upper airway, repetitive oxygen desaturations and sleep fragmentation. Continuous positive airway pressure (CPAP) remains the gold standard treatment for OSA, however Mandibular Advancement Device (MAD) therapy is nowadays widely used in the treatment of mild-to moderate OSA and socially disturbing snoring. A MAD is also recommended for patients with severe sleep apnoea who are unable to tolerate or refuse to use CPAP, therefore the aim of this study was to report a case using a MAD in a CPAP-intolerant patient suffering from moderate OSA.
Methods: The patient, a 62-year-old male with moderate OSA and cardiovascular morbidity, was referred to the Orthodontic Department by the Centre of Sleep Medicine. He presented with a polysomnographic diagnosis of moderate OSA with an Apnoea Hypopnea Index (AHI) of 29.1 events/hour (supine A+H: 42,3/h; non-supine A+H: 13,4/h) and a Sat<90% of 9%. His chief complaints, as described by the patient and his partner, were of loud snoring, disturbed sleep characterized by recurrent apnoeic periods (confirmed by polysomnographic studies) and pronounced daytime sleepiness. He scored 11 points in the Epworth Sleepiness Scale (ESS) and his Body Mass Index (BMI) was 25,2 kg/m2. The panoramic radiograph demonstrated the presence of a healthy periodontal status. A MAD Forward was selected for the treatment of this patient. The design of this type of MAD was in two acrylic splints. The mandible splint

had two buccal flanges angled at 70°, which fitted against buccal blocks on the upper splint to prevent the posterior movement of the mandible. For its retention, tooth undercuts and ball hooks were used. The MAD was produced from a construction bite that was registered at 75% of the maximum mandibular protruded position (patient's maximum protrusion was 9.0 mm). The screws, both left and right, are specific manufactured to get a single direction of activation on both sides. Each activation generates 0.1 mm advancement up to 7 mm. The patient was instructed to wear the appliance at night only. After two weeks of adjustment, the patient reported good compliance and both lateral screws were activated once a day for ten days. Polysomnography exams were performed before treatment and after three months from the titration with MAD in situ.

Results: Three months after fitting and titrating the MAD, the AHI was reduced from 29.1 events/hour to 9.8 events/hour (supine A+H: 0/h; non-supine A+H: 10,1/h) and the Sat<90% decreased from 9% to 1.9%. The appliance had no adverse effects on the teeth or gingivae. The patient reported improvement in sleep quality and in his quality of life, presenting more disposition for his daily activities, without daytime sleepiness (the patient scored 3 points in the ESS after the treatment, the baseline score was 10 points) and without snoring.

Conclusion: The mandibular advancement device improved the symptoms of OSA and the polysomnographic parameters in a case of moderate OSA.

Direct versus indirect bonding techniques: accuracy of orthodontic bracket placemenT

Alessandro Martintoni[1,2], Gaia Rubini[1,2], Fabiola Toma[1,2], Giulia Ghilardi[1,2], Maurizio Manuelli[1,2,3], Alessandra Lucchese[1,2]

[1]Department of Orthodontics, Vita-Salute San Raffaele University, Milano, Italy
[1]Unit of Dentistry, Division of Orthodontics IRCSS San Raffaele Scientific Institute, Milan, Italy
[1]Private Practice, Milano, Italy

Aim: The present retrospective study aims at evaluating the accuracy of axial bracket placement by comparing two cohorts of patients undergoing buccal orthodontic treatment with direct or indirect bonding. In both groups bonding was performed by an orthodontist with more than 30 years of experience. The objective of the study is to investigate the presence of a statistically significant difference between the two groups with regard to the primary outcome, i.e. the prevalence and severity of root angulation errors measured at the mid-treatment panoramic radiograph examination and scored according to the 2012 American Board of Orthodontics (ABO) grading system. As a secondary outcome, the impact of these variables on time elapsed from mid-treatment evaluation (T1) to debonding (T2) will also be investigated.

Methods: A total of 60 patients between 2007 and 2016 were included in the study, 30 of them were treated with direct bonding (Group 1) and 30 with indirect bonding (Group 2). For every bonded tooth, the presence and clinical severity of root angulation errors at the mid-treatment panoramic radiograph examination was assessed. An ABOtip score was assigned as follows; 0 = parallel root, 1 = non- parallel root, 2 = root contacting adjacent root. Differences in error rates by patient and single tooth between the two groups were analysed using Fisher's exact test or Pearson's χ 2 as appropriate. Total ABOtip scores and subtotal ABOtip scores by sector were investigated using nonparametric tests (Mann-Whitney U test, Kendall's τb correlation). Associations among multiple variables were assessed by means of binary logistic regression or multifactor ANOVA as appropriate. Results were considered statistically significant when p values were < 0.05.

RESULTS: A total of 45 out of 60 patients (75%) showed at least one root angulation error at the panoramic radiograph examination. This proportion varied significantly between Group 1 and Group 2 (56.7% vs 93.3% respectively, $p = 0.002$). In all, 5.1% of directly bonded teeth had a root angulation error compared to 9.9% of indirectly bonded teeth ($p < 0.001$). The difference in total ABOtip scores between Group 1 and 2 (41 vs 78, respectively) was found to be statistically significant ($Z = 2.916$, $p = 0.004$) and particularly favourable for direct bonding in anterior sectors. As for post-evaluation treatment times, no correlation was found between T1-T2 and ABOtip scores per patient ($\tau b = 0.189$, $p = 0.052$). When considering only the presence or absence of errors, considerably shorter mean times were found for patients with no angulation errors (10.5 $\pm$ 6.9 months) compared to patients with at least one error (15.1 $\pm$ 7.8 months). However, bonding technique remained as the only independent predictor in multivariate analysis ($p < 0.001$) as mean times were nearly halved in the group undergoing direct bonding (9.4 $\pm$ 6.1 months vs 18.5 $\pm$ 6.6 months).

Conclusion: Direct bonding proved to be more accurate than indirect bonding for axial bracket placement in buccal orthodontic treatment performed by an expert orthodontist. Both prevalence and severity of root angulation errors found at the mid-treatment evaluation would appear to be lower with direct bonding. Also, an association with shorter post-evaluation treatment times was found which was not entirely explained by these variables. Such results may provide valuable information for the scientific community and warrant further investigation with future studies.

Upper molar distalization with orthodontic aligners: a finite element study on anchorage management

Elisa Massari, Gabriele Rossini, Simone Parrini, Francesca Spadaro, Manuel Barbetti, Tommaso Castroflorio, Andrea Deregibus, Mariagrazia Piancino

University of Turin, Italy

Aim: In recent years, several studies examined real effectiveness of orthodontic aligner, by considering the different types of movement and generated forces and moment. Regarding maxillary molars distalization, encouraging resoults have been obtained, both from clinical and in vitro point of view. However, a lack of knowledge regarding aligners' biomechanics and anchorage control during distalization is still present. The aim of this in-silico study was to evaluate, adopting finite element analysis (FEA), whether the presence and configuration of attachments may affect anchorage management and upper second molar distalizaton efficiency.
Methods: A CAD model of maxillary arch from 1.1 to 1.7 including periodontal ligament and aligner was designed and imported in FEA software. Assuming the upper dentition to be bilaterally symmetric, the FEA models were constructed only for the right side. Three experimental models were developed, considering different combinations of attachments:
- Without attachments (NOATT).
- With attachments from canine to second upper molar (ATT 3-7).
- With attachments from canine to first upper molar (ATT 3-6).
Attachments were designed as vertical rectangular with 3mm height, 2 mm of width and 1mm of thickness, with shape derived from ClinCheck Software® (Align Tecnology Inc, San Jose, CA). The aligner was activated with a distalization of 0.2 mm on upper second molar. Dedicated material properties and interface contacts were set to simulated a real oral enviroment. Analysed outcomes included:
- Teeth movement.
- Aligner deformation.
- PDL stress.
Results: In all simulation, a forward displacement of 0.2 mm on average for the aligner was observed. The maximum distal movement of the second upper molar crown was of 0.001 mm for NOATT, 0.017 mm for ATT 3-7 and 0.035 mm for ATT 3-6. The overall maximum displacement was registered on premolars and incisor (0.009) for NOATT, on incisors (0.025 mm) for ATT 3-7 and of both second molar and incisors (0.035 mm) for ATT 3-6. The maximum stress on the ligament was located near the apex of the first premolar (285 mmHg) for NOATT, located at the apex of the second molar for ATT 3-7 (56,39 mmHg) and ATT 3-6 (97.41 mmHg).
Conclusion: The ATT 3-6 configuration reported the most efficent initial force system for upper second molar distalization. However, a clinical anchorage loss in the anterior region and a mesial shift of the aligner were registered regardless of the attachments' layout.

Long-term stability of unilateral posterior crossbite corrected with function generating bite

G. Matacena[1], L. di Benedetto[1], C. de Biase[1], E. Madiai[1], M. Zerbino[1], A. Tortarolo[1], I. Tonni[2], U. Garagiola[3], A. Deregibus[1], T. Castroflorio[1], M.G. Piancino [1]

[1]Department of Surgical Sciences, C.I.R. Dental School, University of Turin, Turin, Italy
[2]Medical and Surgical Specialties, Radiological Sciences, and Public Health, Dental School, University of Brescia, Brescia, Italy
[3]Department of Biomedical, Surgical and Dental Sciences, School of Dentistry, University of Milan, Milan, Italy

Aim: The aim of this study was to evaluate the long-term stability of unilateral posterior crossbite correction after therapy with Function Generating Bite.
Methods: 36 patients (17 boys and 19 girls, 8,53 ± 2 y.o.) with unilateral posterior crossbite corrected with Function Generating Bite were included in this study. Linear measurements were made on dental casts by the same examiner with a digital gauge considering the intermolar distance between the tips of cusps (mesiobuccal cusp was used) and the shortest intermolar distance at the gingival crests. In 21 patients, when the deciduous canines were present, the mean intercanine distances at tips of cusps and at gingival crests were registered. Measurements were made before treatment (T0), after crossbite correction (T1), and about 3 years after the correction and the end of active treatment (T2).
Results: The results showed that: before therapy mean intermolar distance was 45.2 mm (±9) at tips of cusps and 29.52 mm (±7) at gingival crests, intercanine distance was 28.93 mm (±2) and 20.65 mm (±2). After crossbite correction mean intermolar distance was 50.2 mm (± 10) at tips of cusps (p= 0.002) and 32.39 mm (±7) at gingival crests (p= 0.007). Intercanine distance was 31.33 mm (±2) at tips of cusps (p=0.03) and 23.2 mm (±2) at gingival crests (p=0.0001). About 3 years after the end of active treatment, mean intermolar distance was 52.71 mm (±3) at tips of cusps (p=0.0004) and 35.71 mm (± 4) at gingival crests (p=0.0006), intercanine distance was 32.83 mm (±2) (p=0.02) and 24.04 mm (±2) (p=0.0003). The mean increase of maxillary transversal widths during treatment (T1-T0) in the intercanine distance

was 2.39 mm (±1) at the tips of cusps and 2.55 mm (±1) at gingival crest , whereas in the intermolar distance was 4.50 mm (±1) at the tips of cusps and 3.27 mm (±1) at gingival crest. The study showed an additional increase of transversal widths before correction (T1-T2): the mean increase in intercanine distance was 1.5 mm (±1) at the tips of cusps and 0.84 mm (±1) at gingival margin, in the intermolar distance was 0.99 mm (±1) at the tips of the cusp and 0,87 mm (±1) at gingival crest. The overall increase (T0-T2) of intercanine and intermolar distance was 3.89 mm (± 1) and 5.5 mm (±1) at the tips cusps, 3.39 mm (±1) and 4.48 mm (±1) at the gingival crest.

Conclusion: The increase of maxillary transversal width in patients with unilateral posterior crossbite corrected by Function Generating Bite was significant and showed higher values compared to results in literature using fixed appliances. Moreover, at 3 years follow-up, patients treated with Function Generating Bite significantly showed an additional increase of intercanine and intermolar distance instead of the relapse showed after use of fixed appliance in literature.

Evaluation of the efficacy of the Andresen Activator before peak growth in Class II patients

Marco Montanari[1,2], Sara Maestrini[1,2], Giulia Caldara[1,2], Ludovica Casavola[1,2], Filippo Sertori[1,2], Faccioni Paolo[3], Maurizio Manuelli[1,2,4], Alessandra Lucchese[1,2]

[1]Department of Orthodontics, Vita-Salute San Raffaele University, Milan, Italy
[2]Unit of Dentistry, Division of Orthodontics IRCSS San Raffaele Scientific Institute, Milan, Italy
[3]Section of Orthodontics; Department of Surgical Sciences, Dentistry, Gynecology and Pediatrics; University of Verona; Verona, Italy.
[4]Private Practice, Milano, Italy

Aim: Andresen Activator (AA) is a functional oral appliance used to correct Class II malocclusion on mixed secondary dentition and during peak growth. It corrects the malocclusion stimulating mandibular growth and determining a palatoversion of the upper incisors and a vestibularization of the lower incisors. The aim of this study was to analyze the treatment efficacy of class II malocclusion due to mandibular hypodevelopment before peak growth.

Methods: a group of 14 subjects, (8 females, and 6 male), with an average age of 8 years, with class II relationship of the skeletal bases and cervical vertebrae maturation stage 1 or 2 was enrolled in the study. Cephalometric analyzes were carried out using landmarks derived from the studies of Pancherz, Ricketts, Tweed and Steiner.

Results: A significant decrease (P <0.05) in ANB angle was found (-2.29 ± 3.05°) after treatment, which was expression of an improvement in maxillo-mandibular sagittal skeletal relationships. There was also a significant reduction of OJ after treatment (-4.44 ± 2.36 mm; P <0.001), indicating a vestibularization of the mandibular incisors and a palatoversion of the maxillary incisors, and a correction of the molar relationship.

Conclusion: The favorable effects of the Andresen activator for the correction of the mandibular defect can be found even prior to peak growth and during the mixed secondary dentition; the obtained class I relationship through the mandibular anterior-motion allows a correct position of the jaw in time, ensuring a proper skeletal growth.

The role of the orthodontist in the treatment of OSAS: only an oral device after an appropriate diagnostic approach

Alessandra Lucchese[1,2], Marco Montanari[1,2], Matteo Trimarchi[4], Francesca Palonta[4], Paola Sigorini[1,2], Maurizio Manuelli[1,2,3], Giorgio Gastaldi[4,5]

[1]Department of Orthodontics, Vita-Salute San Raffaele University, Milan, Italy
[2]Unit of Dentistry, Division of Orthodontics IRCSS San Raffaele Scientific Institute, Milan, Italy
[3]Private Practice, Milan, Italy
[4]Department of Otorhinolaryngology, Vita-Salute San Raffaele University, San Raffaele Scientific Institute, Milan, Italy
[5]Department of Prosthodontics, Vita Salute San Raffaele Univerisity, Milan, Italy

Aim: The use of oral devices for the mandibular advancement is a possible treatment for the Obstructive Sleep Apnea Syndrome (OSAS) and its systemic complications, as previous studies reported. The aim of this clinical trial is to prove the efficacy of a removal bite in determining the anterior-motion of the jaw, to treat OSAS in specific categories of patients. The mandibular advancement device (MAD) is effective in patients with low to moderate OSAS, whose apnea is due to retro-lingual obstruction and it can be considered the least invasive solution, compared to Continuous Positive Airway Pressure devices (CPAP).

Methods: A total of 3000 patients were visited between 2016 and 2019 in the Department of Otorhinolaryngology (San Raffaele Hospital, Scientific Institute, Milan, Italy), where the study took place. Among this group were recruited 304 patients (140 female and 164 male, average age and range age 48 ±1 years), in permanent dentition, with the Obstructive Sleep Apnea Syndrome (OSAS). They were visited in the clinic LARSON (Department of Otorhinolaryngology, San Raffaele Hospital, Scientific Institute, Milan, Italy).

Some specifics exams are necessary in order to estabilish the eligibility of the patient to treat OSAS with MAD. The first one is the polysomnography, to distinguish between central and peripheral obstruction. In case of peripheral obstruction, a fibroscopy is indicated to understand which airway level is the responsible of the obstruction (rino-, oro-, hypopharynx). In order to classify the level of severity of OSAS the AHI (Apneas and Hypopnea Index) was used. Through an orthodontic visit the relationship between the maxilla and the jaw and the kind of dental-occlusion can be established. If the patient is suitable, radiographical examinations (Teleradiography L-L and Ortopantomography) are needed, and in case of eligibility the dental impression will be taken to create a removable transitory device. The effectiveness of the bite will be tested during the simulation of the sleeping phase, through the sleep endoscopy. Only if the apneas are reduced during the exam, a definitive dental appliance will be produced.
Results: after patient selection the MAD has to be used as a OSAS therapy only during the night. The objective of this treatment is to avoid the occlusion of the upper airways determined by the backward slip of the retro-lingual section.
Conclusion: The MAD seems to be the most valid solution to cure OSAS and to prevent its sysyemic complications. We underline the importance of an accurate selection of the patients with preliminary examinations both clinical and radiographic, and first of all the polysomnography. A correct diagnostic procedure is need to select patients with OSAS and to choose the most suitable therapy for each single case.

Overview of systematic reviews on the effects of maxillary expansion on the upper airways

R. Bucci, D. Montanaro, R. Rongo, R. Valletta, A. Michelotti, V. D'Antò

Department of Neurosciences, Reproductive Sciences and Oral Sciences, School of Orthodontics and Temporomandibular Disorders, University of Naples "Federico II", Naples, Italy

Aim: To perform an overview of the effects of maxillary expansion (ME) on the upper airways, by systematically reviewing all published systematic reviews (SRs) and meta-analyses (MAs). In particular, the goals were: to assess the methodological quality of the published SRs and MAs and to provide a comprehensive synthesis of the effects of ME on the upper airways.
Methods: Six electronic databases (PubMed, Web of Science-WoS, Scopus, The Cochrane Library, Scientific Electronic Library Online-SciELO and Latin American and Caribbean Health Sciences-LILACS) have been explored up to November 2017 using combinations of keywords and MeSH terms according to the database rules. Two authors separately carried out the electronic literature search, without any restriction on publication date and language. Based on abstracts/titles, articles were initially selected; then full articles were retrieved and were further sorted according to secondary, more stringent criteria. The SRs addressing the effects of fixed palatal expanders on the dimension and function of the nasal airways in human subjects were included. Data were independently extracted by two authors using a pre-determined extraction form. Selected studies thereafter were evaluated methodologically. The methodological quality of the included SRs was independently assessed by two reviewers using the revised and updated version of A Measurement Tool to Assess Systematic Review (AMSTAR-2).
Results: Eight SRs were included. The methodological quality of most of the included SRs ranged between low and critically low. One SR was rated of high quality. A significant increase of nasal linear dimensions was reported both in the short- and long-term, but supported by low/critically low quality SRs. The significant increase of nasal cavity volume was the only outcome supported by a high quality SR. Controversial results were found by means of functional exams and they were supported by low quality evidence.
Conclusion: Due to the low/critically low quality of SRs supporting these results, ME cannot be indicated only for nasal improvement purposes, but must be supported by an orthodontic indication. Therefore, whenever a constricted maxilla is present, general dentists, pediatricians and ENTs should be familiar with the potential improvement provided by the maxillary expansion, but still this treatment cannot be indicated only for nasal improvement purposes as the clinical relevance of the results is not well established.

Two-phase treatment of dentoskeletal Class II malocclusion in a growing patient with unilateral agenesis of mandibular lateral incisor: a case report

R. Rongo, D. Montanaro1, R. Adaimo, F. Sostenuto, V. De Simone, A. Michelotti

Department of Neurosciences, Reproductive Sciences and Oral Sciences, School of Orthodontics and Temporomandibular Disorders, University of Naples "Federico II", Naples, Italy

Aim: To use a two-phase treatment to improve aesthetics and function in a growing patient with dentoskeletal Class II malocclusion and unilateral agenesis of mandibular lateral incisor.
Methods: This case report refers to a 10-year-old female with a cervical stage between CS2-CS3. She presented with Class II skeletal malocclusion by mandibular retrusion, brachyfacial type, full Angle Class II molar malocclusion, agenesis of mandibular

right lateral incisor, excessive overjet, deep overbite, reduced Bolton index, convex and slightly retruded facial profile. The Fränkel maneuver was negative, hence the profile did not get worse with the mandibular advancement. The treatment purposes were correction of dentoskeletal Class II, improvement of the smile and facial aesthetics, compensation of overjet and overbite. A two-phase treatment was chosen: at first, the growing patient followed an orthopedic functional treatment phase with Sander's Bite Jumping appliance, commonly used for the treatment of Class II malocclusions with mandibular deficiency. The primary goals of growth modification, then, were both to correct the skeletal discrepancy and to achieve optimal facial aesthetics. Functional treatment lasted about 14 months. A second stage of treatment with a straight wire appliance was required to achieve proper alignment and good interdigitation of the dentition. The fixed appliances were debonded after 16 months. The total treatment time was approximately 30 months. Retention was a removable upper retainer and a fixed one on the lower arch.
Results: All treatment objectives were achieved. As observed in the extraoral and intraoral photographs, satisfactory dental alignment was achieved, overjet and overbite were compensated to allow a molar Class I considering the reduced Bolton index. The overall facial balance was greatly improved, and an orthognathic profile was achieved. The patient was satisfied with her teeth and profile. The cephalometric analysis, which compared pre- and post-treatment values, indicated that the antero-posterior relationship of the basal bone was improved. The follow up after 6 months showed stability in the obtained results.
Conclusion: This case report presents a successful treatment of a dentoskeletal Class II malocclusion in a growing patient using a two-phase therapy, yielding a pleasing profile and good occlusion. A combination of orthopedic treatment and fixed orthodontic treatment may be the best solution to face this type of malocclusion, especially when the functional appliance is used close to the pubertal growth peak.

Epidemiologic study to intercept the child with respiratory sleep disorders

M. Nebbiai[1], L. Scarpata[2], E. Carli[1], L Stoppello[2], C Cuscusa[2]

[1]Unit of Pediatric Dentistry, Department of Surgical, Medical and Molecular Pathology and Critical Care Medicine, University of Pisa, Pisa, Italy
[2]Department of Surgical Sciences, University of Cagliari, Cagliari, Italy

Aim: Obstructive sleep apnea syndrome (OSAS) is a pathology that can affect the entire population, including children where is relatively frequent. This may present with various symptoms such as snoring, respiratory sleep apnea, daytime drowsiness or cognitive-behavioral alterations such as restlessness, attention deficit, hyperactivity. The aim of this study is an epidemiological evaluation of the signs and symptoms associated with OSAS in the pediatric population afferent to Pediatric dental clinic of the University of Pisa.
Methods: The study was conducted by interviewing the parents of the patients on their first visit to the Pediatric dental clinic of the University of Pisa, using validated questionnaires: the "Pediatric Sleep Questionnaire" proposed by Chervin et al. in 2000, whose Italian version has been translated and validated by Cozza et al. in 2015. The form consists of 22 questions, collected in 10 thematic main groups. The questions are closed, in fact they only allow three types of answers: Yes, No, or I don't know.
Results: A total of 55 questionnaires compiled correctly and exhaustively were collected (30 M 25 F), and the final values were converted in percentage. With the epidemiological investigation it was possible to observe that most of the symptoms associated with OSAS in evolutionary age have been approached to the results already found in the literature, like strong and intermittent snoring, oral breathing, headache in the morning, overweight and cognitive-behavioral signs, especially difficulties of attention and concentration.
Conclusions: The epidemiological study carried out has found values that fall within those which are described by the literature, with the exception of symptoms such as diurnal drowsiness or respiratory sleep apnea, higher in the sample, and those related to the growth interruption and nocturnal enuresis, which were instead presented in a lower percentage of the sample. Among the percentages described above, those related to symptoms of oral breathing and overweight stand out, although they are in line with the current literature.

Laser-assisted surgical exposure of an impacted upper canine: a case report

P. Pancera, F. Manobianco, M. Macrì

Department of Oral medical sciences and Biotechnology, University "G. D'Annunzio" Chieti, Italy. School of Orthodontics and Gnathology. Director: Prof. Felice Festa

Aim: The purpose of this study was to evaluate the use of a laser diode in orthodontics, especially in the case of surgical exposure of an impacted tooth. Moreover, the performance of the procedure, the quality of the tissues and the duration of surgical times when carrying out the open exposure of the tooth have also been examined.

Methods: A sixteen years old girl who required orthodontic treatment was selected for performing the surgical procedure. She had no relevant diseases and no coagulation disorders. She had good oral hygiene and was nonsmoker nor drinker. She required an orthodontic treatment aimed at solving her malocclusion and bringing the upper left impacted canine into its correct position. Tooth 2.3 was located under a thick layer of adherent mucosa. A 980 nm laser with 2W continuous pulse (CW) power with activated fiber was used for performing the open surgical exposure of the canine. The patient was instructed to perform her regular oral hygiene maneuvers with a soft toothbrush and to apply a 1% chlorhexidine gel twice a day (one application in the morning and one before going to bed) on the mucosa adjacent to the surgical site.
Results: The laser-assisted surgery for gently removing the thick layer of adherent mucosa overlying the tooth was performed in only twelve minutes, including the time for local anesthesia. The use of the laser allowed for a minimal bleeding during the surgery, as well as in the following days. Moreover, the patient reported no discomfort in the hours after the procedure and no pain in the following days. At a two weeks follow-up the mucosa appeared healthy, pinkish, without any sign of sufferance.
Conclusion: The laser-assisted surgery proved to be effective in performing the surgical exposure of the impacted tooth. It can be considered a reliable procedure especially when the teeth are superficially located because there is no need of surgical flaps nor removal of the overlying cortical bone. Its benefits can be summarized as follows: it allows for a minimal bleeding surgery; the surgery can be performed in shorter times because there is no need of incisions with the scalpel nor suturing; the minimal post surgical bleeding allows for a safer bonding of the orthodontic button that will be used for anchoring the traction of the tooth; the less discomfort for the patient, during the surgery as well as in the following days, makes the procedure safe and efficient even in odontophobic patients and in young patients.

A novel PTH1R nonsense variant in a small pedigree with incomplete penetrance of primary failure of tooth eruption

Francesca Pasquali, Isabella D'Apolito, Anna Blasi, Alberto Valentini, Cristiana Romeo

Università Cattolica del Sacro Cuore, Roma, Italy

Aim: The aim of our study is to describe a rare inheritance pattern of Primary Failure of Eruption in one family with segregating a novel PTH1R mutation.
Primary Failure of tooth Eruption is a non-syndromic disorder caused by mutations in the parathyroid hormone receptor 1 gene (PTH1R). It is characterized by an incomplete eruption of posterior teeth, despite the absence of mechanical obstruction and the appearance of a normal physiological bone resorption along the eruption path. The presence of a genetic alteration of PTH1R is an objective diagnostic feature often confirmatory for the PFE phenotype. However, simple pedigree analysis by inspection provides a strong suggestion of a positive diagnosis including the observation of the phenotype segregating in an autosomal dominant fashion. In one family we describe the incomplete penetrance of PFE and the segregation of a novel gene mutation.
Methods: The proband, a 26 year-old man reported to our clinic with a significant bilateral open-bite , was diagnosed as PFE based on clinical, radiological and genetic characteristics. DNA was extracted from the proband and his family using buccal swabs. The entire PTH1R coding sequences were amplified using previously described primer sets designed to delineate splice junctions and at least 50 bases of the intron-exon boundary. The genetic defect was characterized by sequencing analysis of PTH1R gene by Sanger Method using automatic sequencer AB 3500 Genetic Analyzer.
Results: Sequencing analysis of PTH1R genes revealed a novel heterozygous non-sense mutation in exon 7 that introduces a premature stop codon (c.505G>T, p.(Glu169Ter), causing truncated and non-functional protein. This variant is novel and not associated with a clinical family history. In fact, the mother of the proband, who is also harboring this mutation, does not have PFE phenotype.
Conclusion: PFE mainly follows an autosomal dominant pattern of inheritance but usually displays incomplete penetrance, variable expressivity and phenotypic overlap. These phenotypic variations are due to genetic modifiers but most pathophysiological pathways implicated in these effects remain unknown. Basic analysis and further genotype-phenotype correlation studies in large families are crucial for understanding the cellular mechanism underlying these conditions. Familiarity is one of the main signs but ,in some cases, it is not evident clinically. When PFE is suspected in a patient, a genetic test for mutation in the PTH1R gene should be recommended prior to any orthodontic treatment to avoid starting a long and unsuccessful one.

Oral microbiota and removable orthodontic devices: a systematic review

Marianna Pellegrino[1,2], Sofijia Korolijia[1,2], Flaminia Guglietta[1,2], Francesca De Palma[1,2], Alessandro Martintoni [1,2], Alessandra Lucchese[1,2]

[1]Department of Orthodontics, Dental School Vita-Salute San Raffaele

University, Milan, Italy;
[2]Unit of Dentistry, Division of Orthodontics, Research area in Dentofacial Orthopedics and Orthodontics, IRCCS San Raffaele Scientific Institute, Milan, Italy

Aim: Orthodontic treatment with removable devices was found to have an impact on the quantity and constitution of oral microbiota. However, contradictory findings about the effects of orthodontic appliances on microbial changes were reported. To investigate the microbial changes of orthodontic patients, a systematic review was realized.
Methods: The PubMed, Cochrane Library, EMBASE, Web of Science, Scopus, Ovid Medline, Dentistry & Oral Sciences Source and Vita-Salute San Raffaele University databases were searched up to December, 2018. The keywords and combinations used in searching the databases were "Functional appliance OR removable orthodontic appliance OR frankel appliance OR bionator OR Im activator OR twin block AND microbiology" and "Oral microflora AND orthodontic appliances". Randomized controlled trials (RCTs), controlled clinical trials and longitudinal studies that examined the microbial changes at different moments of treatment (before, during and after treatment) were included. The Preferred Reporting Items for Reporting Systematic reviews and Meta-Analyses (PRISMA) protocol and the 'Swedish Council on Technology Assessment in Health Care Criteria for Grading Assessed Studies' (SBU) method were adopted to report this systematic review.
Results: Eight studies were selected, which provided evidence that any appliance or device placement in the oral cavity causes increased retention sites of plaque and microorganisms. Streptococcus mutans and Lactobacillus spp. significantly increased ($P < 0.001$ and $P < 0.005$) during short-term observation (0-6 months). A sudden statistically significant increase ($P < 0.001$) in the counts of Candida albicans was detected at the end of the first month from the therapy start. For what concern periodontopathogens, only subgingival Spirochetes increased after 6 months, while Aggregatibacter actinomycetemcomitans prevalence was near to zero. Changes of oral microflora, due to orthodontic therapy with removable appliances, cause pH value alterations. It decreases significantly during the therapy, but returns to previous levels just after 6 months from the end of therapy. Furthermore, the buffering saliva capacity is drastically reduced in a statistically significant way during therapy. This means that orthodontic treatment may lead to a modification of the oral microflora, increasing the concentration of cariogenic bacteria in dental plaque and saliva.
Conclusion: According to our systematic review, a significant alteration of the oral microbiota was registered just one month after the treatment start, independently from the appliance type.
This systematic review highlighted, with moderate/high evidence, that removable orthodontic devices lead to an increase in the number of microorganisms of the oral cavity, so patients should keep care of their oral hygiene. Though orthodontic removable treatment might not permanently induce disease by affecting the pathogen levels.

Treatment resolution of Class II malocclusion with extraction of upper premolars in adult patient: a case report

S. Perrotta, P. Petrucci, B. Zunino, V. Donnarumma, R. Valletta

Department of Neuroscience, Reproductive and Oral Sciences, School of Orthodontics, University of Naples Federico II, Naples, Italy

Aim: To describe the orthodontic management of a patient with Class II malocclusion treated through dental extractions. The indications for extractions in the orthodontic practice have historically been controversial: premolars are the most common choice because they are located between the anterior and posterior segments of the dental arch. Different extraction procedures (upper/lower first or second premolars) have been recommended by several authors for different reasons: entity of dental crowding, lower incisors proclination, periodontal tissue thickness and anchorage management. These treatment strategies are also used in the correction of severe malocclusions of skeletal origin in order to make a camouflage of the profile, in patients not inclined to surgical treatment.
Methods: A 23 years old female patient came to our attention with the chief complaint of a bad smile esthetics. The patient presented a convex profile, labial incompetence, a dento-skeletal Class II malocclusion due to a slight retrusion of the mandible, associated to a high proclination of lower incisors. A surgical approach was proposed as first line treatment but it was not accepted by the patient and her family; although the sagittal jaw discrepancy was severe and the lower inferior limit was protruded, the selective extraction of maxillary first premolars was chosen as a valid alternative of treatment. At first premolar extractions were performed, and maxillary and mandibular teeth were bonded. Initial dental alignment was obtained using AC 0,014 NiTi and dental leveling was achieved with the standard arch wires sequence (0,014 x 0,025 NiTi, 0,019 x 0,025 NiTi), until 0,019 x 0,025 SS. Space closure was realized by two-loop Bull keyhole (TMA 0,19x0,25); Interarch Class II and vertical elastics were used at night starting from the SS arches. The final retention was performed by an upper Hawley bite plane and a lower 3.3-4.3 bonded lingual retainer.

Results: The total treatment duration was 24 months. Molar Class II and Canine Class I relationship have been successfully achieved. No significant differences concerning lower incisors proclination were found when comparing pre and post-treatment cephalometric values.
Conclusion: Correction of Class II malocclusion in adult patients requires efficient treatment mechanics. The findings obtained from the present case report show that the orthodontic treatment based on upper first premolars extraction is a valid therapeutic approach Class II malocclusion, in patients in which the lower anterior dental limit should not be modified.

Treatment of post-surgical limited mouth opening due to condyle and mandibular ramus resection: a case-report

R. Bucci, A. Prete, A. Tedesco, Langella, Montanaro, A. Michelotti

Department of Neurosciences, Reproductive Sciences and Oral Sciences, School of Orthodontics and Temporomandibular Disorders, University of Naples "Federico II, Naples, Italy

Aim: The pterygomaxillar fossa is a bilateral, cone-shaped depression located under the apex of the orbital cavity. It is limited by the perpendicular part of the palatal bone, the maxillary tuberosity and the spheno-maxillary face of the pterygoid process.
This case report refers to a growing patient who underwent a massive surgery due to the removal of a cyst in the left pterygomaxillar fossa.The aim of this treatment is to restore the function and the symmetric mandibular growth after surgery.
Methods: An 8-year-old female presented complete condyle resection and partial ramus resection due to a previous surgical intervention. She showed limited unassisted mouth opening without pain (32 mm) and limited right lateral excursion (3 mm), while the left lateral excursion was within the normal range (7 mm). Patient did not refer spontaneous pain or joint sounds during jaw functions.The opening path presented a marked deviation to the left side. Firstly, a physiotherapy protocol (with parents' help) including vertical distraction, mouth opening stretching and right lateral excursion stretching was suggested, to increase the mouth opening range. The second stage of treatment included an oral appliance with a screw for vertical distraction, in order to favor the vertical growth of the affected side.After 12 months of treatment, the patient was provided with an asymmetrical Sander bite jumping appliance, in order to stimulate the sagittal growth of the affected side.During the functional treatment, the patient was invited to continue the home-physiotherapy.
Results: After the treatment, the patient presented a substantial improvement of the maximum unassisted mouth opening (43.5 mm) and of the right lateral excursion (7 mm). Furthermore, the opening path was straight and patient did not present neither pain nor joint sounds. The ortopantomography showed the presence of a new bone formation in the condyle area that, although not articulated in the fossa, allowed to the patient a good jaw function.
Conclusions: The protocol used allowed the restoration of the jaw function and prevented the patient's face from developing asymmetrically. However, due to the very young age, the patient is suggested to continue the treatment during pubertal growth, with a nocturnal use of the appliance, in order to further guide mandibular growth direction.

The impact of combined use of computer-guided, minimally invasive, flapless corticotomy and clear aligners on oral health-related quality of life

M. Rapisarda, F. Gavetti, G. Padalino, F. Squillace, E. Barbato

"Sapienza" Università di Roma, Facoltà di Medicina e Odontoiatria Dipartimento Di Scienze Odontostomatologiche e Maxillo Facciale. Direttore: Prof. E. Barbato , Scuola di Specializzazione in Ortognatodonzia. Direttore: Prof. E. Barbato, U. O. C. di Ortognatodonzia. Direttore Prof. E. Barbato. Rome, Italy

Aim: The aim of this study was to evaluate the impact of computer-guided, minimally invasive flapless corticotomy combined with clear aligners therapy on patient's oral health-related quality of life (OHRQoL).
Methods: Ten patients with severe dental crowding and a class I molar relationship were selected to receive a combined treatment with clear aligners and corticotomy-facilitated orthodontics. The mean age of the patients was 21 years (range 17–28 years, standard deviation 6.08 years); the male to female ratio was 2:1. The Italian version of the short-form Oral Health Impact Profile (OHIP-14) was used to evaluate the impact of this therapeutic approch on OHRQoL. The self-administered questionnaire was completed by the patients in the ward before the beginning of treatment(T1),at 3 days(T2) and at 7 days (T3) after treatment. The t-test was used to determine the impact of the minimally invasive, flapless corticotomy procedure on OHIP-14 scores. The internal consistency of the scale, which means that each domain of the instrument assesses distinct aspects of the same attribute or construct, was evaluated using Cronbach's alpha. P≤value 0.05 was considered to indicate statistical significance.
Results: OHRQoL as measured using OHIP-14 deteriorated from the baseline(OHIP-14 mean 8.67, range 0–19, SD 9.61) to first follow-up, 3 days after

surgery (OHIP-14 mean 17.33, range 20.00–13.00, SD 3.79). At 7 days of follow up there was a nearly complete recovery of the original OHIP-14 values (mean 7.67, range 4–12, SD 4.04).
On the basis of the statistical analysis, the minimally invasive, flapless corticotomy procedure did not significantly modify the OHIP-14 scores at 3 days (P = 0.20) or 7 days (P = 0.89) of follow-up. Cronbach's alpha values indicated excellent internal consistency reliability in all self-administered questionnaires.
Conclusion: Despite the different techniques described in literature, minimally invasive, flapless corticotomy procedure appears to be the only effective and safe method to accelerate orthodontic tooth movement, although few reports on this topic are currently available. The limited deterioration in postoperative oral health related quality of life and the effectiveness of the combined used of computer-guided minimally invasive corticotomy surgical technique and clear aligners treatment should encourage the clinician to its wider use.

Effect of orthodontic treatment on the periodontal tissue

Mikhail Romani, Susanna Ferrario, Paola Beretta, Chiara Ceratti, Salvatore Batia, Gionata Bellucci, Davide Cavagnetto, Matteo Landi, Cesare Lacaita

Dipartimento di scienze biomediche, chirurgiche e odontoiatriche, Fondazione IRCCS Ca' Granda - Ospedale Maggiore Policlinico. Università degli Studi di Milano, Italy

Aim: The aim of this work consist in doing of a literature review concerning the clinical effects of various orthodontic tooth movements on the surrounding hard and soft tissues and to identify important patient and treatment-related factors that may influence the response of the periodontal tissue to specific orthodontic treatments.
Methods: The study was carried out by a revision of literature of different types of orthodontic movements, such as expansion, extrusion, intrusion and the movement of teeth into edentulous sites with limited alveolar bone.
Results: Most orthodontists are often reluctant to close large edentulous spaces, because of the risk of localized gingival dehiscence, poor root parallelism, incomplete space closure, increased treatment duration, and relapse. Sagittal movement of teeth into longstanding edentulous sites seems to be a viable method for closing residual spaces and redeveloping variable amounts of alveolar bone. Orthodontic intrusion may be useful for the intrusion of elongated and flared incisors, management of traumatic deep-bites and the intrusion of over-erupted worn of fractured incisors, but light forces should be used in order to reduce this risk of root resorption. Orthodontic extrusion may offer an effective and less-invasive method for developing prospective implant sites, especially if orthodontic treatment is already indicated. Excessive bodily advancement or proclination of the teeth for the purpose of gaining additional arch space may adversely affect the health of the periodontal tissues, especially in the presence of specific triggering factors, such as overzealous toothbrushing.
Conclusion: The controlled movement of teeth seems to have a positive, but highly variable, effect on the supporting tissues. The correction of some orthodontic problems, such as excessively tipped molars, traumatic deep-bites and flared and spaced incisors, may be particularly beneficial in periodontal conditions. Specific tooth movements can also help develop alveolar bone sites for placing dental implants. However, several factors may contribute to a harmful periodontal response including the use of heavy forces, inappropriate force systems and poor oral hygiene. Excessive and unrealistic tooth movements are also likely to result in reduced alveolar bone thickness, especially in patients with thin cortical plates. On the other hand, response of the soft tissues is less predictable and likely to be influenced by multiple factors. Well-designed long-term prospective studies are therefore needed to identify these patient and/or treatment factors.

Effects of rapid maxillary expansion on nasal respiratory function: what changes in nasal turbinates?

A. Ruggieri1, G. Tornaboni1, L. Di Vece1, A. Giorli2, L. Salerni2, T. Doldo1

1Department of Medical Biotechnologies, University of Siena, Postgraduate School of Orthodontics, Dir. Prof. Stefano Parrini
2Department of Medical, Surgical and Neurosciences, University of Siena

Aim: The aim of this study is to evaluate the presence of possible changes in nasal respiratory function and, above all, in nasal turbinates' grade of hypertrophy in a sample of growing patients with monolateral posterior cross-bite treated with rapid expander of the palate, through examinations of nasal fibroendoscopy and active anterior rhinomanometry performed before orthodontic treatment and 6 months after removal of the device.
Methods: The analyzed sample consists of 12 patients with a mean age of 8.42 years. At T0, each patient underwent an initial orthodontic examination, during which orthodontic records were performed and

analyzed, and an ENT examination including anterior rhinoscopy and oral inspection, active anterior rhinomanometry, nasal fibroendoscopy. The active phase of orthodontic treatment with a palate expander (Hyrax type) was successively carried out with a rapid expansion protocol consisting of two daily activations until a good level of expansion was reached. 6 months after the removal of the device, which occurred after a passive retention phase lasting 9-12 months, patients were re-evaluated by the same ENT operator (T1) in the same way as T0 (visit to ENT, nasal fibroendoscopia, anterior active rhinomanometry). The clinical data, referred to the T0 and T1, were compared through statistical analysis in order to highlight any variations in the degree of hypertrophy of the nasal turbinates, palatine and pharyngeal tonsils, the nasal resistance to the passage of air in inhalation and exhalation, any correlation between rhino- and oropharyngeal obstruction and the results of rhinomanometry, the respiratory pattern of the patient.

Results: In all patients a complete correction of the unilateral posterior cross-bite was obtained, with results maintained stable at 15-18 months from the active phase of orthodontic treatment. The degree of nasopharyngeal obstruction, determined by the nasal turbinates' and adenoids' hypertrophy, has been reduced in a statistically significant manner, thanks to the enlargement of the respiratory space. With reference to nasal turbinates, there was an average reduction of about one degree of hypertrophy; the maximum improvements occurred in patients with a higher degree of hypertrophy at T0. The degree of tonsillar obstruction remains unchanged. In 9 out of 12 patients, there was a reduction in the nasal resistance to the passage of air flow, both in inspiration and in expiration, but the differences were not statistically significant. No statistically significant correlations were found between the degree of rhino- and oropharyngeal obstruction with the total nasal resistance in inhalation and exhalation. All patients and their parents report qualitative improvements in the nasal respiratory pattern.

Conclusion: Rapid palatal expansion can be recommended in growing patients with upper jaw transversal size deficit, predominantly oral respiratory pattern and mild to moderate degree of obstruction of the first airways, due to nasal turbinates' and adenoids' hypertrophy. It has, in fact, positive effects on nasal respiratory function, as it causes an increase in nasopharyngeal respiratory space, with a relative reduction in the degree of nasal turbinates' and adenoids' hypertrophy, without being invasive for the patient. This represents an advantage from a clinical point of view, considering that the treatment of the nasal turbinates' hypertrophy is a surgical one and it is reserved for the most severe forms only in adult patients.

Advances in orthodontics from 2D to 3D photogrammetry: a case report for the diagnosis of facial asymmetries. precision, accuracy and therapeutic strategies

Giovanna Runci, Francesca Coccia, Lucrezia Sparasci, Silvia Giancaspro, Francesca Agostini, Cristiana Romeo

Postgraduate School in Orthodontics, Catholic University of the Sacred Heart, Rome, Italy

Aim: The purpose of this study is to correlate the traditional cephalometric measurements with the measurements through 3D dentofacial photogrammetry, to establish a correct treatment plan in patients with facial asymmetries.

Methods: In this case report a 15-year-old female patient has been observed in the Orthodontic Clinic of Fondazione Policlinico "Agostino Gemelli" (Rome).

The patient came to our observation with temporomandibular disorders and after having already done orthodontic treatment. First of all an accurate medical history was carried out and radiographic examinations and photos were requested. With all this informations, a facial asymmetry with mandibular deviation to the left is detected. Further investigations have been carried out: MNR, postero-anterior cephalometric studios, T-scan to identify pathologic occlusal areas and finally 3D dentofacial photogrammetry. 3D photographs were acquired positioning the patient in natural head position and was asked her to keep the eyes open and relax facial musculature; this was determined by having the patient look straight at her eyes in a mirror at eye level, with the lips at rest and with a full smile, both with the teeth together. The cephalometric measurements were then correlated with their corresponding 3D photogrammetry mesurements to analyze the points of the asymmetry.

Results: This is a new highly performing method to quantify soft-tissue facial asymmetry that improves diagnosis in orthodontics, expecially in recidivious and surgical case. The study demonstrated high reliability for cephalometric and nonradiographic 3D dentofacial photogrammetric measuraments, so this could serve as a cephalometric predictors. The analysis is innovative, easy and quick to use which makes it well suited to measure asymmetry in a clinical setting. Finally, 3D photogrammetry is very impressive for the patient, to show the real situation and how to solve the problem.

Conclusions: Correct diagnosis in orthodontic is the focal and most important point for an effective orthodontic treatment, with a long-term maintenance of the results. Infact, usually in case of relapse, it is due to an inaccurate diagnosis and a wrong therapy plan. So, 3D photogrammetry, as well as the evolution of orthodontics that is increasingly digital, favors excellence and

diagnostic accuracy, solving with maximum attention and accuracy also very complicated cases.

Post-orthodontic occlusion functional morphological analysis: relationship between dental contacts and recruitment of masticatory muscles

D. Scantamburlo[1], R. Peretta[2], R. Rosati[2], L. Favero[3]

[1]Resident, Odontostomatology Institute, Department of Neurosciences, University of Padova, Padova, Italy
[2]Private Practice, Padova, Italy, 3 Professor, Director of Orthodontic Postgraduate, Odontostomatology Institute, Department of Neurosciences, University of Padova, Padova, Italy

Aim: Orthodontic devices modify patient's occlusion but there is no consensus on number, distribution and intensity of dental contact points characterizing post-orthodontic treatment occlusion. Given the unavoidability of the occlusion from the final result of orthodontic therapy, this paper deals with the description of the morphological and functional problems related to it. The aim of this study is to propose a method correlating distribution, area and intensity of contact points with the activation of mandibular elevating muscles measured with standardized surface electromyography. A preliminary study concluded that trans-illumination occlusal silicon dental impression index measurement could be a reliable and promising method to approach occlusion evaluation without altering muscles performance. Using a feeler gauge, three silicone chips at 150, 100 and 50µm thick were produced then digitalized to obtain standard record at known thickness to check the same light power for each scanning.
Methods: Five subjects without signs and symptoms of temporomandibular disorders underwent orthodontic treatment were included in the study. Silicone impressions were taken for occlusal registration before and after treatment. Maximal voluntary clenching registrations were made with and without cotton rolls interposed between the dental arches, in order to standardize all potential as a percentage of clenching tests. Electromyographic indices (Percental Overlapping Coefficient (POC), asymmetry, activation, torque, impact) were recorded using a 4-channel electromyograph (EasyMyo®) before and after orthodontic treatment. Contact areas in the occlusal recordings were analyzed using ImageJ software with the method of trans-illumination to evaluate number, area and distribution of contacts in order to analyze symmetry of contact areas before and after treatment; through the software tools in each occlusion index image, the area with respectively 150, 100,50 and 0µm thick brightness-corresponding were selected and measured.
Results: In all cases, muscle activation indexes are normal. There is a slight decrease in POC of the temporalis (statistically significant, $\alpha = 0.05$). The activation index is positive in all the cases examined and increased after therapy (statistically significant, $\alpha = 0.05$). Pearson correlation index between dental contacts symmetry and muscular activation symmetry was calculated and showed statistical relevance for the POC of the masseter (at 100 µm, $\alpha = 0.05$; 50 µm $\alpha = 0.01$) and for the average POC (at 50 µm and 0 µm, $\alpha = 0.05$).
Conclusion: The variation of the electromyographic indices is supposed to be a consequence of neuromuscular adaptations to the new occlusal morphology after orthodontic treatment, when both morphological and functional symmetry are needed. The variations of the electromyographic indices are in line from the biological and functional point of view of the muscular activity. The illustrated method is valid and can be applied for further evaluation.

Gemination of an upper lateral incisor: orthodontics, restorative dentistry and periodontology - A multidisciplinary synergic clinical approach

A. Scarpis, G. Drago, A. Balian, E. Stellini, L. Favero

Department of Neurosciences, Dental Clinic, School of Dentistry, University of Padova, Italy

Aim: We present a clinical case of a 14-year-old patient, showing no systemic disease nor other clinical antecedents of interest, with crowding and a gemination: he has a supernumerary upper lateral incisor fused with the lateral one. Teeth with this abnormality are unaesthetic due to their irregular morphology. They also present a high predisposition to caries, periodontal disease and spacing problems. We want to point out the interdisciplinary approach and the management of the dental anomaly with a minimal-invasive aesthetic treatment of the geminated tooth.
Methods: The patient was studied through CBCT scan in order to make a correct diagnosis of the dental anomaly: it was possible to see the fusion not only of dentin and enamel but, at some sections, also of the dental pulps. The result is a macrodontic tooth. The therapeutic decision has been made considering all the options: the multidisciplinary team decided for a non-surgical approach, involving orthodontic treatment to solve the malocclusion, mesio-distal stripping of the geminated tooth and a conservative aesthetic rehabilitation of the element with particular effort dedicated to the parodontal management of the soft tissues. No endodontic treatment was planned, being the tooth asymptomatic. The aesthetic evaluations was based upon the golden ratio, through the use of the

golden compass comparing the mesio-distal diameter of the element with both the central incisor next to it and the contralateral lateral incisor: it was clear that the geminated tooth was occupying a wider space compared with the contralateral. For this reason, it was decided to compensate this difference maximizing the mesio-distal stripping during the orthodontic stage without causing dental sensibility and to conceal the remaining with a conservative camouflage after the orthodontics. The contralateral element has not been touched. After the removal of the orthodontic device, the case was finalized with the conservative stage. The patient required a minimally invasive intervention, so we proceeded with just the removal of the outer non-prismatic enamel layer followed by an adhesive direct restoration of the tooth in order to conceal the separated aspect and make the element as similar as possible with the contralateral. The gingival parabola was conditioned by the addition of composite material in order to have a healthy and harmonic gum.
Results: The orthodontic treatment has successfully aligned the dental arches while the stripping during it has regulated as much as possible the mesio-distal diameter of the macrodontic tooth. The final aesthetic result was reached with the conservative treatment, which has also hidden the remaining mesio-distal discrepancy. The use of the golden compass proves that the harmony between the dental elements has been restored.The soft tissues appear healthy. The adopted interdisciplinary approach resulted in an aesthetic and functional improvement without invasive therapies.
Conclusion: Diagnosis and management of double teeth has always been challenging for the clinicians. Careful examination by clinical and radiographic methods provides early diagnosis and intervention. A thorough knowledge about complexity of root canal morphology should be considered in these cases to avoid further complications. Only the preliminary discussion of the case between the dental operators has allowed a successful result. A minimally invasive preparation and a direct composite restoration is a functional, aesthetic and economic solution to finalize an orthodontic treatment of dental elements with shape anomalies.

Multidisciplinary treatment of severe adult open-bite malocclusion: a case report

M. Schiaffino, A. Bruni, S. Ravera, S. Parrini, G. Rossini, M.G. Piancino, A. Deregibus, T. Castroflorio

University of Torino, Italy

Aim: To describe a multidisciplinary treatment that combines an esthetic orthodontic approach, performed using clear aligners, with a minimally-invasive surgical technique for corticotomies. Also, a logopedic intervention was implemented during the whole period of treatment.
Methods: A 24-year-old young adult presented with an anterior open-bite complaining chiefly of him unpleasant smile esthetics and masticatory and speech problems and requesting rapid treatment avoiding orthognathic surgery. Facially, he had a convex profile, severe mentalis strain on lip closure and an unpleasant dental smile line. The intraoral examination showed Class I molar relationship bilaterally, an anterior open-bite, canting of the occlusal plane down on the left, narrow shape of the upper arch and mandibular anterior crowding. Radiographically it was observed a complete permanent dentition with erupted third molars. The cephalometric evaluation of lateral radiograph of the skull attested that the patient had a skeletal Class II pattern (ANB: 8°) enhanced by the mandibular clockwise rotation. A high-angle skeletal pattern was found (SN^GoGn: 41°C) with an increase of lower face height and muscular hypotonicity. No symptoms of TMJ dysfunction were referred (no noises from the joint and pain were identified during mandibular movement; good range of mandibular movement). A cone beam computed tomography (CBCT) scan was collected in order to design the surgical assisted orthodontic treatment plan. Based on the diagnostic records and consultation with the patient, the following plan was developed:
1- Extraction of 1.8, 2.8, 3.8, 48.
2- Corticision and bone graft to enhance the predictability of maxillary expansion.
3- Comprehensive orthodontic treatment with clear aligners (aligners were changed every 5 days) with strategic use of attachments to control the root movements.
4- Logopedic therapy during the whole treatment time.
Results: This approach permitted to reduce the treatment forecasted from 30 to 21 months achieving the most of desired objectives. The three years follow-up showed excellent results with a stable occlusion. Nor dentinary hyper sensibility neither loss of tooth vitality, nor adverse periodontal events neither a significant reduction in crestal bone height and no evidence of apical root resorption effects were clinically and radiographically noticeable during the follow-up.
Conclusion: Clear aligner assisted treatment performed with maxillary minimally invasive corticotomies, combined with logopedic therapy has proved to be a good treatment option for excellent profile and occlusion change in a quite short treatment period.

Orthodontic management of a mandibular double-tooth incisor: a case report

Maria Grazia Schiavone, Paola Martina Marra,

Maddalena Vitale, Luigi Femiano, Ludovica Nucci, Letizia Perillo

Multidisciplinary Department of Medical-Surgical and Dental Specialties, University of Campania Luigi Vanvitelli, Naples, Italy

Aim: Double-tooth is a term usually used to define fusion or gemination, that are primary dental developmental abnormalities and may require treatment for esthetic, orthodontic and functional reasons.A double-tooth is complicated to manage due to the need of a differential diagnosis and the difficult of the subsequent oral rehabilitation. Thus, the aim of this report was to present a rare case of geminated mandibular lateral incisor tooth, successfully treated with an orthodontic approach.
Methods: ACaucasian 10.9-year-old girl in late mixed dentition presented a lower right double-tooth incisor. Clinical examination revealed a class 1 molar with a class 2 cuspid tendencyon both sides, the overbite was normal, whereas the overjet was minimally increased, the maxillary arch presented a bilaterally tendency to crossbite with a slightly lower midline deviation. The lateral cephalometric evaluation revealed a skeletal class I with a mesofacial growth pattern, normal inclination of the upper incisors and proclined mandibular incisors. The double tooth showed a macrodontic and abnormal crownmorphology, with a mesiodistal width of 9.5 mm and a buccal and palatal groove dividing the crown into mesial and distal segments. The treatment started with an interceptive first phase including an expander in the upper arch and a lip bumper in the lower arch to gain some space. A challenging solution to solve geminated tooth shape including the esthetic expectationswas performed with the stripping. Then, the second phase of treatment started with a 0.016 NiTi for initial alignment whereas leveling was performed with a 0.017 X 0.025 NiTi arch wire. Transpalatal arch was also used to derotate the upper molars and to improve the arch form. A 0.019 X 0.025 stainless steel arch wires were used to coordinate both arches for finishing procedures. At the end of the active treatment, the brackets were removed, and an upper Begg's appliance and a lower canine-to-canine bonded retainer was used. The fixed phase lasted 20 months, the patient was motivated and cooperative throughout the entire treatment.
Results: The treatment objectives were achieved. The anomalous tooth was left in its position showing a good shape. The occlusion showed a well-aligned dentition with a class 1 molar and cuspid relationship and a good tooth interdigitation. The crowding was completely solved in both arches, the bilateral cross-bite tendency and lower midline deviation were corrected, a normal overjet was achieved whereas the overbite was maintained. An improved smile with a consonant smile arch was achieved.
Conclusion: Differential diagnosis is one of the most difficult challenges for an orthodontist, due to similar features between fusion and gemination. In general, dental practice, is pretty rare to find these shape anomalies, but the dentist should be able to recognize immediately the nature of the problem and treat it appropriately. Early diagnosis and treatment is needed for a successful orthodontic solution as suggested by the esthetic and functional outcome of this clinical case.

Alveolar bone fracture: innovative surgical and orthodontic approach, a case-report

G. Del Vecchio, F. Sostenuto, T. Bocchino, S. Perrotta, R. Rongo, V. D'Antò

Aim: Dentoalveolar injuries are lesions involving the teeth, the alveolar portion of the maxilla and mandible, and the adjacent soft tissues. Examples of such injuries include migrations or avulsion of the teeth, fractures of the teeth, fractures of the alveolar process, and lacerations of the soft tissue. Adult dentoalveolar trauma is a common result of falls, sports activities and traffic accidents. Although the injuries vary depending on the type, location and direction of the impact. As shown in guidelines of "International Association of Dental Traumatology", similar fractures of the alveolar bone were treated with reduction and stabilization of the displaced segment with rigid or semi-rigid splinting or internal fixation, for four weeks. The aim of this case-report is to describe an innovative surgical-orthodontic resolution of an alveolar bone fracture, with extrusion of dental elements, due to trauma.
Methods: A healthy 18-year-old woman visited our department twenty-four hours after a road accident. The physical examination revealed contusion of the perilabial soft tissues, and the patient reported the fracture of the upper right dento-alveolar process with extrusion from upper incisors to bicuspid (1.1 to 1.5). After five days from admission, the patient, under general anesthesia, received surgical reduction of the fracture and semi-rigid fixation with brackets and Australian archwire S.S. 0.018 inch, made passive intraoperatively, after placement of the orthodontic multibrackets equipment the day before intervention. Approximately one month after the surgical procedure of reduction and stabilization, the patient underwent the orthodontic treatment, in order to reposition the dental elements in the correct position. The "Easy& Straight" operating sequence was used: firstly, it was applied archwire 0.014 inch Ni-Ti followed by archwire 0.014 x 0.025 inch Ni-Ti, archwire 0.019 x 0.025 inch Ni-Ti and 0.019 x 0.025 inch S.S.
Results: After a few months there was an excellent restoration of the function, the patient has normalized the masticatory function and presents a pleasant

smile. At the 18th months follow-up examination, the alveolar bone fracture was seen to have healed, the alveolar bone and tooth were asymptomatic and no signs of inflammatory root resorption or ankylosis were observed by clinical and radiographic examinations. The teeth involved in the trauma should be regularly controlled in order to detect possible complications.
Conclusion: This case-report was conducted with an innovative technique in which dental mobilization is performed after the traditional surgical procedure of reduction and stabilization. This new approach with orthodontic mobilization seems in the short term to guarantee a good restoration of dental function and aesthetics. It is necessary to collect a greater case series with long-term follow up to verify the success.

A comparison of the efficacy of Herbst versus Twin Block functional appliances in Class II malocclusion: a systematic review

Francesca Squillace[1], Giuseppe Rodi[2], Martina Maria D'Emidio[2], Francesca Germanò[1], Gabriella Galluccio[3], Ersilia Barbato[4]

Department of Oral and Maxillo-Facial Sciences, Division of Orthodontics. Sapienza, University of Rome, Rome, Italy
[1]DDS
[2]Post graduate student
[3]DDS. Associate Professor
[4]DDS, PhD, MSc. Full Professor

Aim: The aim of this study was to evaluate the effectiveness of Herbst and Twin-block appliances in Class II malocclusion. Both morphological (skeletal, dental and soft tissue) and patient-centred outcomes (patients' experiences of treatment and quality of life using validated indices, traumatic injuries and appliance breakages and costs of both treatments) were analyzed in order to evaluate the election therapy for Class II malocclusion through a systematic review.
Methods: A comprehensive search of electronic databases (Scopus, PubMed, Google Scholar, Cochrane Central Register of Controlled Trials) was undertaken, applying a pre-specified search strategy. A literature search was performed in electronic databases according key words "Class II malocclusion" – "Herbst" – "Twin Block" – "Fixed function appliances" – "Removable function appliances". No limitations were applied regarding publication year. Randomized (RCTs), controlled (CCTs) clinical trials and systematic review, involving children under 16 years with class II malocclusion and overjet more than 5mm was chosen. Several factors were analyzed: patient collaboration, average time of treatment, cephalometric measurement, lower incisors vestibularization, structural and skeletal effects.
Results: 118 articles trough databases searching were identified. After removing of duplicates and irrelevant articles, only five articles were included in this review. Of these, two were RCTs and compared the TB and the Herbst appliances while the others are a systematic review. All included trials presented skeletal and dento-alveolar changes; however, soft tissue outcomes were only considered in one study. Patients experiences of treatment and costs were considered exclusively by O'Brien et al. The skeletal and structural effects of Herbst and Twin Block are similar. The most relevant difference is in the headgear effect of the Herbst that can be useful in many clinical cases and it determines changes in the patient's profile. Compliance is certainly considered the most important variable and the most relevant prognostic factor. Decisive is also the ability of the operator to diagnose malocclusion and choose the device that best meets the aesthetic and functional needs of the patient.
Conclusion: Herbst and Twin Block are the two functional appliances more treated in literature; their efficiency and effectiveness are widely documented. There was also significant clinical heterogeneity in terms of methodology, type of intervention and the measured outcomes. Both modalities were effective in correcting the overjet with little differences found in cephalometric changes and a shortage of data concerning patient-centred outcomes. Further well-designed randomized clinical trials to assess the efficacy of fixed versus removable functional appliances with a particular emphasis on patient-centred measures are required.

Impacted maxillary central incisors caused by supernumerary teeth: case report

Carmela Suriano, Laura Guida, Gaetano Illuzzi, Michele Laurenziello, Domenico Ciavarella

University of Foggia, Department of Clinical and Experimental Medicine, Foggia, Italy

Aim: The aim of this case report is to describe the orthodontic-surgical modality of disimpaction of the upper central incisors in a young patient in mixed dentition. The most common cause of upper central incisors impaction is the presence of supernumerary teeth in the premaxilla. Other etiological factors are odontomes and trauma at an early age. The frequency of this phenomenon is between 1,5% and 3,5% and a failure of eruption occurs between 28% and 60% of these patients. The treatment options are:
- Extraction of the teeth replaced by prosthetics in the adult age.
- Extraction of the teeth and space closure.
- Orthodontic –surgical disimpaction.

Methods: A 9 years old patient came to our orthodontic department without radiographic records. His parents required an orthodontic evaluation because of his unpleasant smile due to the presence of milk teeth 5.1 and 6.1 and crooked upper lateral Incisors. The radiographic analysis showed impacted maxillary central Incisors (1.1 and 2.1) because of the presence of two supernumerary teeth. The orthodontic-surgical treatement was chosen because of the young age of the patient. The parents were warned of the risk of ankylosis. The treatment followed three main phases:

1. Extraction of milk teeth 5.1 and 6.1;
2. Anchorage preparation provided by a rapid palatal expansion by which the upper arch has been expanded with the rapid expansion protocol.
3. Surgical phase in order to:

- Extract the supernumerary teeth
- Expose the impacted teeth to bond two buttons, with a metal chain, for each tooth.

An elastic traction was immediately applied from the metal chain to the palatal device and it was changed every 15 days in order to take advantage of the accelerated bone turnover (RAP) created by the surgery. A "Closed eruption procedure" was performed.
Results: The treatment was considered successful because the incisors were brought to their place in the upper arch. Finally both the dental arches were bonded with metallic brackets with MBT prescription. Both the incisors erupted in the upper arch after 1 years. The whole orthodontic treatment lasted 4 years. The periodontal criteria were respected.
Conclusion: the prognosis of the orthodontic-surgery approach for impacted upper incisors is good. Failure can occur if the tooth is ankylosed or dilacerated. Besides success rate is related to age, sex, angulation of the impacteed tooth to the midline, vertical crown height, distance of the impacted tooth to the midline.

Clincheck versus clinical outcome in Invisalign treatment

Fabiola Toma[1,2], Umberto Tacchino[1,2], Alessandra Liguori[1,2], Luca Bassani[3], Luis Huanca Ghislanzoni[1,2], Maurizio Manuelli[1,2,4], Alessandra Lucchese[1,2]

[1]Department of Orthodontics, Vita-Salute San Raffaele University, Milano, Italy
[2]Unit of Dentistry, Division of Orthodontics IRCSS San Raffaele Scientific Institute, Milan, Italy
[3]Department of Orthodontics, IRCCS Cà Granda – Ospedale Maggiore Policlinico. University of Milan. Milan, Italy
[4]Private Practice, Milano, Italy

Aim: The aim of this study is to provide an overview on the accuracy of tooth movement and dental arch changes (linear and angular) on patients using dual arch Invisalign Lite Therapy. The study was conducted by comparing achieved movements with predicted ones. Moreover, the effectiveness of different auxiliaries, such as attachments and interproximal reduction (IPR), was estimated.
Methods: 90 virtual models of 15 selected patients were analysed at T0 (before the treatment) and at T1 (at the end of treatment) and were compared with the Clincheck model. 5580 . The variances between the models in transverse changes, arch perimeter, arch depth, torque, tip and rotation was recorded. A paired t-test was used to compare the Clincheck with the results at T1. Differences were tested for statistical significance with $p<0,05$ considered statistically significant.
Results: Only differences bigger than 2° for angular measurements and 0,5mm for linear measurements were evaluated clinically relevant. The main difference statistically and clinically relevant was found in the upper canines rotation (3,3°). The rotation of rounded teeth is more difficult to be completely achieved. Central incisors are not precise in the tip and torque movements, but rotation is fully achieved. Canines final position is very similar to Clincheck forecasts referring to tip, but there are statistically significant differences in the rotation results. Transverse changes, arch perimeter and arch depth are fully achieved.
Conclusion: Clincheck is an accurate system and with Invisalign is possible to achieve predictable results. The movements of some teeth are more difficult to achieve and often an additional refinement is requested. The examination of this weakness can lead to better therapies and to a contraction of treatment times.

Orthodontic-surgical treatment in adult patient with Class III malocclusion and extractions of upper canine and bicuspid: a case report

S. Perrotta, G. Tortora, A. Amato, O. Langella, T. Bocchino, R. Valletta

Department of Neurosciences, Reproductive Sciences and Oral Sciences, School of Orthodontics and Temporomandibular Disorders, University of Naples "Federico II", Naples, Italy

Aim: Class III malocclusions are considered to be one of the most difficult problems to treat. Their causes are multifactorial and include genetic and/or environmental factors. Class III skeletal deformity may be the result of: mandibular prognathism, maxillary deficiency, or a combination of both. Class III malocclusions are generally classified into two categories: skeletal and dental. The diagnosis is very important to choose the correct treatment. Generally, a dental Class III can be treated with orthodontics

alone, while a skeletal Class III requires a combination of orthodontics and surgery in order to improve and harmonize facial profile. Surgical correction of Class III dentofacial deformities may be accomplished by maxillary advancement, mandibular setback, or bimaxillary procedures. The aim of this case report is to describe the orthodontic-surgical management of skeletal Class III malocclusion due to maxillary deficiency and mandible hyperdevelopment in adult patient.

Methods: The present case report describes the orthodontic-surgical treatment of a young adult patient (a 23 year old woman). She came to our observation seeking orthognathic correction of Class III malocclusion. She presented a concave profile with labial incompetence, a mandibular hyperdevelopment and maxillary deficiency with a mesodivergent growth pattern, dental Class III, reduced overjet and overbite; dental midline was deviated 4 mm to the right side from the midline of the face. The upper incisor was proclined compared to ANS-PNS and there was an impaction of upper canine (1.3). Treatment objectives were to improve the skeletal and soft tissue profile, to correct upper and lower incisors proclination, to extract 1.3 because of the unfavorable disimpaction prognosis and to normalize OVJ and OVB values. In order to improve the facial aesthetic, the surgical treatment with orthodontic presurgical dental-decompensation was chosen. The treatment plan consisted in extraction of 1.3 and 2.4 and the Straight-Wire sequences of archwires were performed: it was applied archwire 0.014 inch Ni-Ti followed by a 0.014 x 0.025 inch Ni-Ti, archwire 0.019 x 0.025 inch Ni-Ti and 0.019 x 0.025 inch S.S. Surgical treatment was performed with a Le Fort I fracture plus maxillary advancement, combined with mandibular bilateral sagittal split osteotomy (BSSO). One year after surgery orthodontic appliance was removed and retention was provided by upper Hawley biteplate and lower 3-3 bonded lingual retainer.

Results: Total treatment duration was 32 months. There was a good improvement of facial aesthetic both in frontal and in lateral view. Normalization of overjet and overbite, Class I molar and canine and coincidence of upper and lower midline were achieved.

Conclusion: Class III discrepancy should be diagnosed and classified according to aetiology and treated with appropriate surgical approach. In this case, because of the extraction of 1.3 and 2.4, we couldn't treat this malocclusion only with maxillary advancement but, in order to improve facial aesthetics, a combined surgery was necessary. In reviewing the patient's final records, the major goals set at the beginning of treatment were successfully achieved, providing the patient with adequate masticatory function and pleasant facial aesthetics.

Occlusal plane's inclination in growing subject treated with clear aligners

V. Ventura, S. Meuli, A. Gramuglia, F. Cazzato, P. Gallenzi

Fondazione Policlinico Universitario A.Gemelli IRCCS, Roma, Università Cattolica del Sacro Cuore. Institute of Dentistry and Maxillofacial Surgery, Dean: Prof.Massimo Cordaro

Aim: The inclination of the occlusal plane has a key role in the context of functional space. There is a close relationship between the development of the maxillo-facial system and the inclination of the occlusal plane. The occlusal plane, in fact, determines the relationship between the two arches, the spatial position of the jaws and the macro-aesthetics of the face. The use of the aligners in the clinical routine has led to an increase in the therapeutic possibilities with such devices, therefore, in the literature it was discussed whether it is possible to obtain a correction of the occlusal plane with these devices. We aim to report a severe case of II class division I malocclusion in mixed dentition where invisible aligners were performed to re-establish a proper inclination of the occlusal plane.

Methods: A 11 years-old male presented to our attention with a bilateral class II division I malocclusion, increased overjet and overbite with palatal impingement lip catching, and posterior inclination of the occlusal plane. The cephalometric analysis of the pre-treatment teleradiography showed these values: occlusal plane's inclination was normal compared to the mandibular plane (value19, 5° -mean 17°±5), occlusal plane's inclination in relation to palatal plane of -5, 8° (mean 10°±4°). Focusing on the incisors, the angle between upper incisor and occlusal plane was in the average (value 53, 1°-mean 58°±7°), the angle between lower incisors and occlusal plane was normal (value 74, 6° -mean 72°±5°). The treatment plan involved the use of Invisalign® with the aim to change occlusal plane inclination and provide additional stimulus to the mandibular growth. Precision cuts were designed in the appliance for Class II elastics' (184 g, 1.8N, diameter: 4.8 mm) anchorage and the thickness of the aligners in the posterior area provided a guiding mechanism for the forward displacement of the mandible. Attachments were placed to improve retention of the aligners. The aligners were worn 20-22 hours a day, during sleeping and social activities, with excellent compliance.

Results: After 5 months of Invisalign treatment, the cephalometric analysis of the post-treatment teleradiography showed an anterior inclination of occlusal plane with the angle between occlusal plane and mandibular plane of 14, 3 ° (mean 17°±5), occlusal plane to palatal plane of -1,8° (mean

10°±4°). Focusing on the incisors, the angle between upper incisor and occlusal plane was of 54,1° (mean 58°±7°), whereas the angle between lower incisors and occlusal plane was of 69, 15° (mean 72°±5°). A full Class I relationship was obtained on both sides, with functional overjet and overbite and an optimal profile.

Conclusion: Our study shows how aligners therapy can induce changes in the inclination of the occlusal plane: the reduction of the angle between occlusal plane and mandibular plane can be associated to the intrusion of the lower incisor, whereas the increase of the angle between occlusal plane and palatal plane can be associated to the intrusion and proclination of the lower incisor and to the curve of Spee levelling. The increase in the angle between upper incisor and occlusal plane can be explained by the retroclination of the upper incisor. The reduction of the angle between lower incisor and occlusal plane may be influenced by the proclination of the lower incisor. Our study documented how aligners therapy provide an optimal control of tooth movement.

Correlation between indexes of jaw muscles' function and dental - skeletal morphology

Francesca Vozzi[1], Lorenzo Favero[2], Redento Peretta[3], Luca Guarda-Nardini[4], Francesco Cocilovo[5], Daniele Manfredini[6]

[1]Resident, Odontostomatology Institute, Department of Neuroscience, University of Padova, Italy
[2]Professor Director of Orthodontic Postgraduate, Odontostomatology Institute, Department of Neuroscience, University of Padova, Italy
[3]Private practice, Padova, Italy
[4]Director of Maxilofacial Unit, Treviso, Italy
[5]Professor, Odontostomatology Institute, Department of Neuroscience, University of Padova, Italy
[6]Professor, Odontostomatology Institute, University of Siena, Italy

Aim: To assess the correlation between standardized indexes of jaw muscle function and dento-skeletal morphology.

Methods: A sample of 35 temporomandibular disorders (TMD)-free healthy individuals (10 males, mean age 26.7±9.8 years), not undergoing orthodontic treatment, underwent surface electromyographic (sEMG) assessment of bilateral masseter and temporalis muscles, to evaluate sEMG activity during maximum voluntary clenching (MVC) with a dedicated device (Easymyo®, T.F.R. Technology, Udine, Italy). Four outcome parameters were assessed for each individual: (1) a 5-s maximun volontary clench (MCV) on cotton rolls positioned on posterior teeth (standardization recording); (2) a 5-s maximum volontary clench (MCV) in intercuspal position; (3) a 15-s clench-relax task; and (4) two 15-s chewing tasks for both left and right side. All potentials were standardized as a percentage of the maximum potential of test 1. EMG recordings were assessed based on five standardized indexes of muscle function, to evaluate the degree of muscle asymmetry during static and dynamic function (i.e., Poc, Impact, Asymmetry, Activation, Torque). For each individual, the presence of a number of occlusal and skeletal features was assessed: asymmetry of molar class; deviated incisor midline; deep bite; open bite; cross bite. Skeletal class and vertical dimension of occlusion were also evaluated. Based on normality distribution of data, T-Test and ANOVA, when needed, were used to compare muscle function indexes between individuals with and without the different dento-skeletal features.

Results: Statistical comparison showed that none of the muscle function indexes (Poc, Impact, Asymmetry, Activation, Torque) was significantly different between individuals with or without the various dental and skeletal features. Gender differences were also not significant ($p > 0.05$).

Conclusion: Despite some minor differences were observed, none of them was significant. Thus, the interaction between form and function it's too complex for hypothesizing a simple one-to-one relationship between interarch tooth relationship and muscle function patterns.The lack of statistical evidence is in line with several clinical observations which consider physiologic occlusion as a functional equilibrium between all tissues and structures of the masticatory system, largely independent on the morphology of the maxillo- mandibular and/or occlusal contacts. Further analysis, conducted on larger samples and with a more refined analysis of skeletal morphology, are needed to get deeper into the correlation between function and morphology.

Costs/benefits of Class II therapies with function generating bite managed by post graduate students in orthodontics at the Dental School-University of Torino

M. Zerbino[1], E. Madiai[1], A. de Palma[2], M. Sorchi[2], E. Agastra[2], A. Cedrone[2], A. Ciannamea[2], E. Coda[2], E. Gianello[2], A. Mainardi[2], R. Masia[2], M. Rinaldi[2], C. Lavazza[3], T. Castroflorio[4], A. Deregibus[4], M.G. Piancino[4]

Dental School-University of Torino, Italy
[1]DDS Resident
[2]DDS Resident, post-graduate students in Orthodontics
[3]Dental Student
[4]MD DDS PhD, Aggregate Professor

Aim: The purpose of this study is to present

orthodontic cases with class II malocclusions treated by post graduate students in orthodontics at the Dental School of Torino. A functional investigation with recording of chewing patterns was carried out on all patients treated with the functional appliances Function Generating Bite.

Methods: 10 patients treated at the department of Orthodontics-Dental School-University of Torino, diagnosed with class II malocclusions have been selected. Diagnose has been made on essential data: gnathostatic models, orthopantomography, teleradiography in postero-anterior and latero-lateral projection and relative cephalometry, intra-oral and extra-oral photos. The patients showed the following malocclusions: 3 increased overjet, 2 increased overbite, 3 increased overjet and overbite, 2 asymmetric molar class II). Patients have been treated with functional appliances Function Generating Bites. The appliances were individually manufactured and made of acrylic resin and resilient stainless steel, with posterior metallic resilient stainlessteel bite planes preventing teeth from intercuspal contact and with expansion springs. The simultaneous action of the bites and the expansion spring realizes a bodily movement of the teeth and the most suitable correction of the malocclusion. At the end of treatment, the buccal cusps of the upper teeth, which were previously in class II malocclusion, resulted in class I and the overbite and overjet corrected, thus providing the appropriate physiological stimuli from peripheral receptors and proprioceptors. Mandibular movement was measured with a K7-I, Myotronics Inc. Tukwila, Washington, USA) which measures jaw movements within an accuracy of 0.1 mm. Multiple sensors in a lightweight array (4 oz) track the motion of a magnet attached to the midpoint of the lower incisors. The kinesiograph was interfaced with a computer for data storage and subsequent analysis.

Results: All patients corrected the malocclusion 6 ± 2 months after the beginning of the therapy. Furthermore the orthodontic correction, the functional balance has been obtained in all cases with a non-cariogenic and low cost appliance. The benefits on the child's function and growth has been obtained non-traumatically, avoiding side effects. The collaboration required to the child and his parents can easily be obtained because the appliance is well accepted the child, easy to wear and manage, non-cariogenic, non-pain and low cost and highly effective.

Conclusion: The orthodontic functional appliances Function Generating Bite managed by the post-graduate students represent a valuable device for early therapies of patients with class II malocclusions with overjet and overbite, managed by limited-experienced orthodontists without side effects, to the aim to improve and balance the functional movements and the basal growth during development.

Cephalometric planning of MMA in severe OSAS patients

Benedetta Vaienti, Marco Di Blasio, Diana Cassi, Alberto Di Blasio

University of Parma, Department of Medicine and Surgery

Aim: The aim of this paper is to investigate, in a retrospective sample of severe OSAS patients, the cephalometric outcome of the maxillo-mandibular surgical advancement (MMA). In the studied sample the planning of the MMA amount was carried out on the basis of anthropometric criteria instead of cephalometric ones. After the surgery, Steiner and Delaire cephalometric analysis was traced to evaluate if there were difference between the cephalometric and anthropometric planning methods.

Methods: in severe OSAS patients who do not tolerate, for various reasons, positive air pressure devices, MMA is considered a treatment that may reduce in a very efficient way the AHI score. In these patients the functional improvement is the main goal, however an excessive maxillo-mandibular protrusion should be avoided for aesthetic reasons. In order to avoid the problem, the amount of MMA should be planned preoperatively both by anthropometric and cephalometric analyses. Steiner and Delaire cephalometric analyses are commonly used in the preoperative planning. In this paper a sample of 48 patients affected by severe OSAS and operated by MMA was analysed. Inclusion criteria was: 1) amount of MMA only planned on the basis of anthropometric criteria; 2) presence of a presurgical and postsurgical good quality lateral teleradiography of the face; 3) presence of a presurgical and postsurgical polysomnography for the AHI score measurement; 4) minimum presurgical and postsurgical AHI score improvement 50%; 5) patient full satisfaction about facial final appearance. Presurgical and postsurgical Steiner and Delaire cephalometric tracings were assessed in each subject. For Steiner analysis, the variation in the SNA and SNB angles was measured, while for Delaire tracings the variation in the C3/FM-CPA and C3/FM-Me angles was assessed.

Results: In all patients, both Steiner and Delaire cephalometric analyses showed a presurgical skeletal retrusion and a postsurgical protrusion ($p < 0.001$) in a mild class II maxillary skeletal relation. The mean AHI score had fallen from 40.5 +/- 7 (presurgical) to 12.5 +/- 5 (postsurgical) and the patients was satisfied about aesthetics of their face. The mean advancement of the bony structures was 6.9 +/- 3.8 mm for the maxilla and 13.6 +/- 5 mm for the mandible. For the maxilla, after surgery, the mean value of Steiner's SNA angle increased from 78.5° to 85.6° ($p < 0.001$), while mean Delaire's C3/FM-

CPA angle increased from 81.2° to 89.7° ($p < 0.001$). For the mandible, the mean value of Steiner's SNB angle increased from 74.3° to 80.7° ($p < 0.001$), while Delaire's C3/FM-Me angle increased from 80.1° to 87.3° ($p < 0.001$).

Conclusion: Planning the MMA amount on the basis of anthropometric rules, seems to lead to similar results compared to the cephalometric ones. Both in Steiner and Delaire tracing method, patients showed a mild class II skeletal postsurgical relationship. There are however differences between Steiner and Delaire analysis. In the Steiner analysis the overall protrusion of the maxillo-mandibular complex was due to an ideal mandible position and a mild over-protrusion of the maxilla. In the Delaire analysis the overall protrusion of the maxillo-mandibular complex was due to an ideal maxillary position and a mild retruded mandibler. The advancement of the bones may be larger when planned on the basis of Delaire analysis than in Steiner cephalometry. Authors suggest to integrate all informations, cephalometric Steiner and Delaire, and anthropometric in planning these difficult patients.

Mandibular second molar impaction: a case report

M. Mezio, D. Giovannoni, M. Horodynski, R. Pippi, G. Galluccio, E. Barbato

"Sapienza" Università di Roma, Dipartimento di Scienze Odontostomatologiche e Maxillo Facciali, Direttore Prof. Ersilia Barbato, UOC di Ortognatodonzia, Direttore Prof. Ersilia Barbato, Rome, Italy

Aim: The aim of this case report is to treat the second mandibular molar impaction just using one mini-screw and one button attachment linked by an elastic chain, underlining both advantages and limits of this treatment option which involves a skeletal anchorage.

Methods: A 23 years old female patient with both left mandibular second and third molars impacted. The patient has been previously treated elsewhere with a fixed orthodontic appliance, and she now presents first molar class malocclusion on the right side, with a posterior crossbite, and second molar class malocclusion on the left side. A first skeletal class malocclusion (ANB 2) and an increased divergence result from cephalometric analysis. The treatment plan, according to the patient's request, was to solve only second molar impaction. Orthodontic up-righting of second molar using a mini-screw (FIRMA 11 x 1,80mm SWEDEN e MARTINA), placed on the anterior border of the mandibular ramus, as skeletal anchorage, was chosen as treatment option, after third molar extraction. During the same surgery, second molar crown was exposed, and the button was bonded on the distal part of the occlusal surface. After one week the mini-screw was inserted and an elastic chain was applied between the button and the mini-screw. After each surgery, NSAIDs were prescribed to the needy. Moreover, a pain questionnaire was administered to the patient, to evaluate the amount of pain with a judgment from 1 to 10.

Results: The swelling was higher three days after third molar extraction and the patient did not take any drugs. On the contrary, after the mini-screw placement the swelling was minimal, but the patient took one dose of NSAIDs. The pain was higher in the first three days after third molar extraction and in the day of mini-screw placement. The total duration of treatment was 8 months. After 5 months, as the second molar was partially up-righted, the position of the button was changed towards the mesial part of the vestibular surface, in order to obtain an appropriate force direction. Finally, after further 3 months, the tooth was completely up-righted. Orthodontic checks were performed once a month and in all occasions the traction was reactivated. Finally, an orthodontic sectional appliance was placed, to obtain a complete alignment.

Conclusion: With the treatment option here proposed it is possible to move specific teeth with only one mini-screw and one button attachment and it is also possible to eliminate the reaction forces which usually are unavoidably released on the anchor teeth. Moreover, it is possible to minimize patient's discomfort, also reducing chair time compared with the more complex indirect anchorage. In addition, the present method results very effective in order to reduce treatment duration and it also seems very appropriate in patients who do not require a fixed appliance or any other appliance, since patients are usually more satisfied for every invisible treatment. Anyway, using this technique, there are also some disadvantages because it does not allow both vertical and vestibular-oral force control, so second molar can rotate or have an extrusion out of control. In such a case a subsequent positional adjustment may be necessary. Finally, the mini-screw placement one week after third molar extraction allows to have better soft tissue healing, avoids the elastic chain incorporation into the soft tissue and consequently allows a better management of elastic traction reactivation.

Temporomandibular joint movements limitation in moebius syndrome patients

Marco Di Blasio, Benedetta Vaienti, Diana Cassi, Alberto Di Blasio

University of Parma, Department of Medicine and Surgery, Italy

Aim: The purpose of our paper is to continue on

a larger sample a previous research on the TMJ mobility in Moebius syndrome patients.
Methods: Moebius syndrome is a rare disease (< 1:100.000) characterized by the congenital bilateral palsy of the VI and the VII cranial nerves (mimic muscles paralysis and convergent strabismus are the typical symptoms), associated in 30% of the cases with malformations of the superior and/or inferior limbs. The involvement of the cranial nerves is generally not limited to the VI and VII pair, but can also affect other cranial nerves (especially III, V, VIII, IX, X, XI and XII pair might be affected). Due to this involvement, sometimes there are alterations in sucking, swallowing, chewing, lip competence, sensitivity and motility of the tongue, deeply affecting the general dynamic of the face. At the Hospital of Parma, a specific center for the Moebius syndrome was activated since 2002. In the Moebius ambulatory patients are at the same time visited by ophthalmologist, speech therapist, maxillo-facial surgeon and orthodontist. Until today we have visited 63 patients analyzing, among other symptoms, also mandibular limit movements. As in the previous study, the actual larger sample (63) have been divided in three groups using the classification of Terzis and coll. of 2003: Group A: complete and bilateral palsy of the VI and VII nerves. Group B: presence of some neuro-muscular residual units on one side of the face (Moebius incomplete). Group C: unilateral facial palsy (Moebius-like syndrome). In this sample-control group study authors investigated only the A and B group's TMJ function. The A and B analysed sample was of 52 patients (25 males and 27 females average age 15 y. 7 m.) related to the previous 50 health subjects sample (18 males and 32 females, average age 15 y. 8 m.). The TMJ was evaluated in opening, protrusive and lateral movements.
Results: The results of this study confirm those of the previous one: Moebius patient show an evident limitation in mouth opening mobility. In the A and B groups, maximum opening movement was reduced, on average, 12,3 mm related to the health group. The difference, analysed by Mann-Witney test, was statistically significant at $p<0.01$. In lateral and protrusive movements, the difference related to the health group appeared less severe. We did not find statistically significant differences between groups A and B.
Conclusion: The role in the development, during the growth, of a full excursion in the limit mandibular movements, is well known. We can therefore confirm the presence of this movement limitation in Moebius syndrome, probably related to the lack of general facial mobility. Authors confirm the suggestion, also in incomplete Moebius cases, to early treat these patients by functional therapy to limit this risk.

SEM analysis of roughness and debris of stainless steel archwires during clinical use: an *ex-vivo* study

Gaia Rubini[2], Alessandra Liguori[2], Marianna Pellegrino[1,2], Silvia Croce[1,2], Marco Matarese[3], Maurizio Manuelli[1,2,4], Alessandra Lucchese[1,2]

[1]Department of Orthodontics, Vita-Salute San Raffaele University, Milano, Italy;
[2]Unit of Dentistry, Division of Orthodontics IRCSS San Raffaele Scientific Institute, Milan, Italy;
[3]Department of Orthodontics, IRCCS Cà Granda – Ospedale Maggiore Policlinico. University of Milan. Milan, Italy;
[4]Private Practice, Milano, Italy

Aim: The intraoral use of orthodontic archwires is liable to surface deposits which alter the mechanical properties of archwires causing an increase in the friction coefficient. The biological variables causing increased friction include the presence of saliva, acquired pellicles, corrosion and plaque which present as an adhesive interference by increased surface tension in the archwires. The aim is to investigate the degree of debris and roughness stainless steel orthodontic archwires before and after clinical use.
Methods: Ten as-received rectangular 0.019" × 0.025" stainless steel orthodontic archwires (control) were compared with the archwires retrieved after the final phase during the retraction stage of orthodontic treatment collected after 2 months (T1), 4 months (T2) and 6 months (T3) of intraoral exposure (test samples) from ten patients undergoing treatment.
The control and test samples were use to evaluate surface debris using Scanning Electron Microscopy, and surface roughness was assessed with a rugosimeter in the buccal inter-bracket region that slides through the molar tube for space closure. The wire segment between the premolar bracket and molar tube is considered important for our study because these buccal inter-bracket wire segments is more prone to exposure to saliva, plaque and food and sliding of the archwire through the molar tube during space closure. The primary inclusion criterion for these patients is the need for first premolar extraction as a treatment protocol and patients with good oral hygiene was select. For the microscopic debris and roughness analyses, the upper tip of each segment of the wire was fix on a glass slide. The central area (1cm) of the wires was observe by scanning electron microscope.
Results: Significant increase was observed in the level of debris and surface roughness of orthodontic archwires after their intraoral exposure. Analysis of debris on the wires using SEM showed:
- At T0, as-received wires, a complete absence of debris (0 score).

- At T1 some debris (1 score).
- At T2 moderate presence of debris (2 score).
- At T3 presence of a large amount of debris (3 score).

Conclusion: Stainless steel test archwires showed a significant increase in the degree of debris and surface roughness, increasing the frictional forces between the archwire-bracket interfaces which would considerably reduce the normal orthodontic forces. Thus, we hope that the evolution of technology can lead to the creation of new materials for the archwires that are resistant to the intraoral environment in order to make the orthodontic therapy more efficient.

Ultrasound imaging in Juvenile Idiopathic Arthritis: diagnostic and monitoring use of the ultrasonography on the temporomandibular joints

P. Cressoni, I. Borzani, A. De Filippis, W. Brounsouzoghl, A. Repellini, L. Cigni, G. Batia, B. Colangelo, C. Occhipinti, U. Garagiola

University of Milan, The Faculty of Dental Medicine, Department of Orthodontics – Foundation of IRCCS CA' GRANDA – The Major Hospital of Policlinico, Complex Operative Unit of Maxillofacial Surgery & stomatology, Milan, Italy

Aim: In Department of Orthodontics together with Pediatric Department is now active the service of Ultrasonography service for the assessment of the temporomandibular joints (TMA) I patients with Juvenile Idiopathic Arthritis (JIA). The aim of this study is to show that the ultrasonography is a useful tool to identify and to register the evolution of the pathologic alterations of the temporomandibular joints in 150 pediatric patients with Juvenile Idiopathic Arthritis .

Methods: The sonography became a basic diagnostic exam to make in all pediatric patients with Juvenile Idiopathic Arthritis (JIA) to evaluate condyles and condylar movements. Since 2013 we have been analyzed more than 150 patients with Juvenile Idiopathic Arthritis Every single patient was subjected to periodic assessment to confirm the therapeutic efficiency of orthodontic device. All patients have been subjected to a clinical intraoral and extraoral exam to the function evaluation of the temporomandibular joints (TMJ). Ultrasonography has been applied using a standard technique, patient lied position, on a platform type GE model Logic E9®, with transducer from 11 to 18 MHz that changes according to the age of the patient. In some analyzed cases was noticed: irregularities of the condyle, capsular thickness, (effusion-synovial thickness) Vascular signal was increased, disk dislocation, vascular increase trough color Doppler and condylar symmetries with open and closed mouth.

Results: In the 42% of the cases the condyle function was regular on the opening in both sides. Irregularities of the bony surface were found in 51 % of the cases, and Irregularities of thickness in 37% of the cases. A transition asymmetry from the position of open mouth to a close mouth was founded in 18 patients, and in 5 patient it was not possible to be evaluated.

Conclusion: The sonography, just unlike the magnetic resonance which is the gold standard where the pediatric patients should be immobile for 30 minutes, is a helpful screening method to identify the alterations of the condyles in pediatric patients with Juvenile Idiopathic Arthritis (JIA) even if it does not allow to get a full three dimensional vision of the bony structure. The very young patients can tolerate the sonography test, the patient is not obliged to stay immobile, it also has no biological cost so it is can be repeated easily. In conclusion, Sonography can be considered an acceptable diagnostic test by young patients to get an early diagnosis, it can also be used to monitor the growth of the patient.

Posturometric modification after the application of an orthodontic Herbst type appliance in patients with Juvenile Idiopathic Arthritis

P. Cressoni, L. Cigni, B. Colangelo, C. Occhipinti, A . De Filippi, W. Brounsouzoghly, A. Repellini, A. Bellina, B. Murgiani, G. Batia, U. Garagiola

University of Milan, The Faculty of Dental Medicine, Department of Orthodontics -Foundation of IRCCS CA' GRANDA The Major Hospital of Policlinico, Complex Operative Unit of Maxillofacial Surgery and stomatology, Milan, Italy

Aim: The aim of this study is to evidence the role of the posturography platform in the registration of the computerized dynamic analysis which could be useful to evaluate the effective treatment capacity of an orthodontic appliance Herbst type and its effects on the balance of the patient.

Methods: A telescopic Herbst type orthodontic appliance was applied on a patient with Juvenile Idiopathic Arthritis (JIA) showing a right side deviation of the jaw in opening mouth. This device is a Fixed functional device, with telescopic mechanism that allows the protrusion dislocation of the jaw, manufactured with laser welding and roll bands of 0.07mm thickness, with a cantilever settled on the band from the first molar to the canine. This device applies unilateral force to resolve the deviation of the jaw in this patient. Before and immediately after the application of the Herbst appliance, we evaluated the variation of the posturography using Lizard Ultimateâ posturography platform by the

registration of the computerized dynamic analysis. In both cases the test was conducted in open eyes state.
Results: After the application of the Herbst orthodontic appliance, we immediately obtained a rebalancing of the postural position, an improvement in the postural loads and repositioning of the center of the gravity in a balanced position. Particularly, the load on the right foot is changed from 45 kg (before the application of the Herbst appliance) to 43,9 kg after the application of the appliance. while the load on the right heel changed from 17kg to 14,7kg. and the total torsion of the patient changes from 4,27 ° to 2,82°.
Conclusion: The postural monitoring of the orthodontic case falls within the essential tests of orthodontics. After the execution of the basic exams that are necessary for the therapy that is personalized for each patient, other physiologic dynamics must be monitored which are related to each other.
In conclusion, in this specific case we noticed that the application of an Herbst type orthodontic appliance has improved the balance, the weight loads and the position of the patient's gravity center.

Electromyography in patients affected by Juvenile Idiopathic Arthritis (JIA): the role of neuromuscular system un the protection of the temporomandibular articulation

P. Cressoni, A De Filippis, W. Brounsouzoghly, A. Repellini, L. Cigni, G. Batia, G. Menozzi, B. Colangelo, C. Occhipinti, U. Garagiola

University of Milan, The Faculty of Dental Medicine, Department of Orthodontics – Foundation of IRCCS CA' GRANDA – The Major Hospital of Policlinico, Complex Operative Unit of Maxillofacial Surgery & Stomatology, Milan, Italy

Aim: The aim of this study is to evaluate the motorial model and to understand the role of the neuromuscular system in the protection of the temporomandibular articulation in patients affected by Juvenile Idiopathic Arthritis (JIA) with also articulation disorders.
Methods: 20 patients with Juvenile Idiopathic Arthritis (JIA) were enrolled, these patients suffer from pathology on the temporomandibular articulation. It has been made an evaluation of the motorial function of the masseter muscle and temporal muscle. This evaluation is done through standardized Electromyography (EMG) and by using a software DAQ to analyze the results. The registrations were performed placing the patient in a sitting position, through the use of bipolar electrodes pregelled in Ag/Ag Cl. The test included a measurement in a maximum clenching and a measurement in occlusion on cotton rolls (cot) to determine the coefficient Percentage Overplaning Coefficient (POC). The obtained (POC) coefficient allowed the evaluation of the articular symmetry during muscle activation. Furthermore, the two measurements allowed to get other indices, which are; The asymmetry Index, Index of activation, index of twist, Index of impact,
Results: From the study we notice that 18/20 of patients affected by Juvenile Idiopathic Arthritis (JIA) present hyperactivity of the temporal muscle and consequently Hypoactivity of the masseter muscle, which is a symptom of not correct neuromuscular balance. It is been registered a negative sign about the index of activation in 18 cases. This value of negative sign means that a greater differential recruitment of temporal muscles is involved during the motorial activity of maximum clenching; the difference is about 10%.
Conclusion: In the 90 % of patients with Juvenile Idiopathic Arthritis (JIA) who suffer from articular disorder, it has been registered an adaptive response of protection to the temporomandibular articulation with an hyperactivity of the temporal muscles and/or the hypoactivity of the masseter muscle. From this study emerges, the importance of the evaluation of the motorial activity and the role of the neuromuscular system in the protection of the temporomandibular articulation, through the electromyographic test in maximum clenching.

Clinical, aesthetic and phonetic analysis on three patients

S. Casella, S. Romeo, L. Lombardo, G. Siciliani

University of Ferrara, Italy

Aim: Ghost® is a new aligner designed by Professor Giuseppe Siciliani, Chairman of "Postgraduate School of Orthodontics", University of Ferrara. We created a device that could respect the aesthetic needs of patients by adding on the buccal side of the aligner six composite veneers, on anterior teeth, thus permitting to enhance the aesthetic presence of the device, bypassing psychosocial uneasiness of anterior teeth alignment. This research aimed to evaluate the efficacy of Ghost® performing intrusion, rotation, tipping and alignment movements. We also evaluated its performance in the following scopes: aesthetic (its ability to remain "hidden" inside the oral cavity), phonetic (difficulties in performing spoken language), clinical (the discrepancy between dental movements that we initially established with setup and dental movements we obtained).
Methods: Ghost® is a polyurethane inert and rigid thermoformed-aligner. It was a single aligner used

for all treatment period (2 months, 22 hours day), designed with buccal veneers from canine to canine, giving a better aesthetic presence in the patient's mouth. A soft silicone body was placed on the lingual/palatal side of teeth, and its thickness was specially engineered to help deliver orthodontic forces for teeth movements. We enrolled three patients (two women, one man) with age 25,7 years, permanent dentition and mild/moderate dental crowding. We did radiological imaging (OPT and lateral teleradiography), intraoral and extraoral pictures, oral scans to obtain models, phonetic trial and VITA colour scale to decide veneers colour by referring to natural teeth colour. For aesthetic assessment, we submitted a survey to 800 people - composed by orthodontists, parents, adolescents and ordinary people - to assess Ghost®'s visibility inside oral cavity. Phonetic assessment was approached using three analysis methods: subjective method as a patients' self-evaluation about their ability to perform spoken language; perceptive-objective analysis in which evaluations were done by random listeners; spectrogram analysis (we used PRAAT software to have records) in which a speech therapist performed the evaluation. For the spectrogram analysis we did five recordings of patients reading some text: before treatment (T1), 15 minutes after the delivery of Ghost® (T2), 15 days after delivery (T3), one month later (T4), after two months (T5); For the Clinical assessment, we used OrthoAnalyzer Software (3Shape) by overlapping STL models in the same five times of phonetic assessment.

Results: For aesthetic assessment, most of the people (both random people and orthodontists) did not find significative differences in patients' smile without and with Ghost®. For phonetic assessment, we obtained a different result for each of the three methods: the subjective method showed that most of the consonants' pronunciation did not change, and by progressing from T1 to T5 consonants' distortion decreased; perceptive-objective method showed that listeners did not notice any change; the speech therapist and spectrogram analysis showed that phonetic distortions frequently occurs between T0 and T2 in all patients; distortions improved from T0 to T4 and then they disappeared. For clinical assessment, STL models' overlapping showed Ghost®'s effectiveness in teeth movements: final models complied with the setup we did at the beginning.

Conclusions: Ghost® is able to correct mild/moderate dental crowding by performing tipping movements. By showing early anterior teeth alignment and because it does not give discomfort in performing spoken language, the new aligner - in most of the cases - results invisible to observers, thus drastically reducing the psychosocial impact in the patient using the device.

Periodontics

Comparative microbiological evaluation in peri-implantitis with next generation sequencing and digital PCR sequencing: a pilot study

Andrea Ballini[1], Ciro Gargiulo Isacco[2,3], Stefania Cantore[2,4], Giuseppina Malcangi[2], Gregorio Paduanelli[2], Danila De Vito[1], Gianna Dipalma[2]

[1]Dipartimento di Scienze Mediche di Base, Neuroscienze ed Organi di Senso, Università degli Studi di Bari ALDO MORO - School of Medicine; Dental Hygiene School
[2]Dipartimento Interdisciplinare di Medicina, Università degli Studi di Bari ALDO MORO - School of Medicine.
[3]Human Stem Cells Research Center, Ho Chi Minh City, Vietnam
[4]Sorriso & Benessere Ricerca e Clinica S.r.l., Bari, Italy

Aim: Peri-implant diseases are prevalent, with numerous therapies studied in an attempt to combat this condition. The severity of human peri-implantitis lesions are correlates with the level of submucosal microbial dysbiosis. Peri-implantitis (PI) was defined, according to the 2018 Classification of Periodontal and Peri-Implant Diseases and Conditions (EuroPerio9 congress), workshop co-sponsored by the American Academy of Periodontology (AAP) and the European Federation of Periodontology (EFP), when a distance from the implant platform to bone contact ≥3 mm, and in conjunction with bleeding on probing was found. The purpose of this study was to identify the microbial communities that colonize PI pockets before and after Nd-Yag Laser treatment using Next Generation Sequencing (NGS) and digital PCR (dPCR).
Methods: Clinical and radiographic examination assessed the peri-implant disease status. Subjects having at least one implant with PI, no diabetes, and not taking antibiotics in the previous 3 months were selected. Microbial samples were collected from PI pockets using paper points. After incubation and isolation, the colonies were analyzed by NGS and dPCR. Microbial signatures of 20 submucosal samples from untreated PI lesions before and after Nd-Yag treatment (total 40 samples) were assessed by 16S rRNA gene using QIACUBE HT®, (Rotor- Gene Q and the Illumina MiSeq platform, targeting the V3-V4 region. Datasets were processed using the Quantitative Insights into Microbial Ecology, Greengenes and the Human Oral Microbiome Database (HOMD). Network analyses were performed to identify groups of taxa with mutual occurrence or exclusion. However, to be sure of their methodological effectiveness, the probes were tested in an external laboratory using the Sanger sequencing technique.
Results: Differences between groups were determined using principal coordinate analysis (PCoA), t tests and Wilcoxon rank sum test and FDR-adjusted. Although the compositions were highly variable, major habitants in different peri-implantitis sites could be identified. Network analysis identified two mutually exclusive complexes associated with "false negative" and "peri-implantitis", respectively. The peri-implant core microbiome was determined. The species Cardiobacterium hominis, Leptotrichia buccalis, Capnocytophaga sputigena, Rothia dentocariosa, were most closely associated with false negatives, whereas Synergistetes, Filifactor alocis, and Porphyromonas endodontalis were most
Conclusion: The PI microbiome is a commensal-depleted and pathogen-enriched, harbouring traditional and new pathogens. The core peri-implant microbiome harbours taxa from genera is often associated with bone and related implant loss. Eradication of pathogenic bacteria and infected sulcular epithelium presents a significant challenge in the nonsurgical treatment of PI. This preliminary study provides comprehensive and reliable data for future study designs in PI involving NGS and dPCR in

a more specific, easy, rapid and economical way. NGS and dPCR could be a new clinical method to evaluate and monitor oral microbiota associated with the disease during diagnosis, in the view of a personalized therapy (precision medicine) and related follow up.

Biological papilla preservation technique, an alternative approach for periodontal regeneration surgery: case report

Salvatore Batia, Susanna Ferrario, Paola Beretta, Silvia Pieriboni, Chiara Ceratti, Davide Cavagnetto, Gionata Bellucci, Matteo Landi, Lacaita Cesare

Dipartimento di scienze biomediche, chirurgiche e odontoiatriche, Fondazione IRCCS Ca' Granda - Ospedale Maggiore Policlinico. Università degli Studi di Milano, Italy

Aim: Primary wound closure and uneventful early wound stability over the biomaterials are the critical parts of a successful periodontal regeneration. Surgical elevation of the interdental papilla to access deep and wide intrabony defects interferes with the papillary blood supply that can end up with an impairment in healing process possibly even preventing the primary closure in the early healing phase. Subsequent bacterial contamination may deteriorate the healing process in later phases. An alternative surgical approach designed to maintain the integrity of the interdental papilla is presented with the aim of providing an optimal environment for wound healing in regenerative approaches.
The innovative technique evaluated provides a flap without incisions and a slight elevation of the same for a better aesthetic result determined by a reduced risk of formation of scar tissue.
Methods: Approximately 6 months have been expected from non-surgical periodontal treatment before proceeding with surgery. The surgical site was anesthetized using articaine-epinephrine 1:100,000. Trans-papillary infiltration was avoided to prevent physical (needle penetration) and chemical (prolonged vasoconstriction) trauma to the gingival tissues. Bone sounding was performed after anesthesia. A magnifying loop, micro blades and tunneling surgery instruments were used to increase visibility of the surgical site. For this technique it is essential to know the gingiva biotype. In fact, it is possible to use this surgical technique in medium and thick gingival biotypes, evaluated using the Colorvue Probe. We want to compare two different surgical approaches in the same male patient with two different but adjacent periodontal defects and evaluate the two different healing patterns . The comparison was made at healing time of one week ,two weeks, one month and three months after surgery.The width of the inter-dental space is at least > 2 mm width of the interdental space must be at least 2 mm. The incision was made all around the buccal wall of the tooth adjacent to the defect. The design of the flap provides a full-thickness flap of at least 4 mm and a flap at least 3 mm thick. This design of the flap allows to passivate it correctly and to access the intraosseous defect. Enamel matrix protein (EMD) and bone substitutes (bovine bone chips) are applied in the debrided defect to promote periodontal regeneration. A PTFE 6/0 thread was used for the sutures. The type of suture has been specially designed for a thick gingival biotype and includes cross suspended sutures. While, in the case of the medium biotype, a suspended double cross link suture is better. In case of furcation we can use two concentric suspended sutures with different peripheral distance.
Results: The results of a tissue regeneration surgery with a free papillary incision technique show a good maintenance of the vascularization which leads to better healing and immediate post-operative comfort for the patient. After fifteen days, better tissue healing was noted in the area of surgery.
Conclusion: This technique with free incision papilla may be an alternative surgical approach to prevent exposure of regenerative biomaterials in the early healing phase and possibly enhancing the blood clot stability in intrabony defects. Moreover this technique allows a better vascularization of the flap and better the aesthetic result thanks to the primary wound closure.

Severity of periodontitis among patients with type 2 diabetes in an outpatient diabetes center in Northern Italy Patient Diabetes Center In Northern Italy

A. Bebars[1], S. Mohamed[1], M. Giraudi[1], M. De Caroli[1], G. Iaderosa[1], F. Romano[1], S. Bernardi[2], G. Gruden[2], M. Aimetti[1]

[1]Department of Surgical Sciences, CIR Dental School, University of Turin, Italy
[2]Department of Medical Sciences, University of Turin, Italy

Aim: Diabetes Mellitus (DM) and Periodontitis are complex chronic diseases with an established bidirectional relationship. Type 2 DM (T2DM) is the predominant form of diabetes, accounting for more than 90% of diabetic patients. T2DM and its complications are a major cause of morbidity and mortality in the adult population and diabetic patients are two to six times more likely to develop cardiovascular disease (CVD). Moreover, diabetic nephropathy (DN) is one of the leading causes of end-stage renal failure and greatly enhances the risk

of CVD. The aims of the study were to assess whether periodontitis was associated with poor glucose control, CVD and DN and to explore risk indicators for moderate-severe periodontitis in T2DM. Design: A cross-sectional study was performed on T2DM patients aged 40 to 80 years, with at least six natural teeth, who underwent routine examination at the Diabetic Clinics in the previous 1-2 weeks. A questionnaire was administered to all recruited patients to collect data on demographic characteristics. Data on medical history were retrieved from medical records. Based on a full-mouth periodontal examination periodontal status was classified as healthy, gingivitis, mild, moderate or severe periodontitis. Periodontitis was further stratified by extent as localized and generalized. Comparisons between groups were made by using the chi-square test, the Student t-test or the ANOVA, as appropriate. Logistic regression analysis was used to estimate crude and adjusted effect of moderate-severe periodontitis risk indicators.
Results: A total of 104 adults were recruited into the study: 66% of them reported a first degree familiarity with T2DM with a mean HbA1c of 7.35% and a mean duration of 14 years. Diabetic retinopathy was diagnosed in 34% and neuropathy in 19% of the enrolled subjects. One quarter of the patients had albuminuria, but only 16% had chronic diabetic kidney disease with eGFR less than 60 ml/min/1.73 mm2. About 18% of subjects had CVD. No subject had healthy periodontal conditions: 36% of subjects were diagnosed as having gingivitis or mild periodontitis, 43.3% moderate periodontitis and 21.2% severe periodontitis. HbA1c levels were similar in subjects with and without periodontitis (gingivitis: 7.1 ± 0.3%, mild periodontitis: 7.6 ± 0.3%, moderate: 7.4 ± 0.2%, severe: 7.3 ± 0.1%). The frequency of moderate-severe periodontitis was not related to CVD. The percentage of subjects affected by both DN and periodontitis was 75% compared to 62% of subjects without DN. Subjects with micro/macroalbuminuria had a higher prevalence of periodontitis (78.3%) compared to normo-albuminuric subjects (62.7%). Prevalence of periodontitis was 80% among subjects with severe retinopathy against percentages of 64.0% and 62.3% among patients with a background retinopathy or without retinopathy, respectively. The logistic regression analysis showed that familiarity for T2DM significantly increased by 2.89 times the odds of having moderate-severe periodontitis and age by 5%. A statistically significant association adjusted by age was also observed between active smoking and moderate-severe periodontitis with an odds ratio of 11.3.
Conclusions: The association between severe periodontitis, familiarity for T2DM and microvascular complications are worthy of further investigations in longitudinal studies with larger sample size.

Sonic instruments in periodontology

Paola Beretta, Salvatore Batia, Gionata, Bellucci Davide Cavagnetto, Chiara Ceratti, Susanna Ferrario, Cesare Lacaita, Matteo Landi

Dipartimento di scienze biomediche, chirurgiche e odontoiatriche, Fondazione IRCCS Ca' Granda - Università degli Studi di Milano, Italy

Aim: This study has been settled in order to evaluate how Komet's SonicLine tips , can achive a qualitative and quantitative improvement on compromised periodontal pockets by working through circular, elliptical and oscillatory movements developing sonic vibrations once adjusted on sonic vibrating handpieces, whose oscillating movement is generated by air pressure and how this three dimentional movments can allow an effective removal of hard tissues, thus optimizing operating times.
Also the study wants to show how these sonic tools seem to perform better than other ultrasonic instruments in terms of removal of tartar or concrements from supragingival and subgingival dental surfaces and how their field of action can extend to the treatment of peri-implant tartar and root polishing as well.
Methods: 20 patients between the age of 30 and 45, men and women, were chosen Komet's SonicLine provides a slection of tips. The selection criteria were based on:
- Compilation of the periodontal portfolio according to the University of Berne: probing by means of a six-point periodontal probe for each dental element (MV-V-DV-B-DB-MB), recording the probing depth,
the clinical attachment, the presence of bleeding, the presence of furcations for the multi-rooted elements, the dental mobility, the presence of gingival recessions.
-Recording the presence of dental implants.
-Evaluation of periodontal risk according to the University of Berne (Christoph A. Ramseier).
The patients selected according to these criterias were all treated in two sessions: during the first appointment the sonic instruments Komet's SonicLine Scaler SF 1- 3, SF-8, SF1982, SF4, SF10L / R were used. For the second session of recall and control, setted after 40 days from the first one, a re-evaluation of the poket depth was made using a millimeter periodontal probe while the periodontal indexes were compared with the datas collected on the first visit .
Results: The results obtained from the study show that the Komet SF10 series of sonic tips allowed to scrape the root with less invasive movements and with a final clinical result of greater periodontal reclamation and reduced post-operative sensitivity. Therefore with the SF10 sonic tips it is possible to remove plaque from the root surfaces, leaving a smooth and clean surface.

These sonic points with the terminal part in a shape of a buttonhole, rest on the roots of the tooth and work with delicate and circular movements. The part in contact with the roots is the one that cuts, while the outer part is passive and can also be used under closed sky, without the need of an open flap. Also traction movements aren't required, only thanks to the sonic movement it is therefore possible to work in such a controlled and gentle way on the roots.
For teeth showing furcations,the SF11 instrument showed great results thanks to the particular shape of the tip which makes it specific to remove the plaque in atraumatic way from the furcations always respecting soft tissues. Besides it doesn't release unwanted notches or roughness on the surface of the treated area and allows an accurate clearing.
Conclusions: In these recorded clinical conditions the sonic instruments showed a precise and delicate ability of removing supra and subgingival tartar, by cleaning pockets over 4mm of depth with great simplicity; while for implant prophylaxis applications and for the removal of subgingival concrements they showed cleanliness capacity without the risk of involuntary abrasions on the implant neck.

Quality assessment of systematic reviews on the effect of platelet concentrates in the regeneration of periodontal intrabony defects

Marco Annunziata, Alessandra Bianco, Gennaro Cecoro, Rossella Migliaccio, Angelantonio Piccirillo, Livia Nastri

Unit of Periodontology and Implantology (Head: Prof. L. Guida), Multidisciplinary Department of Medical-Surgical and Dental Specialties, University of Campania "Luigi Vanvitelli", Naples, Italy

Aim: Systematic reviews (SRs) of randomized controlled trials are considered as the best source of evidence on which to base clinical decisions, and the recommendations deriving from SRs should be a guide to clinical practice; however, the way a systematic review is conducted, can compromise the quality of findings and clinical recommendations.
The role of autologous platelet concentrates in the regeneration of periodontal tissues is a very controversial topic in the current literature. In the last years several systematic reviews on the effect of autologous platelet concentrates in the treatment of periodontal defects have been carried out. However, there is a great heterogenity in conclusions, providing unclear and misleading indications to the clinicians. The aim of this work is to perform a systematic critical appraisal of the methodological quality of systematic reviews on the effect of platelet concentrates in the regeneration of periodontal intrabony defects.
Methods: A literature search in PubMed and in the Cochrane Central Register of Controlled Trials, was carried out on February 2019 using an ad hoc created search string for systematic reviews, and possible meta-analyses, focused on the use of platelet concentrates in the treatment of periodontal intrabony defects. Two reviewers, independently, searched in the literature to identify the eligible articles and, in case of disagreement on the selection process, a consensus was reached through a discussion. The methodological quality of these systematic reviews was assessed by using specific evaluation checklists (namely the AMSTAR and the OQAQ) to assess the quality of a systematic reviews.
Results: Fifty eight papers were initially retrieved. Nine systematic reviews of which seven meta-analyses, were finally included. Some domains of the AMSTAR checklist, e.g. "comprehensive literature search" or "list of studies (included and excluded)", were satisfied in most of the SRs. In contrast, domains such as "evaluation of likelihood of publication bias" or "scientific quality used appropriately in formulating conclusions" were rarely met. Using the OQAQ questionnaire, four of the selected studies were classified as medium quality SRs and five were classified as high quality SRs .
Conclusion: There was a high methodological variability among the included SRs. On the basis of the results from high quality SRs, platelet concentrates may be advantageously used in combination with grafting procedures in the regenerative treatment of periodontal intrabony defects. The use of PDs in combination with guided tissue regeneration, did not provide any additional benefit. Future higher quality studies are encouraged, in order to provide more clear clinical indications and recommendations.

Influence of 0.12% chlorhexidine on the early wound healing of the keratinized gingiva following periodontal surgery. A histological and biomolecular analysis

Michaela Di Mario, Lorenzo Marini, Vittorio Blardi, Mariana Andrea Rojas, Andrea Pilloni

Section of Periodontics, Department of Oral and Maxillofacial Sciences, "Sapienza" University of Rome, Rome, Italy

Aim: The infection control is a very important concern during the wound healing process. Chlorhexidine (CHX) is widely prescribed as local antiseptic after surgical procedures to prevent wound contamination. Even though previous in vitro studies showed that the toxic action of this chemical agent is not exclusively directed against microorganisms, but also cells such as PMN leukocytes, erythrocytes, gingival fibroblasts and fibroblasts of the periodontal ligament, the in vivo

effect of CHX on the periodontal soft tissues wound healing was still not clarified. Therefore, the aim of this preliminary study was to evaluate the influence of 0.12% CHX on the early wound healing of the keratinized gingiva of surgically treated periodontal patients, through an histological and biomolecular analysis.
Methods: Four healthy individuals requiring two periodontal surgical procedures in different sextants were enrolled. With an interval of three months, the sextants of each patient were separately treated with a full-thickness envelope flap with a triangular design and osseous resective surgery. At the end of the surgery, the firstly approached sextant of each subject was randomly scheduled as test or control site. As part of the post-surgical protocol, patients were instructed to rinse twice daily with a 0.12% CHX mouthwash for two weeks, starting on day 0 or day 2 depending on whether the surgery involved the test or the control site, respectively. At 24h after surgery, the keratinized gingiva of both the test and control sites was biopsied using a punch of 2 mm diameter at the vertical releasing incision level. Of all the samples of soft tissues collected, the biopsies of the test and control sites taken from one half of the patients were sent for histological examination, while the remainders were referred for biomolecular analysis using a Real-Time Quantitative Reverse Transcription PCR.
Results: The histological analysis exhibited epithelial ulceration with complete necrosis extending to the underlying connective tissue in the test sites. Moreover, the biomolecular analysis resulted in a quantitative reduction of the expression of genes codifying for α-SMA, integrins $\alpha 5$ and $\beta 1$, when 0.12% CHX was administrated from day 0.
Conclusion: In their limits,the results of this preliminary study seemed to show a toxic effect of the 0.12% CHX mouthwashes when prescribed immediately after surgery in a standard post-operative regimen, influencing the gene expressions of some essential proteins in the early stages of keratinized gingiva wound healing.

Severe drug influenced gingival hyperplasia: a case report of special care needs patient on anticonvulsant therapy

G. Bonvento, M. Beghetto, C. Gallo

Università degli Studi di Padova, UOA di Clinica Odontoiatrica, Azienda Ospedaliera Università di Padova, Direttore Prof Edoardo Stellini, Padua, Italy

Aim: In this case report we reported the treatment of a 20-years-old patient with special care needs, suffering from infantile cerebral palsy and mental retardation, in anticonvulsant therapy (Luminale, Lamictal, Depakin and Rivotril) that caused a severe gingival hyperplasia (score 5, according to Harris and Ewalt index modified in 1998) in the jaw and expecially in the maxilla that inteferes with functions. We treated the hyperplasia of the maxilla in two stages because of an anemia. We decided to use an electrosurgery technique. Dental treatment was performed under general anesthesia because the patient was completely non collaborating, and her general health status was classified as ASA III.
Methods: The intraoral examination revealed severe gingival hyperplasia associated with interference of functions and a high plaque index (100%, according to O'leary index) gingival calculus and false periodontal pockets. During the first stage, we initially performed the basic periodontal treatment and then, after the marking of the gingival pockets, we removed the excessive tissue trought internal bevel gingivectomy on the left side (buccal and palatal surfaces) and on the frontal teeth, using electrosurgery. In the anterior area, the incisions on palatal surfaces in the internal bezel were designed to preserve a proper amount of gum tissue after surgery as well as to allow the replacement of surgical flap, thus achieving healing all at once. On the buccal surfaces we practiced an external bevel incision In the posterior palatal area we opted for both an internal and external bevel incision. We removed a palatal neoformation of the size of 1,7 X 1,4 cm. We repeat the professional oral hygiene procedures to ensure that all calsulus deposits have been removed. We waited for one year for the second operation. During the second stage we repeat all the procedures cited above on the other side of the mouth. We removed a palatal neoformation of the size of 1,8 X 2,5 cm. We required an histologic examination of both the removed neoformations.
Results: Histologic reports were: "flap of oral mucosa with focal hyperplasia of the basal layers of the lining epithelium and discrete lymphoplasmacellular infiltrate of the chorion. It is compatible with drug induced gingival hyperplasia". After the first and the second stage, patient's parents reported that she had difficulty in swallowing food and expecially drinks and she had to reeducate to ingest these. During the follow up, parents reported she learned how to swallow, and now she has no dysphagia problems. We immediately obtained an extreme reduction of the pseudopockets, but after six months follow-up from the first operation, we get a partial regrowth of the gum above the crown teeth.
Conclusion: despite the surgical procedures used to remove hyperplastic tissue, tissue stability is not guaranteed due to the inability to ensure adequate home oral hygiene, due to the non-cooperation of the patient and she hasn't change anticonvulsant therapy. So, we expect a regrowth in the next years that leads to intervene again on the patient.

Regenerative periodontal treatment with the single flap approach: evaluation through composite outcome measures

Alberto Borella[1], Anna Simonelli[2], Roberto Farina[1,2,3], Elisa Maietti[4], Leonardo Trombelli[1,2,3]

[1]School of Dentistry, University of Ferrara, Ferrara, Italy.
[2]Research Centre for the Study of Periodontal and Peri-Implant Diseases, University of Ferrara, Ferrara, Italy.
[3]Operative Unit of Dentistry, AUSL of Ferrara, Ferrara, Italy.
[4]Center of Clinical Epidemiology, University of Ferrara, Ferrara, Italy

Aim: To propose novel composite outcome measures (COMs) to evaluate the effectiveness of periodontal regenerative treatment of intraosseous defects. A cohort of patients undergoing the Single Flap Approach (SFA) with and without regenerative devices has been considered for internal validation.
Methods: Two COMs were proposed. COM1 was based on the combination of two parameters: i) 6-month CAL gain for the clinical relevance (clinically relevant if ≥3 mm, clinically not relevant if <3 mm); ii) 6-month PD for the pocket closure (when post-surgery PD≤4mm). Treatment success was obtained when a clinically relevant result was associated with pocket closure, while treatment failure consisted of no clinical relevance in association with a residual pocket greater than 4mm. A different COM (COM2) was also proposed specifically for aesthetically sensitive areas (i.e. maxillary incisors, canines and premolars). COM2 included: i) 6-month CAL gain for the clinical relevance (clinically relevant if ≥3 mm, clinically not relevant if <3 mm); ii) 6-month REC change for the aesthetic impairment (recession not perceivable/absent: ≤ 1 mm; recession perceivable: ≥ 2 mm). According to COM2, treatment success was obtained when a clinically relevant result was associated with a not perceivable/absent recession, while treatment failure consisted of no clinical relevance in association with recession greater than 2 mm. In a cohort of patients undergoing the Single Flap Approach (SFA) for the treatment of intraosseous defects, the performance of the regenerative procedure was evaluated either conventionally (i.e., by considering average CAL change and residual PD individually) or according to the distribution based on the proposed COMs.
Results: Overall, the procedure resulted in significant 6-month CAL gain (3.7±1.9 mm; p<0.001), PD reduction (4.5±1.9 mm; p<0.001) with a residual PD of 3.7±1.1mm. When comparing the clinical performance of different treatment strategies, a significant difference was observed for CAL change between spontaneous healing (SH) (mean CAL gain: 3.0±1.7 mm) and enamel matrix derivative (EMD)+ deproteinized bovine bone mineral (DBBM) (CAL gain: 4.5±1.8 mm) (p=0.029). In contrast, a residual PD at 6-months was similar between groups. The comparison of the two treatments by using COM1 showed a more pronounced, significant difference in the proportion of successful vs failing cases (p=0.006). In particular, complete success was obtained in 77.5% vs 48% of cases in the EMD+DBBM group vs SH group, respectively. Treatment failure occurred less frequently with EMD+DBBM than SH (3% vs 8%, respectively). Also COM2 showed a difference between EMD+DBBM group and SH group in the proportion of successful vs failing cases: a complete success was obtained more frequently in the EMD+DBBM group than SH group (80.5% vs 39%), while treatment failure occurred in 6.5% and 23% of cases in the EMD+DBBM group vs SH group, respectively.
Conclusions: COMs seem to be more accurate than single conventional clinical parameters to assess the clinical performance of a periodontal regenerative procedure.

Fibrin clot adhesion to conditioned root surfaces: an in vitro study with scanning electron microscopy analysis

C. Brugnera, L. Bevilacqua, G. Tacchino, D. Angerame, D. Porrelli, G. Turco, L. Fanfoni, M. Maglione

Clinical Department of Medical, Surgical and Health Sciences.
Postgraduate Specialization in Oral Surgery, University of Trieste, Italy

Aim: Periodontal regeneration is contingent on the adhesion and maturation of fibrin clot to a root surface exposed to periodontal disease. Root surface demineralization in vitro improves the formation of a stable union between the fibrin clot and the root surface. In scientific literature there are not studies of comparison that stand which demineralizing agent is the best in promoting fibrin clot adhesion. The aim of this study was to evaluate and compare the efficacy of six root conditionings in removing the smear layer and developing the fibrin clot in static and dynamic conditions.
Methods: 36 single-root teeth extracted for periodontal disease were cut with a microtome in order to obtain 72 specimens that were divided in three groups: 24 samples not covered with blood, 24 covered with fresh human whole blood, 24 covered with blood and rinsed in a rotary shaker table (Vortex®). 4 specimens from each group were conditioned for 3 minutes with: physiological saline solution (FISIO) as the control group, saturated solution of citric acid 25% (AC), ethylenediaminetetraacetic acid 24% (EDTA), a solution of tetracycline 200mg/mL (TETRA), a solution of tetracycline and citric acid (TETRA+AC), Prefgel® and successively Emdogain® (EMD). Then the 48

samples from group 2 and 3 were covered with blood, which was allowed to coagulate for 20 minutes in a 37°C chamber. The blocks were rinsed and dehydrated under standardized conditions; specimens of group 3 were vortexed (100rpm). All the blocks were then sputtered with gold and analyzed with SEM. SEM images were evaluated by two blinded examiners, starting from the cementoenamel junction (CEJ), at 5 standardized points 2 mm distant from each other. A statistical analysis was performed.
Results: EMD samples showed a more disorganized smear layer, in which is probably present the residual vehicle (propylene glycol alginate). However, in the 90% of all the specimens smear layer was found. AC treated samples showed a firmly adherent fibrin clot that covered the surfaces for the 70% of the specimens (the data was statistically relevant). Same results were found in TETRA+AC samples. The conditioning with EDTA, TETRA and EMD resulted in a sparsely organized clot worsened by the application of tensile forces, especially in TETRA samples. Only few blood cells without any clot organization were found in the control group, confirming that conditioning root surfaces improves the fibrin clot adhesion.
Conclusion: The best formation of fibrin clot was observed for AC treated samples; this is probably due to the increase of root surface wettability caused by AC. The other root conditioning agents, even if lead to results better than the control group, are more susceptible to external forces and do not promote a stable fibrin clot adhesion.

Rheumatoid arthritis and periodontitis: epidemiological study

G. Castagnoli, D. Karapetsa, S. Gennai, M. Nisi, M. Gabriele, F. Graziani

Unity of Dentistry and Oral Surgery, Director: Prof. Mario Gabriele, Sub-Unit of Periodontology, Halitosis and Periodontal Medicine. Department of Surgical, Medical and Molecular Pathology and Critical Care Medicine, University Hospital of Pisa, Pisa, Italy

Aim: To assess the prevalence and severity of periodontitis (P) among patients affected by rheumatoid arthritis (RA) and to describe their clinical and serological profile comparing them with a control population affected by RA but not suffering by P.
Methods: medical records of patients affected by RA from the outpatient rheumatology clinic of the University Hospital of Pisa were screened for inclusion and subjects were invited to participate and sign the informed consent. Exclusion criteria were (i) age younger than 18 years, (ii) pregnancy, breastfeeding or oral contraceptives, (iii) edentulism, (iv) reported diagnosis of other autoimmune pathologies or syndromes associated with RA, (v) subjects having changed their RA therapeutic regime within the 3 months before the beginning of the study and (vi) subjects necessitating antibiotic prophylaxis to undergo periodontal clinical examination and treatment. Included subjects underwent a full-mouth periodontal examination including probing depth, gingival recession, plaque index, bleeding on probing and a full rheumatologic visit. An expert rheumatologist recorded the number of tender and swollen joints, the patient's general assessment of his/her condition scored on a visual analog scale (VAS), disease activity score 28 joints (DAS28) and RA medical therapy (biological or disease-modifying anti-rheumatic drugs). All subjects filled in the short health assessment questionnaire (HAQ-DI) to measure disability. Serum analyzes investigated levels of rheumatoid factor (RF), anti-citrullinated protein antibodies (ACPAs), C-reactive protein (CRP), erythrocyte sedimentation rate (ESR), and fibrinogen. Information concerning smoking, body mass index (BMI) were also collected.
Results: The final cohort consists of 120 patients with RA. Seventy-seven subjects (64.2% of the sample), resulted affected by periodontitis (RA-P group), while the remaining 35.8% only had RA (RA group). Both groups are comparable for age, gender distribution and BMI and smoking status. The number of teeth present was statistically lower in the RA-P compared to the RA group ($p < 0.05$). DAS28 mean value (± standard deviation, SD) in the RA-P group was 3.17 (± 1.23), while the respective value in the RA group was 2.81 (± 1.03); these differences were not statistically significant ($p < 0.05$). With regards to RA serological profile, there were statistically more seropositive subjects for ACPAs in the RA-P group (62.3% versus 32.6%, $p < 0.05$) whereas no statistical differences were observed when comparing the seropositivity for RF of the two groups. Furthermore, the concentrations of serum inflammatory biomarkers (CRP, ESR and fibrinogen) in the two groups were comparable. Finally, patients with P and RA had an unadjusted OR = 2.7 (95 %, confidence interval [CI] 1.19 - 6.11) of presenting a moderate-severe DAS28 score (DAS28 ≥ 3.2); after adjusting for RA medication, RF, ACPAs, smoking status and gender the OR is 2.9 (95%, CI 1.16 - 8.23).
Conclusion: The overall prevalence of periodontitis in RA subjects was not significantly different in comparison with the values observed in important epidemiological surveys. Among RA subjects, a considerably higher prevalence of severe P has been observed. Furthermore, the clinical severity of RA appears to be strongly correlated with the clinical periodontal parameters and RA subjects also affected by P seem to have an OR of 2.9 for presenting with a

moderate-severe RA (DAS28 score ≥ 3.2).

6-Months follow-up of single RT1 gingival recession sites treatment with coronal advanced flap and a novel collagen matrix: a case series

Raffaele Cavalcanti, Camilla Cavalcanti, Mariana Andrea Rojas, Lorenzo Marini, Andrea Pilloni

Section of Periodontics, Department of Oral and Maxillofacial Sciences, "Sapienza" University of Rome, Rome, Italy

Aim: Coronally advanced flap (CAF) in conjunction with the connective tissue graft (CTG) is considered the gold standard of treatment of gingival recession due to its high predictability of the treatment results. Recently, a new resorbable collagen matrix (CMX) (Geistlich Fibro-Gide, Geistlich Pharma) was introduced to overcome the limitations of autogenous CTG, such as the morbidity associated with graft harvesting, the potential volume shrinkage and the limited availability of autogenous graft tissue. The first aim of this case series was to present clinical results over a period of 6 months in the treatment of RT1 gingival recession sites with a CAF and the previously described CMX. The secondary aim was to assess the wound healing, the esthetic outcomes and the patient-reported outcome measures (PROMS).
Methods: Four healthy patients with isolated RT1 gingival recession sites were included in this case series. All the defects were treated with CAF + CMX. At 6 months, the following clinical parameters were recorded: recession reduction (RecRed), keratinized tissue increase (KTI), mean root coverage (MRC), complete root coverage (CRC) and root coverage esthetic score (RES). A visual analogue scale (VAS) was used to assess the patient reported outcome measures: 1) satisfaction with the results of the treatment (at 6 months) 2) post-surgical discomfort (at 2 weeks). Moreover, at 2 post-surgical weeks, the wound healing index (WHI) was recorded.
Results: After 6 months, RecRed was obtained in all the treated sites with a mean value of 3.5±0.57. In two of the four cases, a KTI of 1 mm was obtained. A MRC of 100% was calculated and CRC was achieved in 100% of the cases. All the cases showed an elevated RES value (9.5±0.57) and all the patients reported high satisfaction in terms of the aesthetic outcome. At 2 post-surgical weeks, postoperative healing was uneventful (WHI=1) and absent postoperative discomfort, bleeding and swelling was reported.
Conclusion: Within the limitations of the present case series, the results seemed to suggest that CAF + CMX could represent a valid and safe alternative to CAF + CTG in the treatment of RT1 gingival recession sites after 6 months. Moreover, patient satisfaction and aesthetics was very high, with no pain related to the soft tissue graft harvest and less morbidity presented. More extensive, long term clinical studies are needed to support this result obtained.

Sulfonic/sulfuric acid gel solution as an adjunct to periodontal instrumentation with ultrasonic and hand devices in deep periodontal pockets

L. Costanzo[1], F. Zafar[1], F. Citterio[1], V. Lorenzetti[1], G. Baima[1], E. Canciani[2], C. Dellavia [2], M. Aimetti[1]

[1]Department of Surgical Sciences, CIR Dental School, University of Turin, Italy
[2]Department of Biomedical, Surgical and Dental Sciences, University of Milan, Italy

Aim: Periodontitis is inflammatory disease caused by the colonization and persistence of microbial biofilm on the hard, non-shedding surfaces of the oral cavity. Mechanical debridement, performed by the use of ultrasonic or hand instruments, is aimed to effectively remove plaque and calculus from contaminated tooth surfaces to re-establish periodontally healthy conditions. However, in deep periodontal defects, it may result in both inadequate calculus removal and pocket reduction. Recently, a sulfonic/sulfuric acid gel solution (HBX) has been introduced as endodontic decontaminant and anti-biofilm agent. It is a proven chemical desiccant which can be safely applied on soft tissue as well as on tooth enamel and dentin. Therefore, the aim of this randomized clinical trial was to assess whether chemical cleansing with HBX as an adjunct to hand and ultrasonic instrumentation was more effective than manual and ultrasonic instruments alone in terms of residual bacterial biofilm reduction in deep periodontal pockets.
Methods: Prognostically 56 hopeless premolar or molar teeth, scheduled for extraction due to severe periodontitis were consecutively included. Each tooth had at least 1 interproximal site with probing depth (PD) ≥ 6 mm. Third molars were excluded. Each tooth was randomly assigned to test or control group. In the test group HBX was delivered on the whole reachable tooth surface for 60 seconds plus mechanical instrumentation for 14 minutes, followed by tooth extraction. In the control group only mechanical instrumentation was performed for 14 minutes, followed by tooth extraction. Residual biofilm was evaluated on photographs and measured with SEM as total area and percentage of the root surface covered by plaque or calculus after treatment. Between-groups comparisons were performed with chi-square test, t-test for independent samples and Mann-Whitney U-test as appropriate.

Results: At baseline, the mean PD was 8.04 ± 2.31 mm in test group and 8.34 ± 2.73 mm in the control group. There was no statistical significant difference between them. The root surface area was similar between the two treatment groups (control: 60.13 ± 25.09 mm2, test: 55.86 ± 24.22 mm2, p = 0.197). After treatment the total area covered by plaque and calculus was statistically significantly larger (p= 0.0001) in the control group than in test group. In the control group it amounted to 15.96 ± 13.64 mm2 for plaque and 10.90 ± 7.69 mm2 for calculus, while in the test group it was 5.17 ± 6.69 mm2 and 5.17 ± 8.72 mm2, respectively. In terms of percentage of root surface with soft/hard deposits, the experimental teeth yielded significantly smaller area covered by plaque (p = 0.0001) and by both plaque and calculus (control: 40.99 ± 23.31%; test: 19.53 ± 18.51%) than control teeth.
Conclusion: Within the limitations of this study the additional chemical cleansing with HBX seems to facilitate the removal of biofilm from the root surface in combination with conventional manual and ultrasonic instrumentation.

Alveolar socket preservation: punch technique vs spontaneous healing. A randomized clinical trial

L. F. D'Arienzo, C. Marruganti, A. Russo, R. Mirra, M. Ferrari, N. Discepoli

University of Siena, Italy

Aim: Extraction socket management has acquired over the years even more strategic importance within the periodontal treatment plan. Several surgical techniques have been described to approach the alveolar socket immediately after tooth extraction. The aim of this randomized, controlled clinical trial is to determine whether ridge preservation using epithelial-connective tissue graft would counteract the vertical and horizontal ridge resorption compared to spontaneous healing.
Methods: Patients, requiring single tooth extraction, have been consecutively included. According to a randomization list, patients have been selected to receive either ridge preservation via punch technique (test) or extraction alone (control). Briefly, after atraumatic tooth extraction have been carried out and the inner part of the free marginal gingiva was de-epitheliazed, an epithelial-connective tissue punch was harvested from the palate and closely adapted with 5-0 resorbable single stitches to the socket entrance. Control sockets were left heal spontaneously. Before the experimental procedures were performed, one independent and calibrated examiner assessed the following clinical variables: horizontal socket width, gingival thickness, gingival phenotype (de Rouck 2014), buccal plate thickness, keratinized tissue width (GK), alveolar crest height (from the incisal/occlusal margin). Standardized bi-dimensional x-rays were taken and ridge alterations were measured with a linear distance from the adjacent occlusal plane. Clinical and radiographic measurements have been repeated at baseline and after 6 and 12 months. Analogic (irreversible hydrocolloid) and digital (GC Europe, AAdva IOS) impressions were immediately taken after tooth extraction (baseline) and volumetric changes evaluated at 6 and 12 months. Patient centered outcomes were recorded by questionnaires at baseline and 7 and 30 days post-operatevely. Descriptive statistics was performed. All variables were described with mean and standard deviation. Differences between test and control groups at time points were analyzed by Kruskal-Wallis and post-hoc Dunn's test ($p<0.05$).
Results: 9 patients were eligible to be enrolled in the study so far, 7 of them have been included. All sockets healed uneventfully. After 6 months healing, socket diameter, GK and gingival thickness reduced statistically from baseline. No statistical significant differences were detected between group at any time points; nevertheless a tendency toward a smaller reduction was observed in the test group. According to PCO's variable no differences were recorded between the two procedures.
Conclusion: Epithelial connective tissue punch technique for alveolar socket preservation can be considered a feasible procedure in case of single tooth extraction. No statistical significant difference were observed according to horizontal socket dimension changes between test and control groups after 6 months healing. Patient centered outcome also doesn't seem to highlight differences between the two groups. The reduced sample size of the current ongoing study influences the data analysis, leaving much more strongest speculation to a further and future analysis.

The comparison of the proteomic profile of periodontal pocket and of corresponding gingival crevicular fluid to study periodontal disease biomarkers: feasibility study. biomarkers: feasibility study

Carlo Bertoldi, Filippo Franceschetti, Stefania Bergamini, Luca Giannetti, Luigi Generali, Pierantonio Bellini, Ugo Consolo

Department of Surgery, Medicine, Dentistry and Morphological Sciences with Transplant Surgery, Oncology and Regenerative Medicine Relevance, University of Modena and Reggio Emilia,

Modena, Italy

Aim: Periodontitis is a set of inflammatory disorders characterized by periodontal attachment loss by periodontal pocket development, leading to tooth loss if remain untreated. The etiology and progress of periodontal disease is complex and remains mostly unknown. So, periodontal disease therapy has considerable limitations. The easy, reliable and correct early detection and control of the disease, markedly reduces biological and social costs. However, the diagnosis of periodontitis is established exclusively by clinical criteria based on probing to assess periodontal pockets, which are the pathognomonic expression of periodontal disease. The -omic sciences acquired substantial significance of late years and, in particular, proteomic seemed to be the more promising in this initial stage. Most proteomic analysis regarding periodontal diseases have been performed on saliva, crevicular fluid samples, peripheral blood or periodontal plaque samples which are more easily to harvest than the tissue of the periodontal pocket. However, they failed to provide reliable results for clinical applications. On the contrary, very few studies were directly performed on the periodontal pocket.
So, the aim of this study was to compare the proteomic profile of interproximal pocket tissues with that of GCF, and to analyze if they show a significant similarity in the proteomic profile.
Methods: in this preliminary study, we enrolled 3 healthy subjects affected by severe periodontitis needing of periodontal surgery. Immediately before the surgery, GCF samples were taken by means of filter paper strips positioned in the gingival sulcus correspondent to periodontal pockets. Then, periodontal pocket tissue, harvested during surgery, was adequately stored for proteomic analyses. All samples were immediately frozen at –80°C and maintained until further analysis. Tissue samples were mechanically disrupted and incubated in lysis buffer, while GCF was obtained incubating the collecting paper in phosphate buffered. In both cases, after centrifugation, the supernatant was precipitated in cold acetone overnight and protein content were pelleted by centrifugation and then dissolved in a rehydration buffer. Mono-dimensional gel electrophoresis was used to separate protein content. After staining gel images were acquired and compared. Liquid chromatography coupled to mass spectrometry (LC-MS/MS) analysis was performed to allow protein spot identification.
Results: 1-DE gels from periodontal pocket tissue and the correspondent GCF was analyzed by software Quantity One. Almost the same qualitative protein expression profile in pocket tissue and GCF was found from each patient. However, no statistical significant correlation between the quantitative proteomic profile of pocket tissue and GCF was found. Only one band (that of K immunoglobulin) resulted statistically significant between GCF and pocket tissue proteome in all patients.
Conclusion: To date, this is the first study comparing the proteome of periodontal pocket tissue and corresponding GCF. The periodontal pocket and the GCF are similar as proteomic networks, but the protein network of the periodontal pocket does not influence significantly the GCF protein network and the other way around. So, with the limitations of this study, the preliminary results seem to indicate that the GCF does not seem suitable to study on the pathogenesis of periodontal disease explaining the reason for the failure of studies based only on GCF to control the periodontal disease in real-time.

Systemic inflammation after periodontal surgery with the adjunctive use of enamel matrix derivative

Filippo Graziani[1,2], Stefano Gennai[1,2], Morena Petrini[1,2], Marina Peric[1,2], Laura Bettini[1], Urska Marhl[1,2], Maurizio Tonetti[3]

[1]Department of Surgical, Medical and Molecular Pathology and Critical Care Medicine, University of Pisa, Pisa, Italy
[2]Sub-Unit of Periodontology, Halitosis and Periodontal Medicine, University Hospital of Pisa, Pisa, Italy
[3]Faculty of Dentistry, University of Hong Kong, Hong Kong, SAR China

Aim: The aim of this study was to compare the acute-phase responses after surgical treatment with and without the adjunct of enamel matrix derivative (EMD).
Methods: Thirty-eight periodontitis-affected subjects were randomized to test (surgical periodontal treatment + EMD) and control group (surgical treatment only). Periodontal parameters were recorded at baseline and 6-months. Serum samples were collected at baseline, 1, 7 and 180 days after treatment.
Results: Both treatment modalities resulted in an increase of inflammatory biomarkers at 24-hr. CRP values were higher in the control group at day 1 ($P=0.004$). Also the fibrinogen was higher for control group at day 1, when compared to its baseline values ($p<0.05$ vs. baseline). Better periodontal healing was observed for test group, the clinical attachment level gain was 4.26 ± 2.182mm compared to 3.26 ± 2.207 mm of the control group.
Conclusion: The adjunction of EMD for surgical periodontal treatment was associated with lower increase of CRP and fibrinogen in test group after 24-hr. These results suggest a possible systemic anti-inflammatory effect of EMD. The use of EMD can be

recommended in patients with systemic comorbidities.

Horizontal fracture of the middle root third: a conservative approach

Guilherme Gonçalves de França, Jessica Maria Grazia Spinnato, Elena Cerisara, Andrea Stevanello, Veronica Campana

Student, Dental School, Department of Medicine and Surgery, University of Insubria, Varese, Italy

Aim: This article aims to show how a conservative approach can allow the patient to maintain their natural elements and to limit costs, resulting to be a valid alternative to more invasive and expensive procedures, such as the tooth extraction followed by implant placement.
Methods: This case report exposes a direct trauma on the anterior maxillary area, with a consequent mobility of both central incisors, due to horizontal root fractures, and a simple coronal fracture of the element 1.2. For the diagnosis, CBCT and intraoral periapical radiographs were performed. The chosen therapeutic approach was conservative: the coronal stumps of 1.1 and 2.1 were repositioned using a prosthetic hammer and the coronal fracture of the element 1.2 was reconstruct. The therapy was concluded by splinting the elements 1.2, 1.1, 2.1 and 2.2.
Results: One week after the initial treatment, the gingiva was healing, it had granulation tissue and fibrin at the level of the dental Zenith of 1.1. The three-months check allowed to evaluate a progression of soft tissue healing, the sensitivity was tested after six months and was positive with slight delayed response, and no alteration of the color of the elements was found. Subsequent follow-up visits were performed after 9 months, 1 year, 1 year and 5 months, 3 years and 5 years. After a year and and five months the buccal probing depth was tested and the maximum depth was recorded at 1.5 mm. During the same session a cold vitality test was performed and the physiological sensitivity of the teeth was positive. During the control appointments, periapical and clinical radiographic controls were performed. After five years of follow-up, the teeth are in place and have maintained their physiological sensitivity, no alteration of the color or position of the elements was found. The buccal keratinized tissue, previously bruised and torn, appears healed with the recovery of the natural position and of the trophism.
Conclusion: The data present in the literature describe a better prognosis in case of fracture of the horizontal root compared to vertical fractures. A traumatized element may not respond to sensitivity tests during the first few weeks and this is not an indication of endodontic treatment, according to many authors. The current guidelines recommend splinting the fractured elements after repositioning the fragments, when necessary, for a variable period. This case report turns out to be in complete agreement with how widely supported by the literature: a conservative approach accompanied by the professional management of the oral bacterial load plays an important role to avoid the most common complications and allow the patient to maintain long-term natural teeth.

FM-EPAPT vs SRP in the active therapy of patients affected by severe forms of periodontitis

S. Marchetti[1], S. Calza[2], E. Scotti[1], M. Mensi[1]

[1]Section of Periodontics, School of Dentistry, Department of Surgical Specialties, Radiological Science and public Health, university of Brescia, Brescia, Italy;
[2]Unit of Biostatistics & Bioinformatics, Department of Molecular and Translational Medicine, University of Brescia, Brescia, Italy

Aim: Periodontitis is a widely diffused infectious disease that affects the tooth supporting structures. If diagnosed on time, treatment is able to reduce the clinical signs and the microbiological biofilm. Traditionally the first step of periodontitis treatment aims to disrupt the sub-gingival biofilm and to restablish a healthier microbiological environment. This is commonly done following the traditional therapy, SRP. Recently an air-abrasive system for supra and subgingival debridement has been introduced; his indications have been expanded from supragingival (airflow) to subgingival use (perioflow) by the development of new low-abrasive glycine-based powder (GPAP) and devices with a subgingival nozzle. Recently, a new low abrasive erythritol powder (EPAP) with comparable physical properties to GPAP was introduced for subgingival air polishing. This clinical study is a prospective, single-masked, randomized, split-mouth, non inferiority clinical trial. The aim of this clinical study is to compare the traditional procedure SRP (scaling and root planing) to the new procedure FM-EPAPT (full mouth erythritol powder air polishing therapy) in active therapy. Primary end-point is pocket closure (PPD ≤ 4mm).
Methods: The study provides a 12 months time-line; clinical data collected at the baseline (T0), in reassessment at 6 weeks from the therapy (T1) and at the 3-month control (T2) were analyzed for this abstract. The Professional Mechanical Plaque Removal or PMPR allows the disrupt of both above and below-gingival deposits with consequent stabilization of the balance between the bacterial population and the host response. The current method is based on the use of mechanical instruments (curettes) and manual for

plaque and calculus removal and polishing with cups and abrasive pastes. FM-EPAPT expected the removal of biofilm and the supra and subgingival hard deposits through erythritol powder and piezo-ceramic scaler with ultrasonic tips.
Results: The average of the probing depth expressed in millimeters, shows that both FM-EPAPT and SRP are significant from the clinical point of view looking at the average of pockets closed at T1, 3.5 for FM-EPAPT and 3,3 for SRP, and at T2, 3.2 for both where T0 was 6,2 for FM-EPAPT and 6,1 for SRP. The average number of residual pockets is reduced to both T1 and T2 compared to baseline in both treatments. In particular, the average of the residual pockets of the test sites is reduced to about 6 residual pockets on average per patient at T1 and 4 at T2; however, there is no statistically significant difference between the two methods. No statistically significant is observed with Bop and Pi.
Conclusion: Despite the limitations of the study, the results allow us to state that FM-EPAPT has determined clinical results similar to SRP even if there is no statistically significant difference (p-value > 0,05). The criteria for choosing one method or the other will depend on other parameters, given the non-inferiority: time, protocol ergonomics, patient and operator comfort, costs, adverse and non-adverse effects last the greatest gain of clinical attack obtainable with ever less invasive therapies. The absence in literature of comparable studies and the smallness of the sample involve the need for further studies to confirm or deny the results of this RCT. The excellent clinical results obtained could also be linked to the experience and manual skills of the operator called the center effect.

The effect of immediate implant placement on alveolar ridge preservation: a radiographic randomized controlled clinical trial

Marco Clementini, Giulia Mohammadi, Agnese Agostinelli, Walter Castelluzzo, Fabio Vignoletti, Massimo De Sanctis

Department of Periodontology, Vita-Salute San Raffaele University, Milan, Italy

Aim: The aim of this RCT was to radiographically evaluate the effect of immediate implant placement using a bone graft in the buccal gap (test treatment) as compared to ARP (control treatment) and spontaneous healing (negative control) on horizontal and vertical bone dimensional changes after 4 months of healing post-extraction.
Methods: After tooth extraction, every element was randomly assigned to one of the treatment groups: spontaneous healing (SH), alveolar ridge preservation (DBBM/CM), immediate implant + alveolar ridge preservation (IMPL/DBBM/CM). Before treatment procedures, a CBCT scan was performed. After four-month post-extraction, all patients underwent a second CBCT scan. A computer-assisted superimposition of the original DICOM data of the two CBCT scans was done in areas where no changes had taken place during the 4 months (e.g. the cranial base in the maxilla or the lower border and angle in the mandible respectively). Finally, the measurements were computed on the selected scans at baseline and at 4 months. The following measurements were performed in mm.:
- thickness of buccal and lingual bone plate at 1 mm, 3mm and 5mm at baseline;
- vertical ridge height, measured at the buccal and lingual site at baseline and 4 months;
- mid-buccal and mid-lingual horizontal ridge width, measured at 1mm, 3mm, 5mm below the CBP and CLP, at baseline and 4 months.
The dimensional changes based on the measurements performed at baseline and at 4 months were assessed and expressed both in percentages and in mm.:
- changes in ridge height at buccal and lingual aspect;
- changes in ridge width at 1mm, 3mm, 5mm of the entire ridge, mid-buccally and mid-lingually.
Results: No significant differences between treatment groups were found at the baseline regarding age, gender, tooth position, reason for extraction and thickness of the crest. At 1 mm below the coronal crest, ridge width decreased of 3.37 ± 1.55 mm (-43.2 ± 25.1%) in the SH, while DBBM/CM and IMPL/DBBM/CM presented a ridge reduction of 1.56 ± 0.76 mm (-19.2 ± 9.1%) and 1.29 ± 0.38 mm (-14.9 ± 4.9 %) respectively. These horizontal changes were significantly different between SH and both DBBM/CM and IMPL/DBBM/CM group. Significant differences in horizontal changes were found at 1 and 3mm below the crest of the buccal side between SH group and both DBBM/CM and IMPL/DBBM/CM groups: a reduction of 2.45 ± 1.29 mm (at 1mm) and 1.92 ± 1.99 mm (at 3mm) was revealed for SH group, while a change of -0.91 ±0.43 mm (at 1 mm.) and -0.53 ± 0.44 mm (at 3 mm.) was shown in DBBM/CM group and a change of -0.99 ± 0.21 mm (at 1 mm.) and -0.70 ± 0.33 mm (at 3 mm.) in IMPL/DBBM/CM group. Significant differences at the lingual aspect were found at 1 mm below the crest between SH group (-24.03 ± 22 %) and IMPL/DBBM/CM group (-5.99 ± 6.18 %). No significant differences were observed in vertical changes in all groups.
Conclusion: This study demonstrates that after tooth extraction vertical and horizontal changes of the alveolar ridge occur, although an alveolar ridge preservation technique is performed, regardless of an immediate implant placement. However, both surgical techniques reduce the horizontal bone diminution that occurs, mostly in the coronal portion of the buccal bone, when compared to spontaneous healing. For

this reason, placing an immediate implant in post-extraction site treated by an ARP technique may be a viable option.

Multiple gingival recessions and non-carious cervival lesions: combined restorative-periodontal treatment. A randomized clinical trial

L. Mone[1], C. Razzolini[1], G. Pettinari[1], A. Zambit[1], G. M.Fadda[2], M. Ferrari[2], N. Discepoli[1]

[1]Department of Medical Biotechnology, University of Siena, Unit of Periodontology, Italy
[2]Department of Medical Biotechnology, University of Siena, Italy

Aim: The aim of the present randomized clinical trial will be to evaluate the impact of using a connective tissue graft (test group) in addition to the coronally advanced flap (control group) on the future complete root coverage (CRC) of multiple combined defects (NCCL + Rec). Secondary goals will be to identify the surface of residual NCCL (after conservative treatment) as a prognostic factor for complete root coverage and to assess different patient-related outcomes by means of psychometric tests (OHIP 14, VAS scales) before and after the two performed procedures.
Methods: All the subjects were enrolled consecutively at the Department of Medical Biotechnology of the University of Siena, in the Units of Endodontic and Restorative Dentistry and Periodontology, in accordance with the established inclusion criteria. The sample allocation in the experimental groups (test group = CAF + CTG, control group = CAF) was performed according to the randomization sequence. All clinical and patient-centered outcomes were recorded at baseline. The first part of the treatment consisted in the execution of a composite resin restoration of the whole portion of the NCCL coronal to the line of maximum root coverage, previously outlined. Two weeks later the surgical procedure assigned by the randomization system was performed, while recording all the intraoperative variables. In the post-operative period, a follow-up program was arranged, which involved appointments one and two weeks and three and six months later, in order to collect the same data already recorded at enrollment and baseline timepoints.
Results: To date, the patients definitively included were 6, 3 for the control group, 2 for the test group and 1 has not yet received the surgical treatment. Some of these patients had more than one site with multiple combined defects. Only the descriptive analysis of the collected data was performed. With regard to the main response variable (CRC), the CAF + CTG technique yielded better results (100% of the surgical sites) than the CAF procedure alone (83% of the surgical areas) ($p<0,05$) six months after the surgical procedure. Among the secondary outcomes, the CAF + CTG technique caused a greater discomfort only after 3 months of follow-up. Both the subjective and objective aesthetic assessments showed a marked improvement in all the included cases, since the early stages of healing. In all the patients dentin hypersensitivity drastically reduced after the combined restorative-periodontal treatment. The data just reported refer only to those 3 patients who reached the six-month follow-up.
Conclusion: Within the limits of this still ongoing study, such as the low sample size and the short period of follow-up, it is possible to conclude that the combined surgical-restorative approach is a valid procedure to obtain complete root coverage in the treatment of multiple gingival recessions associated with non-carious cervical lesions.

Enamel matrix derivative combined with autogenous bone for the regeneration of periodontal intrabony defects. a systematic review and meta-analysis

Marco Annunziata, Angelantonio Piccirillo, Francesco Perillo, Gennaro Cecoro, Livia Nastri

Unit of Periodontology and Implantology (Head: Prof. L. Guida), Multidisciplinary, Department of Medical-Surgical and Dental Specialties, University of Campania "Luigi Vanvitelli", Naples, Italy

Aim: The combination of enamel matrix derivative (EMD) with an autogenous bone graft in periodontal regeneration has been proposed to improve clinical outcomes, especially in case of deep non-contained periodontal defects, with variable results. The aim of the present systematic review and meta-analysis was to assess the efficacy of EMD in combination with autogenous bone graft compared with the use of EMD alone for the regeneration of periodontal intrabony defects.
Methods: A literature search in PubMed and in the Cochrane Central Register of Controlled Trials, was carried out on February 2019 using an ad hoc created search string by two independent and calibrated reviewers. All randomized controlled trials comparing a combination of EMD and autogenous bone graft with the EMD alone for the treatment of periodontal intrabony defects were included. Studies involving other graft materials were excluded. The requested follow-up was at least 6 months. There was not restriction on age or number of patients. Standard difference in means between test and control groups and the relative forest plots were calculated for clinical attachment level gain (CALgain), probing depth reduction (PD), and gingival recession increase (RECinc).

Results: Three RCTs reporting on 79 patients and 98 intrabony defects were selected for the analysis. Statistical heterogeneity was detected as high in the analysis of PDred and RECinc (p=0.001 I^2=85.28%; p=0.022 I^2=73.95%, respectively), whereas it was detected as low in the analysis of CALgain (p=0.086 I^2=59.30%). Standard difference in means (SDM) for CAL gain between test and control groups amounted to -0.27 mm (95% CI -0.77 – 0.09. p=0.12). SDM for PDred amounted to 0.19 mm (95% CI -0.69 – 1.07. p=0.67). SDM for RECinc amounted to 0.12 mm (95% CI -0.30 – 0.55. p=0.57).
Conclusion: Within their limits, the obtained results indicate that the combination of enamel matrix derivative and autogenous bone graft may result in non significant additional clinical improvements in terms of CAL gain, PDred and RECinc compared with those obtained with EMD alone. Several factors, including the surgical protocol used (e.g. supracrestal soft tissue preservation techniques), could have affected the limited additional effect of the combined approach. Further well-designed randomized controlled trials, with well-defined selection criteria and operative protocols, are needed to draw more definite conclusions.

Full-mouth ultrasonic debridement: magnetostrictive vs piezoelectric device for the treatment of stage I/II periodontitis. A randomized clinical trial

G. Pettinari, F. Buoni, R. Mirra, L. D'Arienzo, A. Zambito, M. Ferrari, N. Discepoli

University of Siena, Italy. Department of Medical Biotechnologies

Aim: Professional sub-gingival mechanical biofilm removal is a mandatory phase of the whole periodontal treatment plan. Ultrasonic debridement approaches are currently widely used to accomplish this latter clinical step. Magnetostrictive and Piezoelectric devices indeed, are described in the literature as being reliable, ergonomic and safe to help the clinician to obtain reduction in Bop (Bleeding on probing) and pocket closure (Probing pocket depth less than 5mm). Patient centered outcomes (PCO) are variables obtained by means of specific psychometric tools. Information's gathered from clinical and patient centred outcomes, allow a more comprehensive evaluation of the efficacy and effectiveness of a treatment. Nevertheless few evidences are available in the literature about a direct comparison on the efficiency of this two devices for the treatment of periodontitis. The aim of the present study was to compare the effect of two different full-mouth ultrasonic debridement devices (magnetostrictive vs piezoelectric) in terms of clinical and patient centred outcomes, in a cohort of stage I/II periodontitis patients.
Methods: Patients considered eligible were consecutively included according to inclusion criteria (18 years minimum, 20 vital teeth minimum, good health conditions, stage I/II periodontitis). A 1 to 1 randomization list was originated and individuals were allocated in two different groups accordingly. Test group underwent a comprehensive non surgical periodontal treatment by magnetostrictive device and control group by piezoelectric. Two different skilled operator performed all the clinical sessions. At every time points (baseline, 1 week, 3 months) both clinical (PPD, CAL, REC, FMBS, FMPS) and psychometric variables (cold sensitivity, noise, vibration and discomfort levels during debridement by a VAS scale and patient's related outcomes by OHIP 14 questionnaire) were recorded. At 2 weeks and 1 month motivation and oral hygene instruction were provided. Data were collected and variables analyzed according to their mean and SD; differences were compared (Anova, Mann-Whitney and Student's t test) and considered statistically significant with $p<0.05$.
Results: Groups were balanced for the clinical variables at baseline. At 3 months no significant intergroups differences could be detected for any clinical parameters; intragroup FMPS, FMBS and PPD decreased statistically in both experimental groups. The evaluation of the discomfort during the active phase of treatment measured by VAS scale didn't revealed any differences between the two groups, albeit a tendency toward higher values were detected for the piezoelectric device. Measurement of patient's quality of life (OHIP 14) after active treatment improved statistically in both groups.
Conclusion: With the limitation of the current investigation (ongoing study), the different full-mouth ultrasonic debridement approach (magnetostrictive vs piezoelectric) seems to obtain similar clinical results after full-mouth approach. The evaluation of the discomfort felt by patients suggest a better feedback when magnetostrictive device was applied.

Role of vasoconstrictor in the early wound healing of palatal tissues: an histological study

Andrea Punzo, Andrea Scassa, Mariana Rojas, Andrea Pilloni

Section of Periodontics, Department of Oral and Maxillofacial Sciences, "Sapienza" University of Rome, Rome, Italy

Aim: The wound healing is an extremely complex process. It has been observed that oral wounds mechanisms present special features. In fact, mucosal wounds demonstrated accelerated healing compared to

cutaneous wounds. The cellular response after wound is early, showing the first and greatest changes at 12-24 hours post injury. The early wound healing in oral mucosa and gingiva was evaluated in a recent study. The results showed that the healing in oral mucosa is characterized by partially fibrotic outcome during repair. In addition, the activation of an autophagy process determined an increase in the myofibroblast differentiation and collagen deposition justifying its scar outcome. However, the excisional wounds in the palatal tissue have been reported with a different response compared to other oral mucosal tissues. Since the early wound healing of the palatal tissue has not been evaluated yet, the aim of this preliminary study is to describe the histological characteristics of the palatal mucosa 24 hours after injury.

Methods: Seven healthy adults were selected from a pool of patients referred to the Section of Periodontics, Department of Oral and Maxillofacial Sciences, "Sapienza" University of Rome. All the patients required a mucogingival surgical procedure.

- Surgical procedure and sample collection:

All the grafts were taken from the area between the canine and the second premolar. After the anesthesia (articaine 4% with adrenaline 1:100.000), de-epithelialized free gingival grafts were obtained accordingly the technique reported by Zucchelli et al.: Twenty-four hours after surgery, previous anesthesia (articaine 4% with adrenaline 1:100.000), the biopsies were obtained from the vertical mesial incision with a 2 mm diameter punch.

- Histologic processing and sample analysis:

The samples were processed. Sections of 4 µm thick were prepared and stained with haematoxylin-eosin. All the sections were examined with a microscope (Nikon Eclipse E1200). Digital JPEG images were obtained and a descriptive histological analysis were performed.

Results: Clinically, the healing patterns of the palatal wounds did not present post-surgical complications.

The most notable feature of all the samples was the necrobiosis -collagen degeneration- observed in the lamina propria. This process was also noted in the epithelial tissue in two samples. The necrobiosis was often associated with sparse chronic inflammatory infiltrate perivascular and intercollagenic, consisting of small lymphocytes and sometimes plasma cells.

Fibroblasts presented a starred activated "atypical" appearance (reactive hyperchromatic enlarged nucleus). Also, the endothelial cells of the capillaries showed a swollen reactive aspect.

Conclusion: The histological analysis evidenced the necrobiosis process, which refers to the initial degeneration of the collagen that precedes the necrosis usually caused by hypoxia/ischemia. Since that the anesthetic vasoconstrictor has an ischemic and hypoxic effect, within the limitations of the present preliminary study, it could be suggested that the type of anesthetic could cause the necrobiosis of the tissues. This may be clinically relevant since a connective tissue graft with these characteristics placed in the recipient site could have a higher risk of necrosis. Further studies on the effects of an anesthetic without vasoconstrictor in the early wound healing of the palatal mucosa wounds can be addressed.

Single gingival recessions and non-carious cervical lesions: combined restorative-periodontal treatment. a randomized clinical trial

C. Razzolini[1], L. Mone[1], G. Pettinari[1], A. Zambito[1], G. M. Fadda[2], M. Ferrari[2], N. Discepoli[1]

[1]Department of Medical Biotechnology, University of Siena, Unit of Periodontology.
[2]Department of Medical Biotechnology, University of Siena.

Aim: In literature there are no studies that evaluate the effectiveness of root covering procedures by comparing the technique of coronally advanced flap alone (CAF) with the combination of CAF procedure plus Connective Tissue Graft (CAF + CTG), in sites presenting a combined defect (single recession + non-carious cervical lesion). The aim of the present randomized clinical trial is to evaluate the impact of these surgical procedures on the future complete root coverage (CRC) of a combined defect. Secondary outcomes will be to identify the residual root surface (after conservative treatment) as a prognostic factor for complete recession coverage and assessment of patient-centered outcomes (PCO) through psychometric tests (OHIP 14, VAS scales) before and after the two applied surgical techniques.

Methods: The eligible patients were included according to the inclusion criteria and exclusion criteria of the present study. The clinical parameters and the patient-centered outcomes were recorded at baseline. The first part of the treatment consists in predetermining the position of the cement enamel junction (CEJ), so as to position the composite restoration up to that line. Following conservative treatment, each patient was assigned a surgical treatment using a randomization system. Patients assigned to the control group underwent the CAF procedure, whereas the CAF + CTG procedure was performed on the patients in the test group. The parameters assessed at baseline were re-registered at one and two week and at three and six months follow-up.

Results: 15 patients were evaluated, out of which 5 were excluded (2 did not meet the inclusion criteria, 3 refused to participate in the study). The eligible patients were 10; of these patients 5 reached 6 months of follow up (3 subjected to CAF + CTG, 2

subjected to CAF), the other patients are performing the previous follow up. The results were evaluated by performing a descriptive analysis. In both cases clinical and aesthetic improvements were obtained. At the six months follow-up the CAF procedure is better in terms of complete root coverage than CAF + CTG (CRC= 33,3% for CAF + CTG, CRC= 50% for CAF; p<0,05). Moreover, the procedure that use Connective Tissue Graft associated with CAF determines worse results in terms of discomfort perceived by the patient. Finally, the presence of a residual surface of the cervical lesion after the restorative treatment did not affect the prognosis of either of the two root covering techniques.
Conclusions: Taking into account the limits of the study, such as the reduced sample size and the short post-surgical follow-up period, we can assert that the combined restorative-periodontal approach for the treatment of single gingival recessions associated with non-carious cervical lesions is demonstrated be a valid procedure to obtain complete root coverage. The results could change because the study is still in progress.

Topic doxicyclin application in vertical bony defects in non surgical periodontal therapy

Matteo Sangiorgi

Bologna University, Department of Biomedical and Neuromotor Sciences, via San Vitale 59, 40125 Bologna

Aim: The aim of this case series was to evaluate the effectiveness of local antibiotic agents based on 14% doxycycline (Ligosan®, Kulzer GmbH) applied in the bottom of a periodontal pocket during non-surgical therapy in a group of patients with periodontal disease and vertical bony defects. The addition of doxycycline has the rationale of lowering the local bacterial load, bringing the gingival tissues to the day of surgery with no inflammation and bleeding on probing and minimizing the recession of the supracrestal tissue. On one hand this guarantees better regenerative potential for surgery thanks to easier flap management and suture and stability of the blood clot, on the other hand it allows to reach more satisfying aesthetic results. The amount of supracrestal soft tissue could be reduced when some gingival recession occurs at the level of the interdental papilla after cause-related therapy and root planing in particular. From a surgical point of view the presence/quality of facial keratinized tissue is a critical factor inflencing the outcome of the procedure because loss of supracrestal soft tissue and facial keratinized tissue before the surgery could jeopradize the predicatbility of the regenerative surgical procedure.
Methods: We treated 20 patients with periodontal disease with one vertical bony defect with a periodontal pocket > 5mm and infrabony component of 3mm or more mesured on a radiograph. We mesured bleeding on probing (Bop), probing pocket depht (PPD), and clinical atachment level (CAL) on the most deep site of the defect. A different approach during the cause related therapy was performed in the area with the vertical bony defect and in the rest of the mouth. The goal of cause-related therapy in the area of the intrabony defects was to get rid of inflammation and to minimize the recession of the interdental and facial soft tissues. Superficial inflammation is eliminated by supragingival plaque control (plaque index = 0 in the surgical area). Deep infammation (BOP) is controlled by eliminating subgingival plaque and calculus deposits by means of ultrasonic devices. An ultrasonic point "A" subgingivally for 4mm only, then the "P" point from 4 to 7mm, and the "PS" point from 7 to 11mm subgingivally. The use of curettes is avoided not to create an unintentional curettage to the soft tissue during instrumentation. The adjunctive use of Doxicilina 14% (Ligosan®, Heraeus Kulzer GmbH, Hanau, Germania) was locally applied in the bottom of the pocket until the antibiotic comes out of the pocket, then eliminating the excesses. The patient returned a week later for a second application of local antibiotic. 4 weeks after completing cause-related therapy we mesured again the clinical parameters (Bop,PPD,CAL) and the regenerative surgery in the surgical area and was performed only if complete elimination of BOP was achieved.
Results: Initial parametres were PPD 8,3±1,1mm; CAL 9,1 ±1,2mm; REC 0,8 ±0,3 mm; BOP% 100%. 4 weeks after the second application PPD 5,5±1,3mm; CAL 6,9 ±1,4mm; REC 1,4 ±0,5 mm;BOP 60%. PPD reduction 2,8±2,4REC increase 0,6±0,8mm with 40% of the sites with no BOP.
Conclusions: This gentle ultrasonic debridment approach combined with the application of 14% topical doxycycline, carried through a matrix of biodegradable co-polymers crosslinked with polylactic-polyalic acid, has shown its efficacy by improving clinical indices such as probing depth and bleeding on probing, minimizing interdental recession of supracestal tissue. A surgical approach following this first phase remains necessary in many cases to achieve optimal clinical results, but the drug-mechanical approach appears as a new and interesting possibility for the control of periodontal infection during non-surgical therapy and maximize the potential of regenerative periodontal surgery.

Treatment of multiple gingival recessions in the lower incisors

Martina Stefanini[1], Matteo Sangiorgi[2], Giovanni Zucchelli[3]

Bologna University, Bologna, Italy

[1]DDS Ph.D. Researcher
[2]DDS Ph.D. Bologna University
[3]DDS Ph.D. Associate professor

Aim: The aim of this clinical case is to describe the 5 years outcomes of a novel surgical technique for the treatment of multiple gingival recession affecting lower incisors.
Methods: A 37 years old lady was referred to the Department of Biomedical and Neuromotor Sciences of Bologna University, Bologna, Italy, for periodontal screening. Her chief complaint was the unesthetic length of the teeth. The patient was systemically healthy, no smoker and her medical history revealed no systemic contraindications for dental treatment. Clinical examination revealed very good oral hygiene (8% FMPS) and the presence of multiple gingival recession affecting teeth #42, #31 and #32. The aim of the treatment was to obtain complete root coverage and to increase soft tissue thickness in all included teeth to reduce the risk of recession recurrence. Moreover, the aim was to solve the patient chief complaint and obtain along with CRC a pleasant esthetic outcome. The surgical procedure consisted of a modification of the coronally advanced flap (CAF) + connective tissue graft (CTG) from right lateral incisor to left lateral incisor. The design of the flap consisted of the following incisions:
-horizontal beveled incisions (3mm in length), mesial and distal each recession defects located at a distance from the tip of the anatomical papillae equal to the depth of the recession plus 1 mm.

-two beveled obliques, slightly divergent incisions starting at the end of the most mesial and the most distal horizontal incisions and extending into the alveolar mucosa. The resulting flap was elevated with a split–full–split approach in the coronal-apical direction. Coronal mobilization of the flap was considered "adequate" when the marginal portion of the flap was able to passively reach a level coronal to the CEJ of the tooth with the recession defect. Coronal mobilization of the flap was obtained by means of two incisions, one deep to detach labial submucosal tissue (LST) from the periosteum and one superficial to separate the LST from the inner surface of the alveolar mucosa. The LST isolated, by the two incisions, was removed to give the CAF a vertical dimension and close adaptation of the alveolar bone and root surfaces. A free gingival graft was harvested and after de-epithelialization was sutured at the base of the de-epithelialized anatomic papillae with single interrupted sutures. Interrupted sutures, anchored at the periosteum at the most apical extension of the vertical releasing incisions are crucial to obtaining the right flap adaptation; then, it proceeded coronally with other interrupted sutures, each of them directed, from the flap to the adjacent buccal soft tissue, in the apical-coronal direction. This was done to facilitate the coronal displacement of the flap and to reduce the tension on the last coronal sling sutures. The final tightened sling sutures permitted to stabilize the surgical papillae over the inter-dental connective tissue bed and allowed for a precise adaptation of the flap margin over the underlying convexity of the crown.
Results: At 1 year the patient showed a complete root coverage in all treated gingival recessions. She was very satisfied with the final esthetic result. An increase in soft tissue thickness was obtained, along with a deepening of the vestibulum depth. The results were well maintained up to the 5 years follow up visit.
Conclusion: The presented novel surgical technique consisting of a CAF with LST removal + CTG can be successfully applied to the treatment of RT1 multiple gingival recessions affecting the lower incisors.

Correlation between periodontal disease and esofageaus acalasia

E. Talocci[1], E. Brauner[1], M. Jedlinski[1,2], V. Talocci[1], F. De Angelis[1], S. Di Carlo[1]

[1]Sapienza University of Rome, Department of Oral and Maxillo-Facial Sciences
[2]Erasmus Student, Pomeranian Medical University in Szczecin

Aim: The aim of the study was to correlate esophageal achalasia, a rare autoimmune disease that affects the motor neurons of the esophagus, with periodontal disease. Esophageal Achalasia is a disabling disorder for the patient due to the strong and sudden retrosternal pain associated with the inability to swallow solid and / or liquid foods normally. To solve problem it is necessary that the patients undergo surgical treatments such as Heller myotomy, pneumatic dilation, etc. Some patients suffer also from gastroesophageal reflux. The study was conducted in the first half of 2018, and based on the administration of 13 questionnaires completed by anonymous patients and the visit of 5 patients. The patients were recruited on a voluntary basis through the Italian association AMAE Onlus (Associazione Malati Acalasia Esofagea).
The administered questionnaire was aimed to investigate among others: gingival bleeding, gingival pain, dentinal sensitivity, halitosis, habits of oral homecare, smoking, xerostomia, dental caries, last tartar removal (scaling), feeling of discomfort in relation to one's oral health. Furthermore, there was a part of the questionnaire designed to frame the patient in connection with esophageal achalasia. Signs and symptoms of periodontal disease have been found in all patients who made a visit. There were following inclusion criteria in screening: adult patients with esophageal achalasia for at least 5 years, who is capable to collaborate.
Methods: The research was based on following

procedures: intra and extraoral examination, taking and evaluation an x-ray panoramic photo, completing the periodontal survey, tartar removal, providing personalized oral hygiene instructions.
Results: The majority of patients interviewed (62%) suffer from gingival bleeding and dentinal hypersensitivity (53%), 47% halitosis. All the examined patients show absence of caries and high levels of gingival inflammation with periodontal pockets (PPD≥4). Although the small group of the patients, we must underline that these correlations are statistically relevant and can be exclusively correlated to esophageal achalasia. However, it is necessary to extend the study to more patients with esophageal achalasia in order to obtain more reliable data and to study the differences in the oral cavity in patients before and after surgery.
Conclusion: Considering the limits of a research based on small numbers, it still seems reasonable to assert that there is a correlation between esophageal achalasia and periodontal disease.
* Incidence: 0.6 / 1 per 100,000 per year.

Lateral periodontal cyst: differential diagnosis and histopathological analysis of a case with 5-year postoperative follow-up

Filippo Vezzoni, Matteo Corana, Giacomo Collivasone, Dario Collivasone, Franco Vezzoni

Department of Clinical-Surgical Diagnostic and Pediatric Sciences, School of Dentistry, University of Pavia, Pavia, Italy

Aim: The aim of this study is to report a case of lateral periodontal cyst, describing its clinical, radiological and histopathological features. The lateral periodontal cyst is an unusual lesion classified as a developmental odontogenic cyst, representing about 0.7% of the jawbone cysts. The etiopathogenesis is controversial but the most accepted theory is that the lesion originates from the dental lamina.
Methods: A 53 year old male patient presented with a gingival swelling of 3-4 mm in diameter between the mandibular right canine and the first premolar. Thermal tests demonstrated pulp vitality of the adjacent teeth. Periodontal probing was performed to exclude any inflammatory lesion of periodontal origin. The periapical radiograph of the site revealed a round, unilocular, well-circumscribed, radiolucent area of approximately 4 mm in diameter. An initial diagnosis of lateral periodontal cyst was made. During the next session a full-thickness flap was elevated and the cyst came out from the intraosseous cavity maintaining the connection with the flap. The lesion was carefully separated and the histological analysis was performed.
Results: The histological analysis confirmed the initial diagnosis of lateral periodontal cyst: the cystic lesion was lined by squamous epithelium of 1-3 cells layers showing focal thickenings or plaques. Glycogen-rich clear-cells were found. The external connective layer showed areas of bleeding without inflammatory cells. The healing process of the surgical site was revalued 3, 6 and 12 months after surgery. The latest clinical and radiographic evaluation was performed 5 years after surgical enucleation and no relapse was detected.
Conclusion: Various lesions should be considered in differential diagnosis of lateral periodontal cyst: gingival cyst, lateral radicular cyst, periodontal inflammatory cyst, botryoid odontogenic cyst, keratocystic odontogenic tumor, glandular odontogenic cyst, pseudocysts and others odontogenic tumors. The histopathological analysis is mandatory to confirm the initial diagnosis of lateral periodontal cyst. The thin, non-keratinized epithelium is composed by 1 to 5 layers of squamous or cubical cells, with focal thickenings or plaques. Glycogen-rich clear-cells could be found in plaques as well as in the inner layers of the epithelium. The outer connective capsule consists of collagen fibrous tissue, without inflammatory cells. The histological analysis of the lesion described in this report matches the above listed characteristics.

Altered passive eruption: treatment modalities and clinical results

Emanuele Vaia, Michele Nicolò, Alessandra Valletta, Mariangela Cernera

Federico II University - Naples, Italy, Unità Operativa Complessa di Odontoiatria - Director: Prof. Sandro Rengo, Department of Periodontology: Prof. Michele Nicolò

Aim: The term Altered Passive Eruption (APE) refers to a clinical condition observed after the physiological stage of dentition, characterized by an incomplete apical migration of the gingival margin occurring at the end of the active eruption of the tooth into the oral cavity. The consequence of this phenomenon is the formation of gingival pseudopockets and the presence of short clinical crowns. It may be associated with excessive gingival display, known as "gummy smile", perceived as impairing the aesthetics of the smile. To correct this clinical condition several procedures of periodontal resective surgery are available which allow the achievement of ideal outcomes in a simple, predictable and minimally invasive way. The aim of this paper is to illustrate some of these surgical techniques with their respective indications and to assess the clinical results obtained.
Methods: 3 clinical cases are reported which, although characterized by the same clinical condition, were treated with different surgical techniques, in relation to the specific anatomic features of each case. In

the first case a 16-year old female patient presented a reduction of the clinical crowns of anterior teeth on both arches and the coronal insertion of the upper labial frenulum. Periodontal probing showed pseudopockets sized approximately 3mm, from tooth 1.5 to tooth 2.5. An upper labial frenulotomy was performed to prevent having the frenulum inserted in proximity of the gingival margin at the end of the healing period. External bevel gingivectomy-gingivoplasty was performed to remove the pseudopockets and the gingival tissue in excess. The second case, an 18-year old female patient, presented with a similar clinical condition associated to a markedly gummy smile. In this case a gingivectomy-gingivoplasty with internal bevel in order to reduce pain, achieve better haemostasis and shorten the healing time was performed together with an upper labial frenulotomy. The third case concerns a 24-year old patient who, in addition to APE and a "gummy smile", presented alveolar exostoses and asymmetry of the gingival festooning on the anterior teeth of both arches. In this case a mucoperiosteal flap was elevated via a paramarginal primary incision and an osteoplasty was performed to remove the alveolar exostoses and restore the physiological morphology of the bone.

Results: In all the cases reported the treatment succeeded in removing of the pseudopockets, restoring a pleasant aesthetics of the clinical crowns with the gingival margins at the level of the CEJ, and a physiological gingival sulcus. Clinical healing was uneventful, predictable and rapid. The long-term follow-up demonstrated that the outcome was maintained over time.

Conclusion: Altered passive eruption (APE) implies the presence of pseudopockets and small teeth, with an altered relation between length and width, and, in some patients, the display of a gummy smile. Sometimes a marginal inflammation can be caused by too difficult access for home dental hygiene.

In all the cases reported, a resective periodontal surgery has considerably improved the aesthetic condition, restoring the ideal anatomy and allowing easier access for home oral hygiene.

Exposure of the clinical crown for prosthetic purposes: indications, operative procedures and clinical outcomes

Emanuele Vaia, Michele Nicolò, Giovanbattista Simeone, Vincenzo Lodato

Federico II University - Naples, Italy. Unità Operativa Complessa di Odontoiatria - Director: Prof. Sandro Rengo. Department of Periodontology: Prof. Michele Nicolò

Aim: A correct prosthetic treatment requires a sufficient amount of healthy dental tissue where the clinician can position the preparatory lines without invading the periodontal " biological dimension", no less than 2 mm of "ferrule effect" on the abutment teeth and enough occlusal space for prosthetic structures and the layering of aesthetic materials. Often the dental structures to be treated present subgingival carious lesions and a preliminary periodontal treatment is required to make the rehabilitation procedures possible. When the amount of keratinized gingiva is inadequate and it is necessary to expose the healthy dental tissue, an apically positioned flap is the best indicated surgical treatment. In this way the keratinized gingiva is moved apically, making it possible to perform the necessary bone surgery. Often this procedure is the prerequisite for a correct prosthetic technique and the respect of the gingival tissues.

Methods: A cervical location of the carious lesions in prosthetic abutment teeth could invade the biological space of the periodontal tissues. In such cases a correct prosthetic rehabilitation requires an apical repositioning of the gingival margin and the deep periodontium with exposure of the healthy dental tissue. To this purpose, several techniques may be used, and the selection is made taking into account a number of factors, including the amount of keratinized gingiva, the aesthetic relevance of the involved tooth, the apical location of the prosthetic preparation line, the need to ensure an adequate "ferrule effect", the position of the healthy cervical margin and of the reconstruction of the abutment tooth, and the need to ensure adequate space for the materials used. The two cases reported in this paper need a prosthetic retreatment including fixed crowns on previously treated teeth used as abutment teeth for an old fixed denture. In both cases, regardless of the anatomic region involved (anterior or posterior, it may be necessary to expose the healthy dental tissue via a pre-prosthetic apically positioned flap, with ostectomy and osteoplasty. The clinical healing and the aesthetic and functional outcome proves satisfactory in both cases.

Results: The rehabilitation of dental structures presenting subgingival carious infiltration can be achieved causing no damage to gingival tissues and the supracrestal tissue attachment thanks to an apically positioned, split or mixed thickness flap. Such an approach allows the clinician to use the most adequate surgical technique, achieve an accurate marginal seal between the prosthetic abutment teeth and the materials used and preserve the health of the periodontal tissues by means of a clinical outcome easy to clean and maintain over time.

Conclusion: The structures of infiltrated prosthetic abutments can establish anatomic relations with the marginal and/or deep periodontium. In many cases an adequate rehabilitation requires to apically reposition

the marginal and deep periodontal tissues, exposing the healthy tissue of the tooth. In such cases, periodontal surgery is the key to achieving a long-term, successful clinical outcome.

Bilaminar techniques for root coverage: Nelson's procedure. Surgical technique and 20 year follow up of a clinical case

Emanuele Vaia, Gregorio Tortora, Michele Nicolò

Federico II University - Naples, Italy. Unità Operativa Complessa di Odontoiatria - Director: Prof. Sandro Rengo. Department of Periodontology: Prof. Michele Nicolò

Aim: The treatment of gingival recessions in areas of high aesthetic concern is a great challenge for a periodontologist, who is confronted with the need to obtain a full and predictable coverage of the exposed root surface in the oral cavity while ensuring predictable outcome, minimally invasive approach, a limited number of surgical procedures and a long-term stable outcome. To date, bilaminar techniques are generally considered the most reliable solution, as the Italian School has significantly contributed to demonstrate. In the bilaminar approach, a free connective tissue graft is harvested from the palate to cover the denuded root surface and is then overlaid with a mucoperiosteal flap. One of the first clinicians who proposed a similar procedure was S.W. Nelson who in 1987 suggested, in case of multiple recessions, the use of a laterally positioned pedicle flap combined with a bipapillary pedicle flap to cover a free connective tissue graft and, for single recessions, a bipapillary pedicle flap to cover the graft. The aim of this paper is to offer a detailed documentation of the surgical steps required in Nelson's technique for single recessions to cover the root of tooth 1.1. in a young female patient, the clinical outcome achieved and its 20 year follow-up.
Methods: A young female patient about 30 years old has come to the Periodontology Department of our University demanding the treatment of a gingival recession on tooth 1.1. that caused significant aesthetic problems and psychological difficulty in her personal relations. The patient was periodontally healthy and although presenting gingival recessions on other teeth, it was only the recession on tooth 1.1., which, being visible, resulted in serious relational problems and required a coverage procedure. Interproximal probing showed a good state of health, the CEJ was intact while the exposed root surface appeared abraded. The recession was identified as Miller's class I. The decision was to perform Nelson's bilaminar reconstructive flap for single recessions: a connective tissue graft harvested from the homolateral palate was overlaid with a bipapillary flap. This paper describes the surgical stages, the clinical outcome with the full coverage of the root as well as the long-term follow up, first at 1 and 6 months and later at 1,2,5,10 and 20 years.
Results: Bilaminar procedures are the most predictable techniques for the treatment of gingival recessions. In addition, the case reported here showed a significant loss of dental tissue owing to the abrasion caused by incorrect brushing. The treatment included a bipapillary pedicle flap covering a free connective tissue graft, according to the technique proposed by Nelson in 1987. The full coverage remained stable in the long term, as documented by 20 years of regular monitoring.
Conclusion: In the treatment of gingival recessions in aesthetic regions, the complete root coverage is a desirable goal but it is not always achievable in the long term and with a predictable manner. The case reported here documents the application of one of the first technique proposed (Nelson, 1987) to achieve and maintain full coverage and clinical outcome after 20 years.

Lateral periodontal cyst: diagnosis and treatment

Emanuele Vaia, Michele Nicolò, Mariangela Cernera

Federico II University - Naples, Italy. Unità Operativa Complessa di Odontoiatria - Director: Prof. Sandro Rengo. Department of Periodontology: Prof. Michele Nicolò

Aim: A lateral periodontal cyst (LPC) is a non-inflammatory, benign, odontogenic cyst, originated from a disembryogenic growth of epithelial cells embedded in the periodontal space in-between the fibres of the periodontal ligament. It is a very rare form of odontogenic cyst (prevalence 0.2-0.6%), typically developing between the forth and the sixth decade of life. Usually it is located in the mandibular premolar region, laterally to a dental root and extended into the alveolar bone with a unilocular appearance. Sometimes it can erode the cortical plate and protrude underneath soft tissues in the form of a red-bluish tumefaction, with smooth surface and soft consistency that makes it easily identifiable in the oral cavity. Occasionally, due to its asymptomatic nature, it is discovered during a radiographic examination carried out for other purposes.
Differential diagnosis includes gingival cyst, botryoid cyst, keratocyst, and radicular inflammatory cyst. Gingival cysts are not radiolucent, botryoid cysts are multilocular, keratocysts typically displace dental roots and cause root resorption, while radicular inflammatory cysts are associated to pulpal necrosis and/or inadequate root treatment.
The aim of this paper is to illustrate a treatment of CPL via its thorough enucleation and a careful revision of

the area. The result was a complete healing and no long-term relapses.

Methods: A 50-year-old female patient presented with a circular, bluish tumefaction, over 1 cm in size, mesial to the root of tooth 4.4, fixed on the underlying planes. Teeth 4.4. and 4.3 showed no periodontal disease and responded positively to vitality testing. The radiographic examination showed a radiolucent, unilocular, ovoid area, with sclerotic radio opaque rim and no displacement or resorption of the adjacent teeth roots. The location, clinical features and radiographic findings suggested LPC as a suspected diagnosis. Following local anaesthesia, a mucosal incision was performed mesial to the swelling, with blunt separation of the alveolar mucosa from the cystic surface. Owing to the large dimension of the cyst the incision was extended distally, delineating a lozenge on the mucosal tissue. Since the cyst appeared to be closely adhering to the underlying planes, once identified a safe cleavage plane, the cyst was removed and the root surface of tooth 4.4, not covered by bone tissue, was exposed. In order to promote healing by secondary intention, avoid the radicular surface exposure or formation of fibrous laciniae, as well as to facilitate haemostasis and a faster healing, the exposed area was covered with a collagen matrix (Mucograft® – Geistlich). The escissional biopsy has been undergone to the histological examination which confirmed the initial diagnosis of LPC. Healing was achieved in 3 weeks, with epithelialization of the mucosa. Clinical and radiographic examinations at 2 months, 1 year and 6 years confirmed complete healing, absence of relapse and the mainteinance of the periodotal health of the tooth 4.4.

Results: The excision of LPC, combined with the mechanical treatment at the base of the implant around the periodontal space, facilitate healing and prevent relapses. In the case reported, the use of a collagen matrix allowed protection, better haemostasis and the absence of fibrous laciniae.

Conclusion: The enucleation of LPC entails the exposure of the radicular surface of the tooth involved. The mechanical instrumentation of the affected area is the key to a successful healing and the prevention of relapses.

"Alveolar ridge preservation" to salvage fixed prosthetic rehabilitations in case of extraction of non-strategic abutments

Emanuele Vaia, Michele Nicolò, Carlo Rengo, Vincenzo Lodato

Federico II University - Naples, Italy. Unità Operativa Complessa di Odontoiatria - Director: Prof. Sandro Rengo. Department of Periodontology: Prof. Michele Nicolò

Aim: Numerous studies on animals and humans have proven that the "alveolar ridge preservation" (ARP) technique with a slow-resorbing deproteinized bovine bone material (DBBM) graft placed into the alveolar cavities during the extraction of a tooth can prevent or significantly reduce changes in the shape and volume of the edentulous bony crest in the post-extraction period. In this article we propose to apply the same strategy when a tooth used as a non-strategic abutment tooth for a fixed denture must be extracted in order to avoid the partial or total refabrication of the prosthesis or other types of replacement procedures.

Methods: The clinical outcome and the surgical procedure here described refer to two cases requiring the extraction of a tooth used as a non-strategic abutment tooth for a fixed porcelain-fused-to-metal (PFM) restoration. The loss of the compromised tooth might have resulted in functional and aesthetic issues for the female patients involved and have required more invasive, prolonged and expensive surgical and prosthetic procedures. Conversely, the ARP approach made it possible to avoid the replacement of the denture, to keep the previous clinical situation and to reduce the treatment time and cost. The first case concerns a 52-year old female patient, apparently in good health, who had previously received multiple complex dental treatments. Tooth 2.1, previously restored via a PFM crown included in a full-arch bridge, had been endodontically treated and an apicectomy had already been performed with a retrograde filling but was still extremely painful. In order to keep the existing restoration and avoid additional treatments, it was decided to perform a rizectomy of tooth 2.1 and a concomitant ARP with DBBM and collagen membrane (Bio-Gide® – Geistlich) and matrix (Mucograft® – Geistlich) in order to preserve the volume of the edentulous ridge and ensure adequate aesthetics, correct masticatory function and adequate morphology providing for an easy access for oral hygiene. The 1-year follow-up documented the successful outcome achieved.

The second case is a 68 year- old female patient, in good state of health, presenting a fixed prosthetic rehabilitation in porcelain fused to metal, supported by teeth number 1.7, 1.5 and 1.3, all of them endodontically treated. Unfortunately tooth 1.5 showed a vertical fracture which had caused a considerable bone resorption. The remake of the fixed denture would have required an advanced implant-supported rehabilitation due to the marked pneumatisation of the corresponding maxillary sinus. Conversely, an ARP approach in association with the root extraction following a rizectomy made it possible to salvage the existing prosthesis, as documented by the follow-up at 2 years.

Results: The cases here reported illustrate the possibility

to avoid the replacement of an existing fixed denture in case of loss of non-critical abutment teeth, with optimal results both aesthetically and functionally.
Conclusion: In order to preserve the correct morphology of the edentulous ridge underneath a fixed denture, the authors applied an ARP approach using DBBM as grafting material in concomitance with the extraction of the root a compromised tooth. In the authors' opinion, predictability of outcome, minimal invasiveness, reduction of treatment time and cost suggest the use of this technique as a possible strategy to prevent denture re-fabrication.

Oral Pathology

MRONJ in chemotherapy-naïve metastatic castration-resistant prostate cancer patients treated with bta and abiraterone acetate: a potentially severe disease.

A.Antonelli [1], D. Muraca [1], A.Turco[1], P.Biamonte [1], A. Giudice[1]

[1]School of Dentistry, Department of Health Sciences, Magna Graecia University of Catanzaro

Aim: Oral bisphosphonates and denosumab are nowadays the most common drugs used for the prevention and the treatment of skeletal-related events (SREs) in men affected by metastatic castration-resistant prostate cancer (mCRPC). In addition to these bone-targeted agents (BTA), patient's treatment could provide the use of enzalutamide, chemotherapy with cabazitaxel, radiotherapy with radio-223 and hormone therapy with Abiraterone acetate (AA) that primarily targets the tumour cells themselves. AA is a hormone therapy with a selective and irreversible inhibitory function of 17α-hydroxylase/C17,20-lyase (CYP17), which is required for androgen biosynthesis. AA decreases serum testosterone levels inhibiting CYP17 in the testicular, adrenal and prostatic tumor tissues. However, CYP17 inhibition results in increased mineralcorticoid production by the adrenal glands. For this reason AA is coadministered with low-dose of glucocorticoids, such as prednisone or prednisolone. Although there is insufficient prospective scientific evidence to allow a full understanding of the combination of BTA and hormone therapy, there is a notable risk of developing Medication-related osteonecrosis of the jaws (MRONJ). This report describes the development of advance and massive cases of MRONJ in patients affected by mCRPC treated with BTA and AA.

Method: In our report we considered a case series of nine patients affected by mCRPC with clear clinical signs of medication-related osteonecrosis of the jaw (MRONJ). All of the patients were subjected to bone target-therapy (bisphpsponate or RANKL inibithor) and were concurrently administered long-term Abiraterone Acetate and steroids.Of the nine patients, 8 patients were assigned to the third stage of MRONJ and 1 patient was assigned to the second stage. After clinical examination, including history, physical, and oral examinations, all patients performed an orthopantomogram and a computed tomography (CT) for a better identification of necrotic areas. In all cases the necrotic bone exposure was located in the posterior mandible area. Initially the patients were managed conservatively with antibiotic, professional dental hygiene and mouth rinse with nystatin and chlorhexidine 0.2%. Surgery was performed under local anaesthesia and protocol expected piezoelectric resection of all infected and necrotic bone. All bone samples were analyzed to identify any possible metastasis presence. Antibiotic therapy was carried out according to SIPMO protocol.Patients were followed up after 1, 2, 6 and 12 months for clinical and radiological examinations.

Result: At follow-up ending only in 3 patients was noted an improvement of MRONJ (from Stage 3 to Stage 2). Although initially the treatment resulted in an improvement of the clinical conditions, with a significant reduction of pain and swelling, none of the patients achieved a complete resolution of MRONJ. It was observed the persistence of necrotic bone areas in all patients. Radiographic imaging did not allow to detect the border between the necrotic and normal bone and sequestra of necrotic bone were occasionally evidenced to the CBCT.

Conclusion: Clinically, comorbidities of Abiraterone acetate with steroid use along with anti-resorptive drugs can cause osteonecrosis to occur sooner, be

more severe, and respond more slowly to the surgical and medical treatment. From the data gained from our clinical experience in patients affected by mCRPC with clear clinical signs of MRONJ we observed that concomitant use of AA with steroids and bisphpsponate or RANKL inibithor could lead to a massive MRONJ with indefinite margins, which does not resolve in spontaneous sequestra after medical treatment. The authors observed a more severe disease that is refractory to conventional surgical treatment.

Isolated mandibular neurofibroma leading to diagnosis of neurofibromatosis 1: a case report.

G. Antonucci[1], M.Carbone[1], L. Chiusa[2], P. Carcieri[1], D. Conrotto[1], R. Broccoletti[1]

[1]Department of Surgical Sciences, Oral Medicine Section, CIR Dental School, University of Turin, Turin.
[2]Pathology Unit, Città della Salute e della Scienza di Torino, University of Turin, Turin

Aim: Neurofibromatosis 1 (NF1), also known as von Recklinghausen disease, is an autosomal dominant genetic disorder, with a worldwide prevalence of 1/3500 individuals. Mutations of the NF-1 gene, located in the long arm of chromosome 17 (17q11.2) are responsible for the development of the disease, with 50% of the patients carrying a spontaneous mutation and no positive family history. The clinical pattern includes cafè-au-lat cutaneous macules, axillary and inguinal freckling, neurofibromas, and pigmented hamartomas of the iris, often addressed as Lisch nodules. Oral cavity can be affected as well, 72% to 92% of all cases showing oral manifestations, with dental abnormalities, gingival enlargement, and oral neurofibromas, mostly located in the tongue; it is estimated that 20 to 60% of oral neurofibromas are associated with neurofibromatosis, whereas oral neurofibromas are present in about 25% of neurofibromatosis patients. Aim of this paper is to describe a case of an underlying, mild form of NF-1 diagnosed through the identification of an isolated oral neurofibroma.
Methods: A 33-year-old male was referred to our Oral Medicine Section for evaluation of an asymptomatic gingival sessile nodule, undergoing a slow growth in the previous months. Intraoral examination showed a swelling in the gum of the right lower lateral incisor, measuring one centimeter in diameter, resilient on palpation with an intact surface epithelium. Texture, appearance, and location lead to a differential diagnosis of possible fibroma, peripheral ossifying fibroma, schwannoma or neurofibroma. An excisional biopsy was performed. Hematoxylin and eosin staining showed a spindle cell proliferation with moderate cellularity in a background of collagen fibrils. Features pointing towards a Schwannoma diagnosis were not observed as well as malignancy-associated findings (cytological atypia, mitotic figures or necrosis). Neoplastic cells were positive for S-100 by immunohistochemistry. These findings were consistent with a diagnosis of oral neurofibroma. When further interrogated, the patient revealed presence of some light brown pigmentations as well as "fleshy sessile masses" of few millimeters in diameter throughout the skin. A dermatologist counseling was promptly required: seven café-au-lait macules were detected, with a range in diameter between 0.5 to 7 cm, as well as few subcutaneous neurofibromas, although no axillary or inguinal freckling was detected. Ophthalmologist did not spot Lisch nodules; similarly, no worrisome signs were discovered after neurological evaluation and magnetic resonance imaging of the brain. Genetic counselling tested positive for NF-1 pathogenic variant c.7062+2T>C.
Result: The general clinical findings and the presence of an oral neurofibroma confirmed the diagnosis of Von Recklinghausen's disease (NF-1), which might have been caused by a spontaneous mutation, since no similar cases have been identified on patient's family.
Conclusion: Differential diagnosis for a solitary sessile gum lesion should also include oral neurofibroma. With such a hypothesis being confirmed histologically, the oral physician should then rule out the possibility of an unrecognized neurofibromatosis, through an appropriate recollection of anamnestic data regarding pigmentation, freckling or nodules of the skin, which sometimes can be ignored by the patient. Thus, the oral physician might play a pivotal role.

Principal adverse events due to everolimus therapy. A systematic review of the literature

C.Arena[1], V. C. A.Caponio[1], I.[1]Adipietro, M. Mascitti[2], A.Santarelli[2], V. Panzarella[3], G. Campisi[3], L. Lo Muzio[1]

[1]Department of Clinical and experimental medicine, University of Foggia, Foggia, Italy
[2]Department of Clinical Sciences, Polytechnic University of Marche, Ancona, Italy
[3]Department of Surgical Oncological and Oral Sciences, University of Palermo, Palermo, Italy

Aim: Although traditional cytotoxic chemotherapy remains the treatment of choice for many malignancies, targeted therapy is now a component of treatment for many types of cancer including breast, colorectal, lung and pancreatic cancers, as well as lymphoma, leukemia and multiple myeloma. Targeted

therapy exploit different kind of mechanisms of action; one of these is that of the signal transduction inhibitors. They act blocking molecules involved in signal transduction.The PI3K/Akt/mTOR signaling pathway has a pivotal role in cancer cell functions such as growth, proliferation, survival, and mortality. This kind of therapy is based on the fact that in certain malignancies, cells are stimulated to divide continuously without being pushed to do so by external growth signal. Unfortunately, targeted anti-cancer therapies can still cause significant toxicity to non-cancer cells. Rapamycin and its analogues are the first generation of mTOR inhibitors. The target of rapamycin (mTor in mammalian cells) is a 289-kDa serine/threonine protein kinase belonging to a bigger family of phosphatidyl-inositol 3-kinase (PI3K)-related kinase (PIKK).

Methods: A research on the online database PubMed was performed to answer the following question: "Which is the rate of incidence of the most common side effects in patients treated with everolimus?". The research was performed using a combination of free words and MESH terms: "everolimus" AND "side effects" OR "adverse events" OR "toxicities". Only studies fulfilling the following inclusion criteria were considered eligible for inclusion in this study: (i) performed on human subjects, (ii) reporting about the use of an mTOR inhibitor, (iii) written in the English language, and (iv) reporting about the incidence of side effects. Case reports and studies on animal model were excluded from this study. No restrictions were applied to the year of publication. For each study, the following record were extracted: author, year of publication, title, therapeutic protocol, number of patients enrolled, number of events recorded, and grade of the events recorded for each toxicity.

Results: Title and abstract of 912 potentially relevant studies were screened. 731 were excluded because they did not meet the inclusion criteria. Of these 84 were included for anemia, 50 for anorexia, 32 for asthenia, 117 for diarrhea, 103 for fatigue, 52 for hypercholesterolemia, 83 for hyperglycemia, 46 for leukopenia, 50 for pneumonitis, 32 for pruritus, 39 for pyrexia, 100 for rash, 79 for thrombocytopenia, 76 for vomiting. The majority of side effects turned out to be of grade 1-2.

Conclusion: This class of drugs is typically used for the treatment of solid tumors such as renal cell carcinoma, breast cancer, and pancreatic neuroendocrine tumors and for the treatment of tuberous sclerosis complex. The spectrum of adverse events related to this new class of oncology drugs is unique as compared with conventional anti-cancer chemotherapy. The most common adverse events are anemia, fatigue, hyperglycemia, hyperlipidemia, hematologic toxicities, pneumonitis, muco-cutaneous eruption, and stomatitis and skin rash are often reported as dose-limiting side effects. Results of the analysis of literature showed that the majority of side effects are of moderate grade while side effects provoked by conventional chemotherapy are of severe grade.

Salivary biomarkers for the detection of oral squamous cell carcinoma: review of the literature.

R. Franco[1], P. Bollero[3] , A. Coppola[1], N. Ranieri[1], F. Gianfreda[1], M. Asaro[1], M. Miranda[1], A. Barlattani jr.[2].

[1]UOSD Diagnosis Hygiene and Oral Prevention with Dental Day-Hospital, Polyclinic of Rome "Tor Vergata", Tome, Italy
[2]Department of Clinical Sciences and Tanslational Medicine, University of Rome "Tor Vergata"
[3]Department of Systems Medicine of the University of Rome "Tor Vergata"

Aim: Many studies on biomarkers have focused on the profiling and quantification of proteins or RNA molecules in saliva. Since the diseases investigated through salivary biomarkers are often systemic, it is of great interest to identify circulating protein or RNA molecules that can be originated from disease-relevant cells (such as tumor cells). The aim of the study was to evaluate the presence or absence of reliable salivary biomarkers for the diagnosis of oral squamous cell carcinoma.

Methods: The Authors performed a literature search, using literature reviews made by the Bank PUBMED data, over the period 2014-2019, on the role of salivary biomarkers in oral squamous cell carcinoma. Among the 10 reviews detected using the key words "oral squamous cell carcinoma (OSCC)" and "salivary markers", only 6 scientific reviews have been taken into consideration because of their pertinence.

Result: From a biochemical point of view, the most important constituents of saliva are proteins. Human saliva contains a plethora of substances which can provide useful information for the surveillance of general health and well-being, for the pathogenesis of certain diseases and for the oral cavity health. The complete analysis and identification of the human salivary proteome content is the first step towards the discovery of new salivary biomolecules which may denote health or disease. The studies of proteomics of human saliva aim to identify and characterize new peptides and proteins which manifest biological activity at a glandular level and / or in the presence of various pathological conditions. The review showed that the markers most involved in the diagnosis of OSCC are proteins: interleukins (8, 6, 1β), matrix metalloproteinase (MMP 2, 9), transforming growth factor (TGF-1), Ki67, cyclic D1, Cyfra 21.1, transferrin, α amylase, tumor necrosis factor (TNF-α) and catalase.

Studies by Mizukawa et al. reported that the OSCC can also be detected in their earlier stages through high levels of salivary peptides, such as defensin-1, compared with healthy controls. Furthermore Boyle et al. in their comparative study identified p53 mutations in 71% of saliva samples from patients with OSCC, using the plaque hybridization technique, demonstrating that there are also traces of DNA. Moreover, there are MicroRNAs (miRNAs) which are short RNA transcript. Their dysregulation affects cell growth, apoptosis, differentiation, motility, and immunity. Compared to mRNA, microRNA's are significant potential biomarkers for diagnosis of oral cancer because they can accurately differentiate even poorly differentiated carcinomas. These include miR-125a, miR-200a and miR-31.

Conclusions: Salivary biomarkers analysis for OSCC represents an important advance in diagnosis and it is a rapidly growing field within scientific research. The emergence of advanced molecular diagnostic techniques has led to the emergence of salivary biomarkers as a promising diagnostic and prognostic tool in OSCC. The use of saliva as a diagnostic medium is a non-invasive, painless and easier substitute to blood. Compared to it, it is more convenient for multisampling and safer for health care professionals. Salivary biomarkers can also be applied for detection of other types of cancer such as breast cancer, lung cancer, ovarian cancer and pancreatic cancer. More studies on salivary biomarkers may provide greater insight into various systemic diseases in human population.

Malignant salivary gland tumours: a review of 176 cases

Federico Badioli[1], Andrea Balercia[2], Khrystyna Zhurakivska[3], Carlo Caponio[3], Giuseppe Consorti[2], Paolo Balercia[2], Corrado Rubini[4], Andrea Santarelli[1]

[1]Department of Clinical Specialistic and Dental Sciences, Marche Polytechnic University, Ancona, Italy
[2]Maxillofaccial Complex Unit, "Ospedali Riuniti" Hospital of Ancona, Ancona, Italy
[3]Department of Clinical and Experimental Medicine, University of Foggia, Foggia, Italy
[4]Department of Biomedical Sciences and Public Health, Marche Polytechnic University, Ancona, Italy

Aim: Salivary gland tumours are relatively rare and comprise a diverse range of neoplasms; among these, malignant salivary gland tumours (MSGT) are considerably less common.

According to the 4th Edition of WHO Classification of Head and Neck Tumours, there are 31 different types of primary epithelial neoplasm, showing high histological variety and different biological behaviours. Overall, these tumours represent about the 3-6% of all head and neck malignancies, with an annual estimated global incidence of 0.4-13.5 per 100,000.

This study aims to retrospectively determine the relative frequency of MSGT in a tertiary referral centre for Head and Neck pathology in Italy.

Methods: The present retrospective study considered patients treated for MSGT from January 1990 to December 2017 in "Ospedali Riuniti" Hospital, Ancona, Italy. Data were retrieved and catalogued from clinical records and from the archive of the Institute of Pathology, Marche Polytechnic University, Italy. From each case, they were extrapolated the following information: age, sex, pathologic diagnosis, site distribution (Parotid gland, Submandibular gland, Sublingual/minor glands), relapses, and survival.

Results: Overall, 176 patients (95 males and 81 females, M:F ratio of 1.17:1) treated for MSGT constituted the sample of this study. Mean age of occurrence for MSGT was 62.1 ± 18.7 years, showing a mean size of 2.5 ± 1.5 cm. Regarding the localization, the parotid gland was the most common site (103 cases, 58.5%) followed by the sublingual/minor salivary glands (58 cases, 32.9%) and the submandibular gland (15 cases, 8.7%). The most frequent MSGTs were the adenoid cystic carcinoma (30 cases), the mucoepidermoid carcinoma (27 cases) and the polymorphous adenocarcinoma (26 cases), overall representing 30.1% of all MSGTs.

Most frequent MSGTs in the parotid gland were mucoepidermoid carcinoma (14 cases), acinic cell carcinoma (11 cases) and polymorphous adenocarcinoma (11 cases) while in the submandibular gland are adenoid cystic carcinoma (5 cases), mucoepidermoid carcinoma (4 cases) and squamous cell carcinoma (3 cases). In the sublingual/minor salivary glands were adenoid cystic carcinoma (18 cases), polymorphous adenocarcinoma (14 cases) and mucoepidermoid carcinoma (9 cases).

16 cases of these tumours were metastatic disease Some cases were metastasis (16 cases) and recurrence was present in 14 cases. The mean size of the tumours at the diagnosis ranged between 1 and 4.3 cm. Most deaths occurred due polymorphous adenocarcinoma (12 cases), adenoid cystic carcinoma (9 cases) and adenocarcinoma NOS (9 cases).

Regarding the prognosis, 14 cases showed recurrence. 62 patients dead due to MSGTs, mainly due to polymorphous adenocarcinoma, adenoid cystic carcinoma and adenocarcinoma NOS (12, 9, and 9 cases, respectively).

Conclusion: The present study has confirmed that some MSGTs have a predilection for certain sites and that the risk of malignant disease is greater at specific sites within the oral cavity.

Later neck metastasis of buccal posterior squamous cell carcinoma: a retrospective study on 39 patients focusing on histologic and clinical prognostic factors

G. Barile[1], F. Dell'Olio[1], A. Carrassi[1], A. Casorelli[1], L. Barulli[1], L. Limongelli[1], G. Favia[1]

[1]Complex Unit of Odontostomatology, DIM, Interdisciplinary Department of Medicine, Aldo Moro University of Bari, Italy

Aim: The 20% of all Italian cases of oral squamous cell carcinoma arises in buccal mucosa. The aim of this study is to describe diagnostic and therapeutic management, focusing on histological prognostic parameters, of stage 0, 1, 2 squamous cell carcinoma occurring on posterior 2/3 of buccal mucosa referred to the Complex Operating Unit of Odontostomatology of the "Aldo Moro" University of Bari between 2000 and 2016.
Methods: All patients underwent the same protocol of diagnosis and therapy: World Health Organization's 8-setps examination, application of toluidine blue and Lugol, high definition intra-oral ultrasonography to measure tumor depth, high definition ultrasonography of neck and MRI for pre-surgical staging. Micro-invasive laser excision of lesions was performed with intra-operative frozen sections of resection margins and definitive histological evaluation of prognostic factors (grading, invasion pattern, tumor depth, histological structures invaded by cancer, like muscles, vessels, nerves and salivary ducts). Follow-up was performed with clinical exam and ultrasonographical evaluation of neck's nodes. Then if pathologic nodes were detected patients underwent lymphadenectomy. Medical records were collected for each patient, focusing on clinical presentation, risk factors, diagnostic delay, and histologic prognostic factors.
Result: From 2000 to 2016, authors reported 39 cases of clinical stage 0, I, and II squamous cell carcinoma of posterior 2/3 of buccal mucosa (22 stage I and 17 stage II). Buccal cancer occurs frequently as a chronic ulcer (69%) associated to pain (80%), spontaneous bleeding (76%) and chronic local trauma (40%). Mean diagnostic delay was of 4 months and, even though some patients were referred after over 9 months from the onset of symptoms, early diagnosis occurred in 24% of cases. All cases were invasive cancers with a histologic tumor depth between 2 and 4 mm, with single cells infiltration pattern (90%) and high grade (75%). Muscles were invaded in 95% of cases, followed by vessels (42%), nerves (33%) and salivary ducts (17%). 12 patients (31%) underwent lymphadenectomy because of ultrasonographical reports and presented histologic lymph node metastases. The 5-year survival rate was 70%.
Conclusions: This study revealed that clinical stage I and II squamous cell carcinoma of posterior 2/3 of buccal mucosa have high percentages of lymph node metastases, more than same stage oral cancers located in different site as described in literature, because of insidious anatomy, presence of chronic trauma and elevated diagnostic delay. Presence of unfavourable histological prognostic parameters should be considered as highly predictive of occurrence of occult metastases and as a histologic indication to preventive lymphadenectomies in these patients. The efficacy of the management used in Complex Operating Unit of Odontostomatology of University of Bari is proved by the early detection of metastases and by the 5-year survival rate estimated to 70%.

The validity of panoramic radiograph as radiographic diagnostic method for elongated styloid process

Martina Barone[1], Giovanni Bruno[2], Alberto De Stefani[2], Giorgia Costa[1], Antonio Gracco[3], Edoardo Stellini[3]

[1]Undergraduate student, Department of Neuroscience, School of Dentistry, University of Padua, Italy
[2]DDS, Department of Neuroscience, School of Dentistry, University of Padua, Italy
[3]Professor, Department of Neuroscience, School of Dentistry, University of Padua, Italy

Aim: The styloid process is a cylindrical and sharp projection of the temporal bone located in front of the stylomastoid foramen and connected with the hyoid bone through the styloid ligament. It is a part of the splanchnocranium that derives from Reichert's cartilage of the second branchial arch. The normal length of the styloid process varies from 20 to 30 mm, and when it is longer than 30 mm, it is defined elongated styloid process. The styloid process elongation can represent an occasional finding during the analysis of X – ray exams, which can appear both as bilateral or unilateral elongation. In patients in which an elongated styloid process is associated with symptoms such as orofacial and neck pain during mouth opening, deglutition and head rotation, the condition is defined Eagle's syndrome. The aim of the present systematic review of the literature was to evaluate the validity of the panoramic radiograph as radiographic method for the diagnosis of elongated styloid process in the general population.
Methods: An electronic search of available articles about elongated styloid process was conducted on PubMed from October 2018 to December 2018. This led to find 559 eligible articles. Sequential screenings based on previously defined exclusion and inclusion

criteria were performed, after which eight studies were finally included for this systematic review. The main collected data from each included article were extracted and organized in a table.
Result: Data obtained from the analysis of the results reported by the authors of included articles were analyzed and described following a division into different topics. It emerged that the prevalence of elongated styloid process and the mean radiological length of the styloid process increased with the age. Most of the included studies also asserted that did not subsisted statistically significant correlation between elongated styloid process and the gender.
Conclusion: Panoramic radiograph can be defined as a useful radiographic exam for the diagnosis of elongated styloid process in general population, easy to perform and interpreter. In symptomatic patients, it can help in the differential diagnosis with other conditions associated to orofacial and neck pain.

Potential pitfalls in diagnosing diseases of neck and head. A case report of median rhomboid glossitis

R. Cardia*[1], A. Barresi*[2], G. Oteri*[2], M. Lentini*[1]

*[1]:Department of Human Pathology "Gaetano Barresi", University of Messina
*[2]:Department of Biomedical Science, Dentistry and Functional Morphological Images, University of Messina , Italy

Aim: Median rhomboid glossitis is a clinical variant of candida infection. Predisposing factors can be local or systemic; smoking, alone or in combination with other factors, is predominant. The rarity of this kind of lesion can represent an important diagnostic pitfall.
Methods: A 50-year-old woman was referred to the Oral Surgery Unit, School of Dentistry – University of Messina suffering from the presence, for an unknown length of time, of a lesion on the back of the tongue which caused difficulty in swallowing. An objective examination revealed a symmetric, erythematosus, elliptical-shaped lesion in front of the circumvallate papillae; on inspection, lymph nodes showed a bilateral adenopathy. The patient, in apparent good health, presented a negative history of systemic disease, but was a heavy smoker (20 cigarettes a day for 30 years). Results from laboratory tests were within normal parameters. An incisional biopsy was performed, followed by a microbiological test and a pharmacological therapy.
Results: The biopsy showed a squamous cell papillomatous hyperplasia of the mucosa with pseudoepitheliomatousfocal aspects, without changes of stratification or atypical, cytological aspects. A block of fungal hyphae, well documented by PAS positivity, with granulocyte exocytosis, was observed in the upper layers of the parakeratotic ephitelium. A mucormycosis, compatible with median rhomboid glossitis, was diagnosed. The microbiological test revealed the presence of candida with an etiological agent. The patient was subject to a systemic pharmacological treatment with Fluconazole (50 mg/day for 14 days) with an almost complete resolution of the lesion.
Conclusion: Median rhomboid glossitis is defined as a central atrophy of the papillae of the tongue and affects 0.01% - 1.0% of the population; it is typically located around the median line of the back of the tongue, in front of the circumvallate papillae. Once considered a growth anomaly, nowadays it represents a clinical variant of hyperplastic candidiasis. Smoking, alone or in combination with other factors, seems to be an important predisposing factor. Differential diagnosis includes erythroplasia, geographic tongue, cellule granular cell tumour and rare cases of squamous cell carcinoma. Knowledge of this rare lesion allows to assure patients about the harmless nature of this condition, which needs treatment only in symptomatic forms.

Use of a cord blood platelet gel with laser biostimulation in the therapy of patients with bullous epidermolysis

Lucia Basiglio, Paolo Giacomo Arduino, Adriana Cafaro, Francesco Erovigni, Alessandro Dell'Acqua, Stefano Carossa, Ezio Sindici

Aim: Evaluate the efficacy of the topic application of a cord blood derived gel (CBPG) followed by laser biostimulation in the treatment of blisters and ulcerations in patients affected by inherited epidermolysis bullosa.
Methods: Patients with EB and symptomatic oral lesions were selected between June and October 2015. The ethics review board of the "Azienda Ospedaliera Città della Salute e della Scienza of Turin", Turin, Italy, approved the study (protocol number 0089210_CS/585/09-2015). Participants with long-standing ulcerations were selected. Seven patients (4 males, 3 female) with EB were included. The mean age at baseline was 19.8 years (range 8–34). Nineteen oral lesions were treated; the buccal mucosa was the most common site (37%), followed by the lips (27%), tongue (21%), floor of the mouth (11%) and gingiva (4%). CB units not fulfilling the criteria for banking for transplant purposes were processed within 48 h of collection to obtain CBPG according to the "Italian Cord Blood Platelet Gel project" protocol. CBPG vas applied on blisters and ulcerations followed by laser

biostimulation in a 3-day treatment period (one application each day). Morphological changes of the lesions were measured with a 15-mm periodontal probe. The symptom score (for reporting pain) was recorded using a visual analogue scale (VAS); patients were requested to mark the scale at each visit, before and after the application. The primary outcome measures were lesions' size and pain; secondary outcome measure was adverse effects. All data were collected during the follow-up period (at 1 (T4), 4 (T5), 12 (T6) and 24 (T7) weeks after the end of the therapy).

Result: A statistically significant difference was observed for reported pain and clinical size of lesions from the first day of treatment provided. Statistical analysis was performed only until T4. At T5 and T6 no patients presented lesions in the treated area. During the followup period, at T7 only one patient developed a new lesion in the same treatment site; all patients continued to have other oral lesions at untreated sites. One of the patients after a 40 months follow-up period did not report new lesions in the treated area. All subjects were initially advised of the possible unpleasant taste of the medication, and 28% (2 patients) still reported this effect at the end of the follow-up period. No patient reported other adverse effects.

Conclusion: The study shows the effectiveness of CBPG and LLLT in reducing intraoral discomfort from ulcerations in patients with EB, being effective also in the long-term. It has been shown that CBPG releases high levels of vascular endothelial growth factor (VEGF) and plateletderived growth factor (PDGF), suggesting that CBPG might be useful where high levels of VEGF and PDGF may be desirable (e.g. mucosal and skin lesions). Wound healing and tissue repair are complex processes that involve different events; LLLT could effectively accelerate the healing of injured tissues, induce cell proliferation, and increase nucleic acid and collagen synthesis. We decided to add LLLT to the use of CPBG in order to possibly enhance its potential, by adding analgesic, regenerative and immunomodulatory effects.

Odontogenic follicular cysts: a case report

Battista MF, Leonardo P., Saporito I., Spinuzza P., Calvaruso C., Lo Forte V., Borzì F., Nucera R., Militi A., Portelli M.

Dept. of Biomedical Sciences, Dental Sciences and Morpho-functional Imaging Dental School - Oral Pathology, University of Messina, Italy

Aim: Follicular cysts represent about the 17% of the odontogenic cysts, they developed around an included tooth and derived from enamel organ residues; cystic degeneration is induced by regressive phenomena, with an increase of fluid between the ephitelium of the enamel organ and the coronal enamel. Aim of the present study is to describe a clinical case of a mandibular cyst, treated with a combined approach both surgical, to remove the neoformation, and orthodontic in order to obtain the reposition of the included tooth involved in the cyst.

Methods: In this study authors present a clinical case of a 13-year-old patient affected by a follicular cysts that involves the teeht 3.6 and 3.7. In correspondence of them, the periodontal probing revealed the presence of a pocket of 12 mm. After an OPT radiograph a large osteolysis's area in the left mandibular molar region has been observed; the osteolitic lesion involved the crowns of the elements 3.6 and 3.7, which were respectively included in the distal and mesio version. After a careful evaluation of the case, the following treatment plan has been performed: avulsion of the 3.7, considering the impossibility of its repostion; removal of the adherent cystic wall portion to the 3.7; a marsupialization of the adherent cystic wall portion to 3.6; surgical-orthodontic recovery of 3.6. Before the surgical phase, a multibrackets orthodontic appliance has been bonded; an auxiliary element, usefull for the traction of the included 3.6, has been used. During surgery at the level of 3.6, surgical button has been bonded and used for the application of a Ni-Ti coil-spring . An histological examination has been performed on the lesion removed. The report confirmed the follicular cysts diagnosis.

Result: The marsupialization of the cystic wall portion adhering to 3.6 allowed to reduce the endocyst pressure by reversing the osteoclastic process and allowing a progressive reduction of the cyst size until the total disappearance. In this way authors avoided any damage to the adjacent anatomical structures and performed the orthodontic recovery of the included element. The 30-day check confirmed the positive outcome of the surgery and the effectiveness of orthodontic traction of the included element, whose crown was erupted in the oral cavity by more than half and supported by an adequate band of adherent gingiva. The follow-up demonstrates the complete healing of the cyst wall portion adhering to the marsupialized 3.6. The controls also show the progressive repositioning in the arch of 3.6, which results in its own at the end of orthodontic treatment.

Conclusion: The proposed clinical case is a good example of a combination of the surgical technique of cystectomy and marsupialization, which allowed at the same time to eliminate the cystic neoformation and reposition in the arch the dental element 3.6, which has maintained a good support of adherent gingiva. The conservative attitude of the authors allowed to rehabilitate the masticatory function in the left mandibular molar region. A complete

recovery of masticatory capacity will be possible by the subsequent orthodontic repositioning of 3.8 in region of 3.7.

Isolation and characterization of mesenchimal stem cells from human minor salivary glands: a feasibility study

Bogdan Preda Magdalena Theodora, Katia Rupel, Davide Porrelli, Giulia Ottaviani, Margherita Gobbo, Augusto Poropat, Matteo Biasotto

Oral Medicine and Pathology, Department of Medicine, Surgery and Health Sciences, University of Trieste, Italy

Aim: Salivary gland hypofunction or xerostomia is a common finding that occurs in several pathological conditions such as oral neoplasm treated with head and neck radiation, Sjogren's syndrome, diabetes and other metabolic diseases, drug administration for systemic conditions. Salivary flow has some fundamental properties such as tooth remineralization, digestion tasting and oral pH buffering. It was already proved how reduced salivary flow impacts negatively on oral health and quality of life because it effects the ability of swallowing, speaking, chewing and relates with oral infections and the development of dental caries. The purpose of this preliminary study is to isolate and characterize mesenchimal stem cells obtained from human minor salivary glands of the lip in order to be able in the future to rehabilitate the salivary gland's normal function with a regenerative therapy approach.
Methods: After obtaining an informed consent from the patients, human minor salivary glands were surgically hrvested from the lower lip during biopsy procedures for Sjogren's syndrome investigation. The minor salivary glands were put in a Petri dish under fume extraction plant and the cell culture establishment was assessed using the enzymatic method that consist in 1mL of Collagenase I and 1mL of Dispase in 2mL of sterile PBS solution with antibiotics. The minor salivary glands were delicately cut into small pieces using surgical instruments and the solution was incubated for 45 minutes at 37°C with 5% of CO2. The digested suspension was put in a 15mL Falcon tube with 3mL of DMEM formulation and centrifuged at 800 rpm for 5 minutes. The supernatant was taken, the pellet was suspended in a flask with growth medium and 100 microL of L-ascorbic acid and incubated at 37°C with 5% of CO2. The medium chance was performed every 4 days until the cells reach confluence. Then the cells were treated with PBS, BSA 0,5% and EDTA 0,5 mM and fixed with PFA 1%. The flow cytometric analysis was performed to determine the composition of the cell population considering the following mesenchimal stem cells markers: CD73, CD29, CD105, CD14, CD34, CD45 and IgG1.
Result: The population of this cell culture consist in spindle – shaped, fibroblastoid like cells expressing stem cells markers CD73, CD29, CD105, CD14, CD34, CD45 and IgG1.
Conclusion: Mesenchimal stem cells obtained from human minor salivary glands were successfully isolated and characterized. Further investigation is needed in order to be able to create self renewal and differentiation in multilineage organoids that can be transplanted as human salisphere – derived cells to restore normal production of saliva and to improve patient's quality of life.

Therapeutic considerations of ozonized oral gel in the chronic stomatitis. Preliminary results

M. Bosotti, M. Rossi, M. Porrini, V. Candotto, L. Rey, E. Bossi, S. Marino, F. Spadari

Department of Biological, Surgical and Dental Sciences – University of Milan – Unit of Oral Pathology and Medicine-Maxillo-Facial and Odontostomatology Unit-Ospedale Maggiore Policlinico, Fondazione IRCCS Cà Granda Milano, Italy

Aim: Oral Lichen Planus (OLP-LP) is a chronic disease that can affect the skin and any lining mucosa. Overall, LP affects approximately 2% of the population. Although the disorder may occur in all age groups and women over the age 50 years are most commonly affected. OLP can appear in the oral cavity in several different patterns. The reticular pattern is commonly found on the cheeks as lacy web-like, white threads that are slightly raised. The erosive (atrophic) pattern can affect any mucosal surface, including the cheeks, tongue, and gums. This form often appears bright red due to the loss of the top layer of the mucosa in the affected area. In most instances, individuals with erosive LP are uncomfortable when eating and drinking, particularly with extremes of temperature, acidic, coarse, or spicy foods. Topical steroids associated with systemic or topical antimycotic have proven to provide the greatest benefits, but have secondary side effects and cannot be used for long periods. In recent years there has been an increase in the use of Ozone therapies in medicine and oral therapies. These local treatments, have no side effects and is well tolerated and effective.
Methods: The aim of this preliminary monocentric clinical study was to evaluate the efficacy of a topical ozonized oral gel in the OLP. The clinical study involved the exclusive use of topical drug: the Ozoral®Oral Gel, based on sunflower seed oil ozonized at 15% (Innovares, Italy). Twenty patients were selected with clinical and histopathological diagnosis

of OLP. About the parameters for clinical evaluations, were considered a topographic classification of the oral lesions by Pinboonniyom et al. and a severity classification proposed by Thongprason in 1992. All the patients were instructed to apply the ozonized oral gel twice a day. The gel had to remain in the mouth for at least 60 seconds. The therapeutic program considered four weeks of local therapy, with checks every seven days (T0,T1,T2,T3,T4). After fifteen days of suspension of local therapies, the patients were further clinically controlled.The symptoms expressed by the patient are evaluated by using the one-dimensional VAS, NRS and VRS scales and the SF-McGill-Pain Questionaire multidimensional scale of pain. Two verbal scales assess the degree of relief and the patient's level of satisfaction.

Results: The first data collected by this preliminary monocentric clinical study, shows that the Ozoral Gel initially caused a discomfort to the patients (about 22%), due to its organoleptic characteristics (taste, smell and consistency). This initial discomfort resolved in all patients after a few applications. Most of the participants found an improvement in the pain symptomatology, already from the first applications of Ozoral Gel with decrease of verbal pain scales of about 32%. The clinical evaluation of the lesions proved a reduction of the local inflammation.

Conclusion: We can therefore say that our preliminary clinical and therapeutic protocol with Ozoral Oral Gel is still being analyzed and discussed about results obtained with only twenty patients (14 female, 6 male).Furthermore, a numerical increase of the patients and a careful and precise selection of oral inflammatory lesions, will allow us to analyze the actual therapeutic potential of topical medical Ozone. In this regard, topical ozone with no side effects or adverse local reactions could be considered a valid therapeutic alternative to topical steroids.

Osteonecrosis of the jaws (onj) in osteoporotic patients: comparison of stage according to aaoms and sipmo-sicmf staging systems in two italian centers

A. Gambino[1], I. Bosso[1], F. Erovigni[1], M. Cabras[1], P. Carcieri[1], L. Benzi[2], A. Fasciolo[3], V. Fusco[4]

[1]Department of Surgical Sciences, Oral Medicine Section, CIR Dental School, University of Turin, Italy
[2]Radiology Unit, Azienda Ospedaliera Alessandria
[3]Maxillofacial Unit and ONJ Multidisciplinary Team, Azienda Ospedaliera Alessandria, Italy
[4]Oncology Unit and ONJ Multidisciplinary Team, Azienda Ospedaliera Alessandria, Italy

Aim: Osteonecrosis of the Jaws (ONJ), or Medication-Related ONJ (MRONJ), in osteoporosis patients has been defined as rare, but the number of reported cases is increasing. Controversies on ONJ definition induce underestimation of ONJ incidence and/or diagnosis delay. The definition of the American Association Oral Maxillofacial Surgery (AAOMS) task force is based on clinical features), whereas the Italian proposal, supported by Società Italiana Patologia Medicina Orale (SIPMO) and Società Italiana Chirurgia Maxillofacciale (SICMF), imply the use of imaging tools (mainly Computed Tomography, CT) together with clinical features. These definition differences are important in order to make earlier diagnosis and improve treatment effectiveness, implying also different ONJ stage systems.

Aim: The aim of this study is to compare the stage of ONJ cases at the first observation time in patients receiving antiresorptive therapy (bisphosphonates, denosumab) for metabolic bone diseases, according to two different staging systems (AAOMS and SIPMO-SICMF).

Methods: We reviewed data for patients with osteoporosis and other non-malignant disease (Rheumatoid Arthritis-RA, Paget's disease, etc) treated with bisphosphonates and /or denosumab with signs of ONJ. Cases were observed at two northern Italy centers: the hospital ONJ Multidisciplinary Team, in Alessandria, and the City of Health and Science – CIR Dental School, University of Turin. Collected data were: age, sex, date of first ONJ manifestation, baseline disease, type of antiresorptive treatment(s), ONJ site(s), and staging according to both AAOMS and SIPMO –SICMF systems.

Result: We collected data about 66 patients: 3 M/63 F; mean age 72.4 years; 57 patients with osteoporosis, 5 with RA. The AAOMS stage was 0/1/2/3 respectively in 7/14/30/15 cases. The SIPMO-SICMF stage was IA/IB/IIA/IIB/III respectively in 11/5/8/27/15 cases. The 7 AAOMS stage 0 cases (without bone exposure) were reclassified as stage IA (2 cases) IIA(1 cases), IIB (1 case), III (3 cases) respectively, according to the Italian system. Out of 14 AAOMS stage 1 (exposed bone, asymptomatic at the observation time) cases, 9 were reclassified as stage IA, 2 as stage IB, 2 as stage IIA, and 1 as stage IIB. The 30 AAOMS stage 2 (exposed bone, with pain or purulent discharge) cases were so reclassified: 3 as IB, 5 as IIA, 22 as IIB. The 15 AAOMS stage 3 (advanced/complicated) cases were all classified as stage III according to the Italian system.

Conclusion: There is no unique ONJ definition and staging system, even if the AAOMS one is mostly reported. In our hands, even in ONJ cases in osteoporotic patients (often incorrectly reported as cases mostly with limited and not severe disease), the AAOMS definition and staging system are insufficient, exposing patients to delayed diagnosis.

It would be advisable to establish the diagnosis not only on the basis of the clinical data but also on the findings of the CT scan, since the latter technique offers greater information on the extent and severity of the disorder.

Concurrent mandibular bone metastasis and MRONJ in a prostate cancer patient

Lia Giordano[1], Martin Giorgio Campolongo[1], Matteo Miegge[1], Gianluca Gesualdo[1], Matteo Val[1,2], Monica Pentenero[1,2]

[1]Oral Surgery Specialty School, Department of Oncology, San Luigi Gonzaga University Hospital - Orbassano, University of Turin, Italy
[2]Oral Medicine and Oral Oncology Unit, Department of Oncology, San Luigi Gonzaga University Hospital - Orbassano, University of Turin, Italy

Aim: Prostate cancer is the most frequent cancer affecting males over 50 years old in Italy. Almost 70-80% of patients develop metastases mainly affecting bone, particularly ribs, vertebrae and pelvis. Distant metastases at oral tissues are observed in 1% of patient and most often they involve mandibular bone (61%). We describe one case of mandibular metastases from prostate adenocarcinoma, whose clinical and imaging features were at first suggestive for medication-related osteonecrosis of the jaws (MRONJ).
Case report: In December 2017, a 87 years old male was referred to our department for a dental evaluation. He was suffering from a Stage IV prostate adenocarcinoma diagnosed in 2004. Because of bone metastases at pelvis, coccyx and femur he was on anti-resorptive treatment with zoledronate since 2015.
At oral examination he has asymptomatic residual dental roots of 4.7, 4.4 and 4.3 and on panoramic x-ray assessment a radiopaque are was observed anteriorly to 4.7. Due to the absence of symptoms or clear signs of acute/chronic infection and due to the anti-resorptive treatment, no extractions were performed and the patient entered a clinical follow-up program. In July 2018, the patient was referred us by his dentists for the presence of a non-healing wound after removal of a bone sequestrum from the left mandible. In the absence of bone exposition or signs of infection a medical treatment with topical Chlorexidine gel and systemic pentoxifylline and tocopherol was set. Due to lack of clinical improvement and the subsequent onset of suppuration with bone exposition in the left and right mandible, antibiotics were prescribed and bilateral mandibular marginectomy was scheduled.
In December 2018 the intervention was performed; on surgery tissue consistent with necrotic bone and soft lardaceous tissue were removed from both the molar and canine right mandibular region. On histopathological assessments, such tissue was found to be consistent with distant metastases from prostate adenocarcinoma.
Actually the patient is in follow up, the oncologist has decided not to make changes in patient therapy.
Discussion: The posterior mandibular region is a preferential site for bone metastases, because of the presence of red bone narrowfavoring homing, survival and proliferation of metastatic cells. Swelling, pain, and numb chin syndrome are the most common clinical features of mandibular metastases, while radiopaque or a mixed image are the most common radiographic feature. Less frequently metastases may appear at imaging as radiolucent zones and sometimes they completely lack any evidence at imaging. In the present case, a pre-surgical diagnosis of MRONJ was made more accurate thanks to pathological examination of the excision specimen. A pre-surgical pathological assessment is not routinely indicated in the suspect of MRONJ. Nevertheless, evidences from the present case highlight that when surgery is performed a pathological assessment is mandatory in order to confirm the diagnosis.
Conclusion: To the best of our knowledge, this is the first case described in literature of concurrent prostate bone metastasis and MRONJ. Mandibular metastases could be confused with osteonecrosis or non-specific imaging alterations. Pre-surgical clinical and imaging evaluations bring to a provisional diagnosis which has to be confirmed through pathological assessment.

Ozone insufflation and l-prf application in an idiopathic and recurrent case of osteonecrosis of the maxilla

F. Canepa[1], R. Mauceri[1,3], A. Santarelli[4], L. Lo Muzio[2], G. Oteri[3], C. Del Gaizo[1], V. Panzarella[1], O. Di Fede[1], G. Campisi[1].

[1]DiChirOnS, University of Palermo, Palermo, Italy
[2]Department of Clinical and Experimental Medicine, University of Foggia, Foggia, Italy
[3]Department BIOMORF, University of Messina, Messina, Italy
[4]Department of Clinical Specialistic and Dental Sciences, Marche Polytechnic University, Ancona, Italy

Aim: In the last years, Osteonecrosis of the jaw (ONJ) has received much attention due to it development subsequently after the administration of anti-resorptive and anti-angiogenetic medication. However, there are other several uncommon causes of ONJ, such as: trauma, infections, neoplasia, nutritional, vascular, immunological, radiation, iatrogenic or idiopathic causes.
Methods: We report a case of idiopathic and recurrent ONJ in a healthy female patient treated with a

combination of surgery, ozone and L-PRF.
Result: A 68-year-old healthy female, with no relevant medical and social history, was referred to our sector of Oral Medicine (University Hospital Policlinico "P. Giaccone" of Palermo, Italy) with a chief complaint of two months ulcerated and suppurating asymptomatic lesion in the posterior right maxilla. Extra-oral examination revealed no swelling, tenderness or regional lymphadenopathy. Intra-oral examination revealed 1 cm mucosa ulceration in the edentulous alveolar ridge in the area of the previous extraction of tooth 1.6, done 18 months before. Teeth 1.5 and 1.7 were mobile. Computerized tomography (CT) showed erosion of the cortical bone in the edentulous area of tooth 1.6. Due to the suspicious lesion, an incisional biopsy was made. Histological examination revealed a non-specific inflammation with presence of severe dysplasia in the ulcerative area. Patient was referred to our Plastic Surgery Department for the complete surgical excision of the lesion; however, another non-specific inflammatory histological result was obtained with evidence of necrotic area from the surrounding bone. After three months, patient presented an acute infectious process associated with suppuration and pain on the post-surgical area. Teeth 1.5 and 1.7 were painful and mobile. Antibiotic therapy and a CT scan were prescribed; the new imaging showed an oral-sinus communication. After the extraction of the teeth involved and removal of the necrotic bone with a piezosurgery device, an insufflation of ozone was performed in the area and L-PRF membranes were applied. Non-steroid anti-inflammatory drugs and chlorhexidine, were recommended. Ten days after, the wound closure was obtained. The new histological examinations of bone specimens showed non-specific inflammation with no evidence of malignancy, moreover, there were no signs of infection to indicate osteomyelitis. A diagnosis of ischemic osteonecrosis of the maxilla was made by exclusion. After six months, patient underwent a follow up visit and the lesion was completely healed.
Conclusion: In the present case, the previous dental extraction may represented a risk factor in the pathogenesis of ONJ even if the patient was healthy with no underlying pathology that might predispose to infarction of small blood vessels. In addition, necrosis of the maxilla is really rare because it has a richer blood supply in comparison to the mandible and it is protected from ischaemic insults. Usually, in these cases, symptoms are not specific because mucosal ulceration and related osteonecrosis are generally associated with low to moderate chronic pain; imaging is helpful late in its evolution. In absence of a clear sequestration, the removal of the necrotic area is usually the treatment of choice. In our case report, up to date, the second stage surgery, combined with ozone insufflation and L-PRF membranes application, showed a successful outcome in a demanding case of recurrent idiopathic ONJ.

Differential diagnosis of diffused oral mucosal pigmented lesion: a case of Dubreuilh's melanosis

O. Di Fede[1], F. Canepa[1], M. Mascitti[3], M. Giuliani[2], P. Tozzo[1], R. Mauceri[1], V. Panzarella[1], G. Campisi[1].

[1]Department of Surgical, Oncological and Oral Sciences, University of Palermo, Palermo, Italy
[2]Department of Clinical and Experimental Medicine, University of Foggia, Foggia, Italy
[3]Department of Clinical Specialistic and Dental Sciences, Marche Polytechnic University, Ancona, Italy

Aim: Melanosis circumscripta praecancerosa of Dubreuilh is nowadays known as lentigo maligna (LM), it is a relatively uncommon lesion from which malignant melanoma frequently develops (30-40%). The aetiology is unknown; it has a female preponderance twice as often as males, especially after the V decade. LM usually develops on sun-exposed area: back of the hands, the face, the scalp and the neck; only exceptionally on the legs, feet or oral mucosae. Initially it is a small pinhead sized with irregular borders, dark brown sepia spot and its extension remains superficial. Dubreuilh observed an average period of ten years between the onset of the lesion and the development of malignant melanoma. The aim of this paper is to report a case of diffused oral mucosal pigmented lesions, diagnosed as a Dubreuilh's melanosis.
Methods: We report a case of a man who has attended our sector of Oral Medicine (University Hospital Policlinico "P. Giaccone" Palermo, Italy) since 2014, he has undergone multiples biopsies with confirmed diagnosis of LM.
Result: A 67-year-old caucasian male was referred to our sector of Oral Medicine (University Hospital Policlinico "P. Giaccone" of Palermo, Italy) with a chief complaint of a three months asymptomatic pigmented lesions in the lower lip. His past medical history revealed autoimmune atrophic gastritis with secondary pernicious anaemia. On intra-oral examination, two flat brownish lesions localized in the lower lip were observed. The patient's informed consent was obtained and a incisional biopsies were made of both lesions. The histopathological examination confirmed the presence of a pigmented area characterized by elastosis and atrophic derma with the presence of melanophages and focal atypical lentiginous melanocytic hyperplasia. Indeed, diagnosis of Dubreuilh's melanosis was done. During the follow-up period, two new pigmented

lesions arisen on the tip of the tongue and on the hard palate; new incisional biopsies were done. The following histopathological exams confirmed the previous diagnosis and excluded the presence of any atypia in the basal layer melanocytes. Patient underwent regular follow-up appointment every three months; at the latest appointment, after five years, LM's lesions were stable.

Conclusion: Diagnosis of pigmented lesions of the oral cavity is challenging and histopathological evaluation are usually needed, in order to exclude oral malignancy. The location, number, type, infiltration, colour, homogeneity and extension of the oral pigmented lesions as well as the other mucous membranes and skin, are fundamental to help the clinician in formulating a differential diagnosis. Indeed, a thorough investigation of dental, medical, family and social histories, is also necessary. From a histological point of view, the differential diagnoses to consider with LM are benign lesions (e.g. solar lentigo, melanocytic nevus) and oral malignant melanoma. As reported in this case report, regular follow up appointment are fundamentals in order to monitor and prevent any possible development in malignant melanoma, due to its poor prognosis.

Bioinformatics analysis of TP53 gene in head and neck squamous cell carcinoma patients from the cancer genome atlas

V. C. A. Caponio[1], K. Zhurakivska[1], C. Arena[1], M. Mascitti[2], A. Santarelli[2], R. Mauceri[3], G. Campisi[3], L. Lo Muzio[1]

[1]Department of Clinical and Experimental Medicine, University of Foggia, Foggia, Italy
[2]Department of Clinical Specialistic and Dental Sciences, Marche Polytechnic University, Ancona, Italy
[3]Department of Surgical, Oncological and Oral Sciences, University of Palermo, Palermo, Italy

Aim: TP53 is composed of 393-residue protein; it is encoded by a gene, which is localized on the chromosome 17p13.1. It is involved in different cellular functions such as apoptosis, differentiation and cell-cycle control. From different studies, TP53 gene alterations were reported to be frequent in many human cancers, for example ranging from 89 to 94.9% in serous ovarian cancers and in endometrial carcinoma. In particular, different studies analysis showed how differential mutational profiles of tp53 gene could influence the prognosis in different kind of tumors, for example TP53 mutations have emerged has independent predictor of survival in CD20+ lymphomas. Same results have also been reported in hepatocellular carcinoma, acute myeloid leukemia, clear cell renal cell carcinoma (RCC), and thymoma. TP53 has also emerged as a mark in therapy targeting specific p53 variants. Head and neck squamous cell carcinoma (HNSCC) is the sixth most common cancer and is characterized by a biologically highly diverse group of tumors. Mucosal surfaces of the oral cavity, oropharynx and larynx are involved in around 90% of HNSCCs. Aim of this study was to investigate the mutational landscape of TP53 in HNSCC, correlating such features with clinical variables. In order to perform this analysis, we used a bioinformatics approach by analyzing data from The Cancer Genome Atlas (TCGA) database, aiming to give new suggestions for clinical application, towards a personalized medicine care point of view.

Methods: Different platforms can be used to download data from TCGA database. Data for mRNA expression profile of TP53 were download from Xena Browser, in addition to the mutational profile, such as the type of mutation affecting TP53. Clinical and follow-up data were downloaded from Data Commons GDC Data Portal. According to the mutational profile, patients were divided as wild-type (WT) and mutated (MUT). According to the median mRNA expression, patients were also classified as lower or higher expression for p53.

Result: No difference in survival emerged between low and high mRNA expression. Meanwhile, interesting result came from the analysis of survival in patients with and without the mutation, such as WT or MUT. In particular, mutated patients reported a worst prognosis and specifically, mutated TP53 gene resulted to be an independent prognostic factor in HNSCC.

Conclusion: Results from our study reveal that p53 could be useful prognostic marker in the management of patients and could be a promising target for future treatment. In order to include these results in the clinical application, larger and well-standardized studies should be performed, including a large amount of patients.

A persistent and wide proliferative verrucous leukoplakia with HPV involvement: a case report

Letizia Carenzi, Alessandra Lissoni, Chiara Moreschi, Eugenia D'Innella, Giorgio Gastaldi, Silvio Abati

Università Vita-Salute San Raffaele - Dip. di Odontoiatria, Dental Clinic - IRCCS Ospedale San Raffaele - Milano, Italy

Aim: Proliferative verrucous leukoplakia (PVL) is a clinical entity described for the first time by Hansen et al. in 1985 as a modification of oral leukoplakia(OL). PVL is nowadays considered an aggressive form of OL, characterized by a slow-growth behavior and with a high risk for malignancy with a transformation rate that goes from 70 to 80%. Initially, the clinical appearance of PVL is a hyperkeratotic focal lesion, that over time spreads out becoming multi-focal with nodular and/or

verrucous features. PVL has a prevalence in the female population with a mean age in their seventh decade. The etiology and pathogenesis of PVL are nowadays still unclear, even if different studies suggest that human papillomavirus (HPV) might play a role in the onset of these lesions, in particular for genotype HPV-16 and HPV-18. The occurrence is mainly in never smokers and alcohol does not present any significant association as well. The treatment of choice for PVL lesions is mainly surgical excision and rigorous follow-up since they tend to recurrence. The aim of this report is to describe a case of a patient with a large PVL lesion affecting the buccal mucosa with koilocytotic infiltrates.

Case Report: A 72-years old never-smoking female patient with a medical history of neurologic disorders (essential tremor) and a previous history of breast cancer, was referred by the dermatologist for a consultation to the Oral Pathology and Medicine Unit of San Raffaele Hospital, Milan, for the assessment of a large lesion localized on the right side of the buccal mucosa. The first clinical evaluation showed a keratotic thickened and verrucous lesion, sized about 3 cm in length per 0,7 cm width, and with clear and well defined margins. It was painless but bothersome for its roughness. An incisional diagnostic biopsy was immediately performed. The histopathological diagnosis was proliferative verrucous leukoplakia with mild dysplasia. The patient then returned to the clinic after a month to complete the excision of the lesion. The excisional biopsy was performed and the pathologist diagnosed a verrucous/papillomatous keratotic hyperplasia with koilocytotic atypia. After the complete excision of the lesion, the patient had a perfect recovery, despite she was treated with blood thinners (clopidogrel and apixaban) for her neurologic and CVD conditions.

Conclusio: The presence of a koilocytotic alteration in the last histologic examination suggests the possibility of an HPV-infection as suggested by different authors. Although the role of the infection by human papillomavirus in the etiology of PVL is still unclear, this case report encourages researchers to further investigate the possible correlation between these conditions.

Oral manifestations of rare diseases in Sardinia: a descriptive analysis of the literature

S. Cherchi, M. Cabras, A. Gambino, D. Karimi, P. G. Arduino, R. Broccoletti.

Department of Surgical Sciences, Oral Medicine Section, CIR Dental School, University of Turin, Turin, Italy

Aim: In Sardinia, it is likely for dental practitioners to treat patients affected by rare diseases. Aim of the present work was to shine a light on prevalence and oral manifestations of the following diseases: diabetes mellitus type 1 (T1MD), thalassemia, Glucose-6-phosphate (G6PD) deficiency, multiple sclerosis (MS), lateral amyotrophic sclerosis (LAS), and cystic fibrosis (CF), since they can be commonly encountered in the everyday clinical practice.

Methods: A bibliographical research on PubMed was carried out, with the following strings: "diabetes mellitus type 1", "thalassemia", "Glucose-6-phosphate deficiency", "multiple sclerosis", "lateral amyotrophic sclerosis", "cystic fibrosis", each one combined with "oral medicine", "oral pathology", "oral cavity", "mouth" "teeth".

Result: T1MD, a metabolic disorder characterized by hyperglycaemia due to absolute insulin deficiency, has a staggering prevalence in Sardinia, with 40 new cases for each 100000 inhabitants, surpassed only by Finland, which detains the highest prevalence, worldwide. A part from the notorious association between diabetes and periodontitis, few studies focused the attention on T1MD and oral manifestations: oral ulcers and recurrent candidiasis seem to be the most frequent clinical entities among these patients. Thalassemia, a group of genetic disorders characterized by abnormal hemoglobin production, displays one of the highest incidences worldwide in Sardinia (12%), second only to Cyprus (14%). The main oral manifestations include gingival pigmentations and hyposalivation, due to iron deposition within the gums and salivary glands, higher risk of caries, and malocclusion. Sardinia detains one of the highest prevalence of G6PD deficiency (12.6%) in the Mediterranean area. An interesting study proposed a pathogenic link between G6PD deficiency with Osteonecrosis of the Jaws and Sjögren syndrome, due to depletion of reduced ascorbate, DHEA sulfate and sulfomucins. Furthermore, a significant association between G6PD deficiency and hand-foot-mouth disease was described in a large case-series of patients. Association between G6PD deficiency and maxillofacial dysmorphic disorders, such as Apert syndrome and hypohidrotic ectodermal dysplasia have been discussed in sporadic case-reports. With a prevalence of 150 cases for 100000 individuals, Sardinia holds the highest rates of MS in Italy, and one of the highest in Europe. In patients affected by this immune-mediated demyelinating disorder, the main oro-facial manifestations range from dysarthria, to temporomandibular joint disorders (TMJD), and trigeminal neuralgia. MS patients have an increased risk of caries and periodontitis, due to difficulties in maintaining domiciliary oral hygiene and drug-induced xerostomia. Similarly, Sardinia holds one of the highest prevalence rates of LAS in Italy (2.5/100000). This neurodegenerative disorder can even arise with TMJD or trigeminal neuralgia, leading to a diagnostic delay

of several months or years, as described in few case reports. Sialorrhea is a major issue in LAS patients, often treated with botulinum toxin or salivary gland irradiation. Cystic fibrosis, caused by autosomal recessive mutations of CFTR gene, carries an almost unique genetic spectrum in Sardinia. Among these patients, caries seems to occur more frequently, due to high calorie dietary regime, higher concentrations of Streptococcus Mutans within the oral flora, and depletion of sialic acid and thromboplastin in saliva.

Conclusions: Genetic homogeneity in Sardinia's inhabitants, caused by centuries of isolation, low immigration and expansion rates, concurs to explain the clustering of so many rare diseases, whose prevalence can reach staggering peaks. Oral physicians and dental hygienists across Sardinia should be aware of the oral manifestations of these diseases, and more often they should be included in the multidisciplinary teams assembled for the management of these particular patients.

Ultrasounds effects on osteosarcoma cell line (MG63) with double frequency and direction of sonication

C. Cianci[1,2], I. Adipietro[2], V. C. A. Caponio[2], M. Mascitti[3], A. Barlattani[3], F. Canepa[4], R. Mauceri[4], N.F. Testa[2]

[1]Department of Mechanical and Management Engineering, Polytechnic of Bari, Bari, Italy
[2]Department of Clinical and Experimental Medicine, University of Foggia, Foggia, Italy
[3]Department of Clinical Specialistic and Dental Sciences, Marche Polytechnic University, Ancona, Italy
[4]Department of Surgical, Oncological and Oral Sciences, University of Palermo, Palermo, Italy

Aim: Ultrasounds are widely used in clinical practice, mostly in the fields of medical therapy and research. This kind of technology may improve the speed up of wound and fractures healing and might turn out to be a useful tool in the treatment of cancer. However, poor is known about the direct effect of frequency or energy density of the ultrasounds upon the cell themselves. The aim of this study is to evaluate the effect of ultrasounds on the survival and morphology of osteosarcoma cell line (MG63) with two different frequency and direction of sonication.

Methods: Osteosarcoma cell line(MG63) was cultured in Dulbecco's modified Eagles medium (High Glucose) supplemented with 10% FBS (Fetal Bovine Serum),1% Penicillin/Streptomicin and 1% L-Glutamine. The cells were incubated at 37°C with 5% CO2 until 100% of confluence was achieved. Once reached confluence, cells were washed twice with Dulbecco's Phosphate Buffered Saline without magnesium salt and calcium. The effect of ultrasounds on osteosarcoma cell line was evaluated with different types of sonication: at 0,800 MHz and 1 MHz (up and down sonication). Subsequently cells were detached with trypsin/EDTA, spin-dry at 1200 rpm for 5 minutes and re-suspended in cell culture medium. The number of living cells was measured with a cell counter. We discriminate live cells and dead cells through mixing cell suspension with Trypan Blue stain 0.4% with the ratio 1:1.

Result: The sonication from above at a 0,8 MHz frequency showed a percentage of 90-93% of live cells and of 10-17% of dead cells; sonication at 1 MHz frequency showed a percentage of 84-90% live cells and a percentage of 10-16% dead cells. The sonication from below at a 0,8 MHz frequency showed a rate of 92-93% live cells and of 7-8% dead cells; sonication at 1MHz frequency showed a rate of 23-34% live cells and of 66-77% dead cells. Cellular morphology resulted to be modified, cells lost their characteristic shape and became more rounded.

Conclusion: The exposure to ultrasound generates a decrease in the number of osteosarcoma cells number treated with sonication compared to the untreated group and the results showed that MG-63 cell mortality rate tends to increase consistently with the sonication frequency.

Juvenile spongiotic gingivitis: an under-recognized lesion in the pediatric population (not only)

Marta Dani[1], Vittorio Maurino[1], Alessandro D'Aiuto[1], Giorgia Ottini[2], Fabio Croveri[1], Andrea Boggio[1], Lucia Tettamanti[1], Lorenzo Azzi[1].

[1]Department of Medicine and Surgery, University of Insubria ASST dei Sette Laghi, Dental Clinic, Unit of Oral Medicine, Varese, Italy.
[2]Department of Medicine and Surgery, University of Insubria ASST dei Sette Laghi, Unit of Pathological Anatomy, Varese, Italy

Aim: A 10 years old boy presented at the attention of the Oral Medicine Unit of the Dental Clinic at University of Insubria with an asymptomatic lesion, which he had since a month. The lesion had a diameter of 5 mm, it was on the adherent and marginal gum of element 2.1. It was papular, red-orange, smooth, sessile, not eroded, not ulcerated and, by a greatest magnification it was possible to observe a papillary plot. The patient had negative anamnesis. The endo oral radiography didn't show sign of periodontal pain, break or periapical osteolysis. At the clinical examination it was possible to observe over gum plaque deposit, with diffuse gingivitis associated and it was possible to observe red-orange slight erythema on the marginal gum of element 1.1. This case report describes diagnostic path

and therapy carried out in this situation.
Methods: Firstly, a professional dental hygiene was performed. After the procedure, it was observed the resolution of the gingivitis, but the papular lesion persisted without improvement or change. It has been decided upon surgical excision and following histologic exam. The differential diagnosis was between vascular epulis, squamous papilloma and foreign body granuloma.
Results: The histologic outcome was: gingivitis with hyperplasia and epithelial spongiosum. It was defined as diagnosis of "Juvenile Spongiotic Gingival Hyperplasia" or "Juvenile Spongiotic Gingivitis". The histological characteristics of this pathological entity shows not-keratinizing hyperplasia, elongated epithelial ridges and intraepithelial spongiosis. Moreover, at direct examination it presentsf as a single lesion, a papule with a diameter of some mm, bright red or orange colored, asymptomatic, smooth, not plaque-related. The diagnosis is confirmed by all those clinical aspects. The therapy is surgical, although there is a considerable risk of recurrence.
Conclusion: The Juvenile Spongiotic Gingivitis could be considered the oral counterpart of "Acute Spongiotic Dermatitis"; risk factors of the disease are unknown. The subjects affected by Juvenile Spongiotic Gingivitis are adolescent, but the disease could also affect people in the late youth; so we consider a range from 7 to 39 years. No correlations have been demonstrated between "Juvenile Spongiotic Gingivitis" and plaque deposits or hormonal changes, which are peculiar in childhood. The female sex is affected mostly. The lesions are often localized on the vestibular aspects of the maxillary gum and they can also involve the marginal gum. The clinical lesions, which characterized the Juvenile spongiotic gingivitis, could be single or multiple and are painless; only in the 20% bleeding of the lesions occurs during the dental hygiene (brushing teeth). The histopathology differs from puberty gingivitis as regards clinical presentation and the absence of responsiveness to dental hygiene.After the surgical removal, in this case, the patient had a relapse, which was removed again by surgery. The patient entered within a periodic follow-up.

Rare case of juvenile pemphigus vulgaris in a 13 years old male patient

G. Ghidini, M. De Filippis[1], M. Meleti, M. Manfredi, P. Vescovi.

[1]Oral Medicine and Oral Surgery Laser Unit, University Center of Dentistry, Department of Medicine and Surgery, University of Parma, Italy

Aim: Pemphigus vulgaris (PV) is a severe autoimmune disease, characterized by intraepithelial bullae and erosions involving the skin and mucosa. PV's type II hypersensitivity reaction process is mediated by pathogenic anti Desmoglein 1 and 3 antibodies leading to an inter-keratinocyte disjunction. PV is traditionally considered to be prevalent among the adult/elderly population. The onset occurs on average at 50-60 years, although childhood onset forms have been described they remain isolated cases rarely described in the literature.
Case report: Male patient, 13 years old, with no previous history of systemic diseases, presented with conjunctivitis and diffuse oral ulcers non-responding after ten days of medical treatment with Amoxicillin and Aciclovir. Patient chief complaint was oro-facial pain and difficulties feeding. Patient was hospitalized and underwent intravenous hydration; no alterations nor abnormalities were highlighted with chest and abdomen evaluations. Ophthalmologist prescribed three topic applications per day with Desametasone and antibiotics. First blood tests revealed: elevated VES value (37 mm/h), blood count with formula showed no alterations, antibodies ANA, ASCA, ANCA, TSH, tTG were negative, rheumatoid factor was negative and serology for Coxsackie virus, Mycoplasma, EBV, HSV1-2, Parvovirus B19 were negative. Patient presented with diffuse desquamative gingivitis, bilateral ulcers on cheek's mucosae and on tongue and ulcers in oropharynx's area. Positive Nikolsky's sign was demonstrated, suggesting a bullous pathology. Punch biopsy, as gold standard for diagnosis, and examination by direct immunofluorescent staining ELISA method were performed. Patient began treatment with Deltacortene 50 mg/day and Aziatoprina 50 mg/day associated with Lansoprazolo as gastroprotective immediately after oral biopsy. Blood test for anti-skin antibodies were also conducted.
Result: After blood tests: IgE resulted 1370.0 IU/mL, via IFA method ASA resulted positive and via ELISA method Ab anti-BP180 IgG resulted 74.1 (positive), Ab anti-Desmoglein 1 were 16.2 (negative) and Ab anti-Desmoglein 3 were 105.6 (positive). After direct immunofluorescent staining, the specimen collected intraorally showed intramucosal acantholytic detachment and IgG anti Desmoglein between intercellular spaces of keratincites were highlighted. Patient came to follow-up recalls with fewer symptoms but no complete remission. Immunosopressive therapy's doses were progressively reduced. Patient was instructed to brush teeth with soft-bristles toothbrush, he underwent professional scaling and root planing and given Aminogam gel, three to six applications per day. Last recall patient's ulcers and lesions were still not completely healed, new treatment plan with Rituximab was prescribed (2 intravenous infusion 15 days apart of 1000 mg).

Conclusion: The manifestation of PV in young patients classified as a rare event. The standard treatment for patients with pemphigus vulgaris has long consisted of high-dose glucocorticoids. Continuous monitoring of blood pressure, glycemia and ocular tone is needed during the whole glucocorticoids treatment's duration. Recently the therapeutic role of Rituximab (a monoclonal antibody that binds to the CD-20 antigen of B lymphocytes) in PV has been highlighted showing increasing evidence of successful outcomes. Rituximab can be an alternative in patients with recalcitrant or relapsing PV and in patients with contraindications to systemic corticosteroids. Recently, randomized clinical trials have shown that first-line use of rituximab combined with short-term prednisone regimen can be both more effective and potentially safer than a standard regimen of high doses of corticosteroids in patients with moderate to severe pemphigus.

Effectiveness of a spray containing 1% malic acid in patients with xerostomia induced by graft-versus-host disease

Mariacristina De Giuli DDS[1], Elena Bardellini AP DDS MS[1], Veneri Federica DDS[1], Alessandra Majorana FP, DDS, MS[1].

[1]Clinica Odontoiatrica, University of Brescia, Italy

Aim: Graft versus host disease (GVHD) is one of the most frequent and serious complications of hematopoietic stem cell transplantation.The chronic form is characterized by the involvement of several organs, including the oral cavity, which could represent the primary site of chronic GVHD (cGVHD). The prevalence of oral cGVHD ranges between 45-83. The specific or distinctive clinical oral features are oral lichenoid lesions, hyperkeratotic plaques, mucosal atrophy, erythema, ulcers, pseudomembranes, limited oral aperture secondary to sclerosis and, last but not least, xerostomia. Although no standard treatment guidelines are available, many treatment options exist for the management of xeros¬tomia and hypo-salivation, from topical agents to systemic therapies. Intraoral topical agents, being free of side effects, are among the most commonly recommended treatments for the management of xeros-tomia. Malic acid acts as a sour tasting gustatory stimulus. Its mechanism of action is linked to dissociation of H+ in malic acid in water, which becomes hydronium ions (H3O+); this action generates a stimulation of salivary secretion to dilute the concentration of acids in the oral cavity. Xylitol do not stimulate saliva but it reduces erosion and cariogenic potential.Thus, a spray containing malic acid with xylitol seems to be a safe topical sialogogue.
The aim of this study is to evaluate the clinical effectiveness of a topical sialogogue spray (malic acid, 1%) in the treatment of xerostomia in patients with chronic Graft versus Host Disease (cGVHD).
Methods: This study was designed as a randomized double-blind clinical study. Twenty-eight patients with cGVHD suffering from xerostomia were divided into 2 groups: the first group (14 patients) received a topical sialagogue spray containing malic acid 1% (SalivAktive®) whereas the second group (14 patients) received a placebo. Both groups received treatment for 2 weeks. Dry Mouth Questionnaire (DMQ) scores and unstimulated salivary flows rate were collected before and after treatment.
Results: DMQ scores increased significantly from 1.3 ± 0.4 to 3.5 ± 0.4 points ($p<0.05$) after two weeks of treatment with malic acid, whereas in the control group DMQ scores increased from 1.2 ± 0.7 points to 1.4 ± 0.6 ($p>0.05$). The unstimulated salivary flow rate in patients treated with malic acid increased significantly from 0.15 ± 0.06 mL/min to 0.24± 0.08 mL/min, while that of the patients treated with placebo went from 0.16 ± 0.07 mL/minto 0.17 ± 0.09 mL/min($p>0.05$)
Conclusions: According to the results of our study, the use of malic acid 1% spray as a salivary stimulant can be considered effective in the treatment of cGVHD induced xerostomia.

Oral Lichen Planus: a new experimental therapeutic protocol by means of oxygen-ozone mixture injection.

C. Del Gaizo[1], V. Panzarella[1], G. Giannatempo[2], L. Lo Russo[2], F. Canepa[1], R. Mauceri[1,3], G. Campisi[1], O. Di Fede[1].

[1]Sector of Oral Medicine, University of Palermo, Palermo, Italy
[2]Department of Clinical and Experimental Medicine, University of Foggia, Foggia, Italy
[3]Department of Biomedical and Dental Sciences and Morphofunctional Imaging, Section of Orthodontics, School of Dentistry, University of Messina, Messina, Italy.

Aim: Oral Lichen Planus (OLP) is a chronic inflammatory condition involving oral mucosal surfaces. Topical corticosteroid formulations are the gold standard, even if it could be related to local immunosuppression and dysgeusia. Ozone therapy is a medical treatment based on the use of medical ozone: its effects are proven, consistent, safe and with minimal and preventable side effects. Up-to-date, latest evidence showed that ozone has antiseptic and healing properties and could enhance ischemia-reperfusion of organ with anti-inflammatory properties in acute and chronic

disease. The aim of this study is to evaluate efficacy and safety of oxygen-ozone mixture injection in the acute phase of Oral Lichen Planus.
Methods: A woman of 66 years has been referred to our Sector for burning and diffuse pain. Oral inspection showed presence of bilateral reticular lesions of buccal mucosa and of erythematous/atrophic lesion on the dorsal tongue. Only metformin has bees been registered during medical history. After informed consent, an oral biopsy has been carried out and histopathological examination confirmed the suspected diagnosis of Oral Lichen Planus. No burning has referred on buccal site. For treatment of the dorsal tongue lesion, taking into account the singular aversion of the patient for drugs, we have adopted a new protocol by oxygen-ozone mixture. The protocol consists of local application of lidocaine + prilocaine (EMLA®) and multiple injections all around dorsal surface (20 ml dosage) (by 30G x 4 mm needle) of oxygen-ozone mixture (15γ concentration). At the end, gauze compressions with chlorhexidine (0.2%) for 2-3 min. Local Ethics Committee approved the study. This protocol has been repeated every 15 days for two months. No home therapy has been prescribed, except exclusion of acid foods (e.g. tomatoe, oranges).
Results: Clinical and symptomatic data have been registered, with significant amelioration after two administrations.
Conclusions: The new protocol with infiltration of O3 seems to be a valid and a safe topical therapy for the treatment of OLP, avoiding secondary effect of immunosuppressant agents.

Analysis of correlation between glycogen storage disease type ia and clinical conditions of the oral cavity: a case report

M. Di Petrillo[1], D. Russo[1], A. Romano[1], M. Contaldo[1], F. Loffredo[1], A. Lucchese[1], R. Serpico[1], D. Di Stasio[1]
[1]Multidisciplinary Department of Medical-Surgical and Dental Specialties, University of Campania "Luigi Vanvitelli"

Aim: The objective of this case report was to describe the oral clinical findings in a young adult with glycogen storage disease type Ia in order to confirm a clinical correlation between this kind of rare genetic disorder and oral health.
Methods: Glycogen storage disease type I is an inherited disorder, with an estimated incidence of 1 in 100,000 individuals, caused by the buildup of glycogen in certain organs and tissues, especially kidneys, small intestines and liver, impairing their normal functioning. Two types of GSDI have been described and are known as GSDIa and GSDIb, which differ in their signs and symptoms and genetic cause. A 18-year-old female patient was recruited from the Oral Pathology Unit of the University of Campania "Luigi Vanvitelli". The past medical history revealed glycogen storage disease type Ia, diagnosed within the first month of life. The patient underwent intraoral clinical examination and different conditions were examined to determine the whole oral and dental health, including dental caries, malocclusions, enamel defects and periodontal condition. DMFT index was used to examine individual caries experience, whereas presence of plaque percentage (Plaque Index, PI), Bleeding on Probing (BOP) along with Community Periodontal Index (CPI) and Periodontal Screening and Recording (PSR) were recorded in the evaluation of periodontal health.
Result: As regards malocclusions, an anterior open bite, a molar and canine class III relationship with a concave profile of the face were observed. The patient also exhibited enamel hypoplasia and tooth discoloration and presented with extensive dental plaque and gingival bleeding on the vestibular surface corresponding to teeth 2.1 and 2.2. The total number of the teeth observed was 26 and the DMFT score recorded was 15 (1 decayed, 3 missing, 11 filled), whereas the CPI scored 3, resulting from the calculus detected in all the sextants and the gingival bleeding observed in the second sextant during probing. Furthermore, 4 to 5 mm pockets were detected through a WHO-probe. The plaque index recorded was 0.70 and the BOP was positive as a vestibular bleeding of two upper left incisors was observed within 15 seconds after probing, thus confirming the presence of an active periodontal disease. As regards PSR index, a special ball-tipped probe, with a 0.5 mm ball at the tip and a colour-coded band extending 3.5 mm to 5.5 mm from the tip, was used during clinical examination. The score recorded was a code 3 in all sextants, since the coloured area of probe remains partly visible in the deepest probing depth in the sextant, thus indicating the presence of pockets with a 3.5 to 5.5 mm probing depth.
Conclusion: The clinical picture observed appears to be in accordance with some studies reporting periodontal disease and dental caries in few individuals affected by GSDI, but in general scientific literature is poor of data concerning oral manifestations in patients affected by Glycogen storage disease type I. Moreover, tooth discolorations, enamel defects and even malocclusion were detected in this case report, hence it is necessary to investigate if a relationship with these other clinical findings exists. Since glycogen storage disease type Ia represents a rare disease, further studies are needed to strengthen the clinical correlation with oral health and to understand the underlying mechanisms of such clinical manifestations in the oral cavity.

A complete denture with saliva reservoirs in patient suffering of hyposalivation: a case report

D. Familiari, M. Cabras, A. Gambino, P. G. Arduino.

Department of Surgical Sciences, Oral Medicine Section, CIR Dental School, University of Turin, Turin, Italy

Aim: Xerostomia, consisting of subjective feeling of oral dryness, and hyposalivation, its objective counterpart, can be caused by a variety of systemic diseases, including Sjögren's syndrome, and local factors, leading to difficulty in speaking, chewing and swallowing. Discomfort in wearing dentures is a very common complaint. Saliva acts as a thin film between the dentures and the oral mucosa; therefore, its absence may cause decreased retention of the prosthesis, as well as increased chances of inflammation and ulceration in the oral cavity. Treatment of patients with severe hyposalivation and xerostomia can be a challenge for the clinician, especially if completely edentulous. The complete prosthesis still represents the most reliable alternative to rehabilitate edentulous patients, especially among those who are not eligible to implant-prosthetic rehabilitation. The aim of the work was to present a two-part total mobile prosthesis that incorporates artificial saliva reservoirs, to allow the patient to wear the denture without problems.
Methods: This work presents a case where a reservoir denture was used successfully in a patient where other treatment modalities had failed. An alternative method for constructing full, mandibular reservoir dentures is presented. A female patient, edentulous in the inferior arch, affected by primary Sjogren's Syndrome, was applied a two-part mandibular denture with inside artificial saliva reservoirs in the lower one. This method relies on routine Materials and follows routine clinical stages during construction. The denture splits into two sections, a base section, which contains the reservoirs, and an upper section, which contains the denture teeth. It provides constant salivary flow for the patient and has the added advantage of allowing easy cleaning of the reservoirs. In order to assess patient's satisfaction, the patient was asked to fulfil the Summated Xerostomia Inventory-Dutch (SXI-D) version, before and after the installation of the denture.
Result: After six months since the installation of the prosthesis, the patient reported a marked improvement concerning speaking, chewing and swallowing and therefore a clear improvement in the overall quality of life. The only problems detected by the patient were related to the mobility of the denture, due to the marked resorption of the edentulous alveolar ridge.
Conclusions: Building a prosthesis with reservoirs inside can offer a great advantage for patients with severe hyposalivation, as the patient finds more benefit from a continuous humidification of the oral cavity, with the resulting improvements in terms of restore of the oral system.

The role of photodynamic therapy in the treatment of lesions of the oral mucosa: a systematic review

Fausto Fiori, Diana Russo, Antonio Romano, Luigi Laino, Dario Di Stasio, Rosario Serpico , Alberta Lucchese

Multidisciplinary Department of Medical-Surgical and Dental Specialties, University of Campania "Luigi Vanvitelli", Naples, Italy

Aim: Photodynamic therapy (PDT) is a minimally invasive technique to the treatment for both malignant and premalignant lesions. The mechanism according to which the destruction of cells occurs, is the use of a photosensitizing agent which is activated by a light source, used at a particular wavelength. Light Emitting Diode lamps (LED) seems to be more advantageous light sources than laser, because of the reduction in energy production and risk of eye damage. The interaction between the photosensitizing agent and the light source, in presence of oxygen, causes the production of cytotoxic reactive species (Reactive oxygen species - ROS) which cause oxidative damage to cells, resulting in cell death by apoptosis, necrosis and microcirculation damage. The apoptotic response induced by PDT consist in the release of Cytochrome C and other mitochondrial factors, which bypasses the normal programmed cell death mechanisms. The photosensitizing molecule can be administered to the patient systemically or topically, in both cases this will accumulate in the mitochondria, lysosomes and cytoplasmic membranes. Topical photosensitizers most commonly used are 5-aminolevulinic acid (ALA), methylene blue and toluidine blue. Photodynamic therapy has been used with satisfactory results in various branches of medicine such as dermatology, gynecology, gastroenterology. Excellent results have been obtained in the neck head region. In particular, in the oral cavity topical photodynamic therapy has given good results in the treatment of preneoplastic lesions, lichenoid lesions and fungal infections. Starting from these considerations, the aim of this review is to evaluate the usefulness of topical PDT in the treatment of lesions of the oral mucosa.
Methods: We performed a systematic review of the literature using different search engines: PUBMED, ISI Web of Science and the Cochrane Library. The employed MeSH terms were: Photodynamic therapy or PDT; topical; oral; mucosa; lesion; lesions;

precancerous; mouth; buccal; lip; lips; tongue; lingual; palate; palatal; cheek; cheeks; oral floor; gum; gums; gingiva; gingival.
Results: The initial research yielded 883 studies, of these, 610 were duplicates. Of the 273 studies remaining, 232 were excluded by reading titles and abstracts as they did not meet the inclusion criteria. Reading the full texts, 11 other articles were excluded. In the end, 30 studies were identified.
Conclusion: Clinical studies confirm high effectiveness of PDT in the treatment of many lesions that affect oral mucosa. Although in literature a large range of cases undergoing to PDT is not yet available, results seem to be promising. In addition, PDT might represent a valid alternative to traditional methods like pharmacological therapy and surgical treatment.

Influence on oral health of patients affected by Marfan syndrome: a data review

Luca Fiorillo[1,2], Luigi Laino[1], Gabriele Cervino[2], Marco Cicciù[2], Rosario Rullo[1]

[1]Department of Biomedical and Surgical and Biomedical Sciences Naples University, NAPLES, NA, ITALY
[2]Department of Biomedical and Dental Sciences, Morphological and Functional Images, School of Dentistry, University of Messina, ME, Italy

Aim: The role of this study is to highlight a correlation between young patients with Marfan syndrome and oral health status and quality of life by evaluating and reviewing the relevant scientific literature. Marfan syndrome is an autosomal dominant disorder that affects connective tissue. The syndrome is characterized by an abnormal production of the fibrillin1 protein. The manifestations of Marfan syndrome affect organs that contain connective tissue such as the skeletal system, the eyes, the heart and the blood vessels, the lungs and the fibrous membranes that cover the brain and the spine. The facial bony and soft structures can therefore be affected, influencing the stage of tooth formation and the structure of the teeth.
Methods: A comprehensive review of the literature was conducted according to PRISMA guidelines accessing the Ovid MEDLINE, PubMed, EMBASE, and Dentistry and Oral Sciences Source. Authors conducted the search of articles in English language. A total of 18 relevant studies were included in the review. The study evaluated only papers with specific inclusion criteria regarding oral health. The works initially taken into consideration were 36, subsequently applying the inclusion and exclusion criteria there were 20 works. After a careful analysis of the work obtained by two academics who have worked separately, there have been 18 studies. All data from the studies were compared and many of these highlighted the presence of abnormalities in the oral district.
Result: The studies taken into consideration led to a whole series of oral manifestations related to the Marfan syndrome. Some of these concern oral mucosa, periodontal, dental abnormalities, bone abnormalities or joint dysfunction.
Conclusions: All the research have given positive results in terms of dental or oral anomalies. This information may be essential to limit and intervene early improving the oral health of syndromic patients to manage diseases related to other body districts.

Our experience about odonthogenic phlemmongs and abscesses: three complications

Carlo Franceschini, Benedetta Cassese, Federici Stanganelli Francesca Romana, Massimo Galli

Aim: In recent years we have recorded an increase in the number of hospital admissions due to odontogenic abscesses and neck phlegmons requiring surgery. There were three complications: recurrent abscess, Lemierre syndrome and mediastinitis.
Methods: This is a longitudinal retrospective study included patients admitted from emergency to our ENT Department of Sensory Organs, Polyclinic Umberto I Hospital with a diagnosis of "neck abscess" and/or "neck phlegmons". In the present study were enrolled 55 patients, admitted between January 2013 and November 2017. The reference to gender was 31 males (56%) and 24 females (44%). The average age was 46 and most cases involved patients between 30 and 50. The only inclusion criterion involved patients admitted to our department through emergency due to their serious clinical conditions. The following were excluded from the study: patients with non odontogenic abscesses and/or phlegmons and non-EU citizens residing in Italy for less than 5 years and/or patients with pathological or pharmacological immunodepression. As far as therapy was concerned, all patients received antibiotic treatment which often included administration of multiantibiotics and surgical treatment. As far as surgical treatment is concerned, 8 patients had dental extractions only and transalveolar drainage; 25 patients underwent cervicotomy as first step treatment with successive outpatient dental treatment. 15 patients underwent combined treatment including cervicotomy and dental care with transalveolar drainage. Tracheotomy was performed on 3 patients of these. In addition to combined cervicotomy and dental care 7 patients also required thoracotomy in order to place thoracic drainage due to mediastinitis. Tracheotomy was performed on 4 of these patients. An average of 2

teeth/patient were extracted. Extracted teeth were most frequently 4.7;4.8 – 3.7;3.8. Abscesses originated from upper quadrant teeth in only 8 patients.
Result: During the treatments occurred three complications: a patient initially treated only with transalveolar drainage and dental extraction manifested a recurrence of primary infection and required a second surgery with cervicotomy and hospitalization in the Department of Infectious Diseases; 7 patients have had mediastinits wich has required a thoracotomy treatment; a patient has manifested a rare Lemierre syndrome case caused by Streptococcus intermedius, a multidrug resistant germ.
Conclusion: Odonthogenic phlemmongs and neck abscesses must have a timely multidisciplinary approach. We must know that there may be fearsome complications that may pose a risk to life.

Haemophilia a rare disease: the correct management in oral surgery

R. Franco[1], A. Barlattani.jr.[2], F. Gianfreda[1], M. Asaro[1], N. Ranieri[1], M. Miranda[1], P. Bollero[3]

[1]UOSD Diagnosis Hygiene and Oral Prevention with Dental Day-Hospital, Polyclinic of Rome "Tor Vergata"
[2]Department of Clinical Sciences and Tanslational Medicine, University of Rome "Tor Vergata"
[3]Department of Systems Medicine of the University of Rome "Tor Vergata", Italy

Aim: Haemophilia A (HA) is caused by factor VIII deficiency, while haemophilia B (HB) is caused by factor IX deficiency. Hemophilia is characterized by a tendency of bleeding due to congenital deficiency of blood coagulation factor activity. Individuals with hemophilia had an impaired ability to form thrombin and a consequent spontaneous bleeding. Severe hemophilia shows the symptoms with bleeding early in life, often in the first year, either following circumcision in the newborn period or as recurrent palpable hematomas. Patients with severe hemophilia had frequent spontaneous bleeding into joints or muscles, usually without any identifiable hemostatic challenge. Moderate hemophilia showed with bleeding after minor trauma, injury, surgery, or dental work. Patients with mild hemophilia may never have a bleeding problem and rarely experience spontaneous bleeding. Aim of this case report is to evaluate the oxidize fibrin sponge as tool to avoid the excessive bleeding in hemophiliac patient.
Methods: The patient A.M. of 28 years old with HB needs extractions of the dental teeth 3.4 and 3.6 for endo-perio lesion, diagnosed by ortopanthomography, at the "Tor Vergata" University Hospital in Rome. Oral surgery is classified as simple surgery because risk of bleeding is low. The hematology has advised against performing blood transfusions. A prophylactic assumption of amoxicillina and clavulanic acid has been started one day at the dose of 2 g daily before the surgery and continued for another 4 days. A peripheral block of the inferior alveolar nerve with bupivacaine without adrenaline and paraperiosteal anesthesia with articain and adrenaline in concentration 1/100000 was also performed. The socket was courted, washed with saline solution. At the end oxidize fibrin sponge was inserted in the socket and the mucous membrane was sutured with discontinuous reasorbable suture.
Result: The patient did not present excessive and uncontrolled bleeding during the postoperative period and during the days following the operation.
Conslusion: The use of tranexamic acid and oxidized fibrin sponge represents an excellent local hemostatic agent in hemophiliac patients and thus avoids possible transfusions, discomfort of the patient and autoantibodies developing.

Mucoepidermoid carcinoma: histopathological grading systems

Sogol Ghassemzadeh[1], Davide Mirra[1], Valerio Marci[1], Lia Giordano[1], Matteo Val[1,2], Monica Pentenero[1,2]

[1]Oral Surgery Specialty School, Department of Oncology, San Luigi Gonzaga University Hospital - Orbassano, University of Turin, Italy
[2]Oral Medicine and Oral Oncology Unit, Department of Oncology, San Luigi Gonzaga University Hospital - Orbassano, University of Turin, Italy

Aim: Mucoepidermoid carcinoma (MEC) is the most common malignant tumor of the salivary glands. Many authors favoured the classification of MECs into low, intermediate and high grade, based on the relative proportion of cell types. Other authors suggested various grading criteria including the degree of tumour invasion, anaplasia, pattern of invasion, degree of maturation of the various cellular components, mitotic rates, presence or absence of necrosis, neural or vascular invasion and proportion of tumor characterized by cystic spaces compared to solid growth. Therefore, the histopathological grading criteria of MEC remains controversial. We assessed a surgical specimen of MEC comparing data from the grading systems reported in the literature.
Case report: 48-year-old man came to our observation for the rapid onset, in the previous 2 months, of a swelling of the posterior hard palate. The oral examination showed the presence of a 10 x 10 mm blue and red mass needing further diagnostic assessment through incisional biopsy. The histological

examination showed the presence of a minor salivary glands tumour with prevalent aspects of clear cells and low proliferative index, but the observed features did not allow a more precise diagnosis. Therefore, total excision of the lesion was recommended. The final histological examination of the surgical specimen allowed the diagnosis of low grade mucoepidermoid carcinoma (MEC).

Conclusion: The scoring system developed by Auclair and Goode (1992) considered: intra-cystic component <20% (+2 points), >4 mitotic figures per 10 high power fields (+3 points), neural invasion (+2 points), necrosis (+3 points), and cellular anaplasia (+4 points). A score of 0–4 was considered low grade; 5-6 was intermediate, while a score of 7 or higher indicated an aggressive behaviour. The present case had score 0, so we could define it a low grade by Auclair and Goode. Brandwein et al (2001) proposed a grading scheme with these features: intra-cystic component <25%(+2 points), tumour front invading in small nests and islands(+2 points), pronounced nuclear atypia (+2 points), lymphatic or vascular invasion (+3 points), bony invasion (+3 points), >4 mitoses/10 HPF (+3 points), perineural spread (+3 points), necrosis (+3 points). A score of 0 was considered low grade, a score of 2 or 3 was considered intermediate grade, while a score of 4 or higher indicated a high grade.
The present case had score 0, so we could define it a low grade by Brandwein's. The present case had the same grading irrespective of the grading system adopted, thus suggesting that these scoring systems give comparable results. Nevertheless, the agreement between these two grading systems and their reliability contrasted with the clinical outcome and finally survival should be assessed in a large group of patients with proper sample size.

Use of amniotic membrane in a patient with bisphosphonate-related osteonecrosis of the jaw (BRONJ)

Federica Gheller, Diletta Trojan[2], Lisa Spagnol[2], Adolfo Paolin[2], Luca Guarda Nardini[1], Mirko Ragazzo[1]

[1]Maxillofacial Surgery Multispecialty Department, Ospedale Ca' Foncello [Ca' Foncello Hospital], Piazzale Ospedale 1, 31100 Treviso, Italy and 2 Fondazione Banca dei Tessuti di Treviso onlus [Treviso Tissue Bank
[2]Foundation non-profit organisation], Piazzale Ospedale 1, 31100 Treviso, Italy

Aim: BRONJ is an adverse drug reaction described as the progressive destruction and death of bone that affects the mandible or maxilla of patients exposed to the treatment with nitrogen-containing bisphosphonates, without previous radiation therapy to the craniofacial region. The management of BRONJ is still controversial and no effective treatment has been developed yet. In accordance with AAOMS Position Paper, surgical treatment is reserved for stage III and stage II (when the lesion is unresponsive to antibiotic treatment) to get a long-term palliation with the remission of symptomatology, but it can also lead to a larger area of infected bone. Recently, structure and function of human amniotic membrane (HAM) have been investigated. In addition to pluripotent properties of HAM cells, it has been highlighted that HAM has anti-inflammatory, anti-bacterial, anti-viral and immunological characteristics and that it promotes epithelialization. Because of its attractive properties, HAM has been applied with positive results in surgical procedures related to ocular surface reconstruction and the genito-urinary tract, skin, head and neck, among others. The good results obtained in surgery have encouraged the use of HAM for the recovery of patient with BRONJ. For a few years, at Maxillofacial Surgery Multispecialty Department, Ospedale Ca' Foncello of Treviso, it's investigating, if the placement of HAM after surgical debridement of the infected bone can facilitate the wound healing process. Up-to-date, collected data demonstrate that HAM can promote good levels of epithelialisation and absence of infections and pain. The aim of this paper is to report the case of a patient with severe mandibular BRONJ treated with the application of HAM after bone debridement.

Methods: A 63-year-old female patient was submitted to our attention for recurrent mandibular periimplant infections. The anamnesis showed that the patient had received since 2003 antiresorptive drug therapy (alendronate) to treat osteoporosis. She underwent placement of six oral implants into the mandible in 2014. Since a year, she has complained of pain closeness the fixture located in the left canine-premolar region, with a few episodes of modification in sensibility of inferior alveolar nerve. The infections were treated with antibiotic therapy, with transient relief of symptomatology. A panoramic radiograph and computed tomography scan showed an increased bone marrow density with a large peri-implant bone sequestration. Clinical and radiographic signs were compatible with BRONJ. Bone sequestration was very large and involved almost completely the thickness of left mandibular body and the parasymphyseal area. Despite the high risk of fracture, a conservative approach was chosen. All six implants were explanted and a large ostectomy of necrotic bone was performed; after debridement of infected tissue, HAM was positioned, and primary closure was sutured. After surgery, the patient received an antibiotic therapy.

Result: 3 weeks after surgery, clinical assessment

releveled that intraoral wound was completely sealed and patient was asymptomatic.
Conclusion: the good levels of epithelialisation and the improvement in symptomatology obtained encourage the use of HAM in patients with BRONJ as a promising therapeutic alternative to current conventional treatments.

Green tea, turmeric and aloe vera in oral medicine: descriptive analysis of the most recent literature

R. Z. Grasso, M. Cabras, A. Gambino, D. Karimi, P. G. Arduino, R. Broccoletti

Department of Surgical Sciences, Oral Medicine Section, CIR Dental School, University of Turin, Turin, Italy

Aim: Aim of the present work was to assess the beneficial properties of green tea (GT), curcuma and aloe vera (AV) applied in support of oral medicine.
Methods: A bibliographical research on PubMed was carried out, combining "green tea", "turmerics", "aloe vera", with "oral cancer", "oral pathology" and "oral lichen planus". In-vitro and clinical studies, published in English in the last five years (2013-2018), were considered eligible.
Result: GT, with its main molecule epigallocatechin gallate (EGCG), seems to provide promising in-vitro antioxidant effects on wild-type cells, also displaying a pro-oxidant impact on squamous cell carcinoma cells, leading to apoptosis through augmented production of reactive oxygen species (ROS) and hyperactivation of hesokinase-2. Clinically, two meta-analyses and a systematic review found promising but limited evidence on the role of GT on oral cancer, with Wang and co-workers showing a positive association between GT consumption and reduced risk of oral cancer (RR = 0.798), especially among high dose consumers (RR = 0.853). GT was tested unsuccessfully in a small case series of patients with bullous epidermolysis, whereas a double blind randomized controlled trial (RCT) revealed a statistically significant reduction of clinical manifestations of herpes labialis among 20 of 40 patients treated with an ECG-based ointment, when compared to placebo. In-vitro studies discovered a possible interaction between turmeric and micro-RNA, specifically miR-9, thus inhibiting proto-oncogenes such as Wnt/beta catenin and cyclin D1. When turmeric was combined with copper supplements, it was able to trigger an even higher synthesis of ROS, and reduce cell migration, by decreasing vimentin, and enhancing levels of E-cadherin. Clinically, turmeric has been used with satisfying results for management of chemo-radiotherapy induced oral mucositis (OM), with an RCT and a case-control study finding statistically significant improvement of OM among patients treated with turmeric mouthrinse, when compared to placebo or chlorhexidine. Case-series and trials provided similar results for turmeric in providing relief among patients with oral submucous fibrosis (OSM), with a RCT detecting significantly wider mouth opening and pain reduction when compared to propionate clobetasol 0.05%. There is lack of evidence concerning turmeric role on atrophic-erosive oral lichen planus (OLP), as suggested by the most recent reviews of the literature, with encouraging outcomes only if patients were to be treated with three to six application per day. AV showed conflicting in-vitro results, regarding its anti-oxidant and pro-apoptotic effects on SCC cells; discouraging effects of AV on Candida Albicans have been detected both in-vitro and on patients. Two RCTs assessing the role of AV on recurrent aphthous stomatitis revealed lesser results when compared to topical steroids, and better outcomes in comparison to a myrrh-based gel. Among OSM patients, a combination of AV and surgery seemed to cause significant reduction of burning sensation and wider mouth opening, than surgery alone. Similarly, AV application and tongue protector among patients with burning mouth syndrome provided a better impact than tongue protector alone, or combined with placebo. AV seems to be valuable in the management of OM, as showed in a recent triple-blind RCT, whereas there is low evidence concerning its usefulness as an alternative treatment for atrophic-erosive OLP.
Conclusion: In the last years, promising evidence emerged concerning the role of natural remedies in oral medicine: however, further and wider trials are needed. Oral physicians and dental hygienists should keep themselves up-to-date, in order to administer these medications with a strict evidence-based approach.

Intraoral application of ultra-high frequency ultrasound (uhfus) to the study of oral diseases: a novel tool for diagnosis

R. Izzetti[1], S. Vitali[2], V. Iodice[2], C. Baldini[3], F. Graziani[4], M. Gabriele[4], D. Caramella[2]

[1]Department of Translational Research and of New Surgical and Medical Technologies, University of Pisa, Pisa, Italy
[2]Diagnostic and Interventional Radiology, University Hospital of Pisa, Pisa, Italy
[3]Department of Clinical and Experimental Medicine, University of Pisa, Italy
[4]Department of Surgical, Medical and Molecular Pathology and Critical Care Medicine, University of Pisa, Pisa, Italy

Aim: Intraoral conventional ultrasound (US) has been seldom employed in the evaluation of tumour

thickness and depth of invasion in malignant oral diseases. However, several pathologic conditions may affect oral mucosa, and to our knowledge intraoral US has never been applied to the study of the many types of oral lesions involving soft tissues. Ultra-High Frequency Ultrasound (UHFUS) is a diagnostic technique involving the use of higher US frequencies compared to conventional US, providing 30 µm resolution while imaging depths up to 3 cm at frame rates up to 10,000 fps. The high resolution allows to image in detail the superficial layers of the oral epithelium, therefore making the technique suitable for the study of oral diseases. For the first time, we applied UHFUS to the intraoral investigation of oral soft tissue lesions of various aetiology, in order to assess a potential role of intraoral UHFUS in the identification and classification of oral diseases. We report our preliminary results on the UHFUS appearance of oral soft tissues and describe specific UHFUS features of different lesions.

Methods: Patients presenting oral soft tissue lesions eligible for surgical biopsy were investigated prior to biopsy with a 70 MHz US probe (Vevo® MD, VisualSonics, Toronto, Canada), using a standardized acquisition protocol. For all the lesions C-mode acquisition was also performed. The UHFUS scan included image acquisition of the affected side and of the contralateral healthy one, which was used for comparison. In the B-mode US images of the affected side, standardized ROIs were selectively positioned across the border between normal tissue and lesion to evaluate the pattern of pixel values in terms of their frequency (histogram) and spatial distribution (profile).

Results: 100 patients (M: 45, F: 55; mean age: 54.06, SD + 31.52) were included in the study. One-way ANOVA was performed to evaluate if the difference in grey value distribution as expressed by the histograms was statistically significant when different clusters of diseases were compared. The f-ratio value was 2.91929. The p-value was .029956. The result was significant at $p < 0.05$. Statistical analysis was also performed considering the affected site, in order to evaluate whether the local anatomy influenced the pattern of the grey scale. No statistically significant difference was found, therefore suggesting that grey value distribution varied depending on the type of lesion analysed and was not influenced by the site of localization. Our study demonstrates the presence of a statistically significant difference between disease groups in terms of the histograms. Indeed, different clusters of disease show different grey value distribution, suggesting a potential role for UHFUS based differential diagnosis.

Conclusion: UHFUS was effective in detecting and differentiating oral soft tissue alterations. Histograms showed disease-specific patterns, giving a quantitative contribution in addition to the qualitative US comparison between symmetrical structures on both sides. UHFUS could therefore become an important support to the diagnosis, monitoring, and surgical management of oral soft tissue diseases. Further studies (possibly involving Deep Learning) are needed to confirm our preliminary data in a larger sample of patients.

Palatal polymorphous low-grade adenocarcinoma clinically mimicking squamous papilloma: an unusual presentation

D. Karimi*[1], M. Cabras[1], P. Carcieri[1], L. Chiusa[2], M. Carbone[1], R. Broccoletti[1], P. G. Arduino[1]

[1]Department of Surgical Sciences, Oral Medicine Section, CIR-Dental School, University of Turin, Turin, Italy
[2]Pathology Unit, Città della Salute e della Scienza di Torino, University of Turin, Turin, Italy

Aim: Polymorphous low-grade adenocarcinoma (PLGA) is a malignant neoplasm that originates from the minor salivary glands and frequently occurs in palate. PLGA usually arises as a firm, non-tender swelling whose non-specific clinical appearance might resemble either a salivary gland disorder or a soft tissue neoplasm. The epithelium surface often appears normal, although ulceration and bleeding may be evident. However, such clinical characteristics are not conclusive for diagnosis, since they can be found in association with other tumor types as well. We present a case of a polymorphous low-grade adenocarcinoma of the hard palate, clinically mimicking a squamous papilloma.

Methods: A 32-year-old female patient, with no significant medical history, was referred to the Oral Medicine Section, C.I.R. Dental School of Turin, complaining about a lesion arisen on palate two weeks before. Intraoral clinical examination revealed a sessile lesion with verrucous-papillary surface, measuring one centimeter in diameter, located on the left paramedian hard palate. Texture, appearance, and location lead to a clinical hypothesis of oral squamous papilloma. Therefore, an excisional biopsy was performed a few days later, using a diode laser. Hematoxylin and Eosin stained tissue sections showed tubular, cribriform, papillary and tubulo-papillary patterns. The tubules were round to irregular in shape, and some were cystically dilated lined by cuboidal epithelium. Cells showed round to oval shape, with moderate amount of cytoplasm and pale nuclei. Cell boundaries were distinct. No perineural invasion was detected. MIB1-guided proliferation index was 5%. Immunohistochemistry (IHC) showed positivity with CKAE1/AE3, CADE, p63, CK14, Vimentine, ad a partial reaction for BCL2, S100, CD117. A definitive diagnosis of polymorphous low-grade adenocarcinoma (PLGA) was then provided.

Results: An urgent contrast computed tomography (CT) of head and neck district was required, showing a rounded hypodense area in the left paramedian palate, with irregular margins, extended for about 9 mm, compatible with the unhealed surgical site. On the other hand, a portion of tissue of 13 x 9 mm in diameter with high uptake, consistent with the residual neoplastic burden was found. Cranially, this mass caused narrowing of the left paramedian palate, disruption of the vomer bone, thus expanding through the floor of the left nasal cavity. Soft palate appeared to be involved, as well. Finally, she was referred to Otorynolaryngoiatric Unit for therapy evaluation. A complete surgical excision was performed.
Conclusion: PLGA can arise as an asymptomatic mass in the oral cavity. Differential diagnoses should include pleomorphic adenoma and adenoid cystic carcinoma. Sporadic case reports described pathologic resemblance with metastatic lobular carcinoma of the breast. Some authors reported an association between HPV infections and salivary gland neoplasms. Thus, it cannot be excluded that HPV might be implicated in the etiology of this group of tumors. Although a painless mass is the most common presentation of PLGA, clinically it can occur as a verrucous papillary lesion, as in our case. Pathologist and clinicians should consider that the clinical presentation of PLGA might rarely simulate that of a squamous papilloma.

Expression of cd68 and cd163 in macrophages associated hnscc: a systematic review and meta-analysis

E. Lo Muzio[1,4], V. C. A. Caponio[1], G. Troiano[1], M. Mascitti[2], A. Santarelli[2], V. Panzarella[3], O. Di Fede[3], L. Lo Muzio[1]

[1]Department of Clinical and Experimental Medicine, University of Foggia, Foggia, Italy.
[2]Department of Clinical Specialistic and Dental Sciences, Marche Polytechnic University, Ancona, Italy.
[3]Department of Surgical, Oncological and Oral Sciences, University of Palermo, Palermo, Italy
[4]Department of Oral and Maxillofacial Sciences, University "Sapienza" of Rome, Roma, Italy

Aim: Head and neck squamous cell carcinoma (HNSCC) is reported to be the sixth most common kind of cancer worldwide. More than 90% of HNSCCs involves the mucosal surfaces of the oral cavity, of the oropharynx and larynx. Whereas, there are advances in therapy and general knowledge about this kind of cancer, the prognosis did not see any improvements. In particular, some kind of tumors show an increase of chemotherapy resistance. Last evidence show how microenvironment could have a role, not only in the chemotherapy resistance, but also on tumor onset and progression. Macrophages are the most abundant kind of cellular type associated to the tumor microenvironment. Different studies showed their role in chemotherapy resistance, tumor antigen presentation and regulation of immunity answer. In particular, it emerged how macrophages can be characterized according to their polarization, with differences in activity. Specifically, CD163+ has been associated to M2 polarized macrophages, giving macrophages a pro-tumor action, with positive influence in proliferation and vascularization. Aim of this study is to show a possible association between macrophages marker expression and patient's prognosis, through a meta-analysis approach.
Methods: Guidelines reported in the Cochrane's Handbook have been followed in order to perform the study in association to the Preferred Reporting Items for Systematic Reviews and Meta–Analyses (PRISMA) statement. Inclusion and exclusion criteria were applied. In particular, we included studies reporting prognostic analysis about the correlation between CD68+ or CD163+ macrophages and HNSCC, including at least 20 patients. Studies not reporting prognostic information or non-in English language were excluded. Prognostic information had to be reported as overall survival data, such as Hazard Ratio, with 95% confidence interval or by Kaplan – Meier graph, by which, thanks to Tierney et al.'s method is possible to extract the Hazard Ratio with 95% C.I. After study selection and data extraction, Review Manager Software was used to perform the analysis. Risk of bias was assessed according to Newcastle-Ottawa scale to further investigate the quality of the study included.
Result: In the performed meta-analysis, CD68+ tumor associated macrophages marker, was not statistically significant associated to the prognosis of HNSCC patients. Meanwhile, CD163+ resulted to be an independent negative prognostic factor in HNSCC.
Conclusion: Macrophages play different roles in the tumor microenvironment and could be used as prognostic marker in HNSCC, giving more information about patient's prognosis in a personalized medicine point of view. In order to give a clinic application of this data, well standardized studies should be performed, with a large number of patients included.

Blind pathological evaluation of oral lichen planus specimens: are there any differences between different pathologists and correlations to clinical characteristics? A pilot study

Lodolo[1], Gobbo[1], Rupel[1], Ottaviani[1], Poropat[1], Bussani[2], Torelli[3], Di Lenarda[1], Biasotto[1]

[1]Department of Medical, Surgical and Oral Health Sciences, Division

of Oral Medicine and Pathology, Ospedale Maggiore, Trieste, Italy
[2]Institute of Pathologic Anatomy, Ospedale di Cattinara, Trieste, Italy
[3]Department of Mathematics and Informatics, University of Trieste, Italy

Aim: The primary aim of the present study was to evaluate the level of agreement between histopathological diagnosis performed by two different pathologists in specimens obtained in Oral Lichen Planus (OLP) lesions. The secondary aim was to assess the grade of histopathological concordance between two biopsy specimens obtained in the same OLP patients in different sites of the oral cavity. Eventually, the histological findings were correlated to clinical appearance of the lesions through a validated scoring system called REU (Reticulations, Ulcer, Erythema), and to pain expressed through Visual Analogue Scale (VAS).
Methods: A total of 111 patients were recruited at the Division of Oral Medicine and Pathology at the University Hospital of Trieste between December 2016 and June 2018. Patients were suspected as having OLP if they had bilateral white reticulations of either the buccal mucosa and/or tongue- regardless of whether erythema and ulcers were present- or bilaterally symmetric erythema of the gingiva with/without striations. All the patients were photographed at ten intraoral sites and the validated scoring system called REU was used to clinically grade the patient. Diagnosis was confirmed histologically by a pathologist. A single operator performed two biopsies in two different oral sites to each patient, under local anesthesia and prior written informed consent. Subsequently, 30 specimens were analyzed by two different independent and blind pathologists, using specific histopathologic criteria. The first pathologist was a general pathologist, expert in oral lesions, but not a clinician. The second pathologist was both expert in oral lesions and a clinical oral medicine specialist. The Fisher's exact test was run in order to: 1) evaluate the grade of concordance between the histological criteria evidenced by the two pathologists; 2) to evaluate if the clinical features (expressed through REU and VAS) correlated to the histopathological grade of inflammation (expressed through the thickness of the typical band-like lymphocytic infiltrate).
Results: The diagnosis performed by the two different pathologists didn't highlight any differences in the evaluation of the histopathological parameters neither between the two operators, nor between the different sites examined. Dissimilar results were only obtained only when evaluating the increased number of Langerhans cells and the presence of eosinophils in the epithelium and connective tissue. Further investigations including an increased number of specimens is warranted in order to evaluate possible influences on clinical diagnosis. Regarding our second aim, the results of our pilot study did not show statistically significant correlation between histopathological features of OLP and REU or VAS. Although previous studies documented that REU correlates with VAS, in our findings we did not report any concordance between clinical severity of OLP (expressed by high REU score and VAS>5) and the characteristics of the band-like lymphocytic inflammatory infiltrate.
Conclusions: Our results showed how performing biopsies in sites with different clinical features of OLP didn't affect the diagnostic results. Moreover, the histopathological features of inflammation do not seem to correlate to clinical severity. The sample size should be increased in order to confirm or discredit our hypothesis. Further research is needed to understand if there could be a relationship between these findings and specific clinical features or aetiological mechanisms (i.e. discrimination between real OLP and lichenoid lesions).

Epidemiological study of odontogenic tumours in marche region

Elisa Luconi[1], Marco Mascitti[1], Giuseppe Troiano[2], Lucio Lo Russo[2], Alberta Barlattani[3], Corrado Rubini[4], Maurizio Procaccini[1], Andrea Santarelli[1]

[1]Department of Clinical Specialistic and Dental Sciences, Marche Polytechnic University, Ancona, Italy.
[2]Department of Clinical and Experimental Medicine, University of Foggia, Foggia, Italy.
[3]Department of Clinical Sciences and Translational Medicine, University of Tor Vergata, Roma, Italy.
[4]Department of Biomedical Sciences and Public Health, Marche Polytechnic University, Ancona, Italy.

Aim: Odontogenic tumours (OT) constitute a group of heterogeneous diseases that range from hamartomatous tissue proliferations to benign and malignant tumours with metastatic potential. Epidemiological data of benign OT are conflicting, with significant differences among the countries. One reason for these discrepancies may be ascribed to an under-estimation of the OT frequency. Furthermore, real geographical difference based on ethnic differences is still to be demonstrated. Epidemiological data regarding OT has generally been obtained through single-centre analysis, often tertiary referral centres. However, this is biased in not demonstrating the actual population distribution of OT. This study aims to retrospectively determine the incidence and prevalence of OT in the Marche population, using data from the Institute of Pathology of the Marche Polytechnic University, Ancona, Italy, in a period of 25 years, according to 4th Edition of WHO Classification of Head and Neck Tumours.
Methods. The present retrospective study considered

only patients of Marche region treated for OT from January 1994 to December 2018. Data were retrieved and catalogued from clinical records and from the archive of the Institute of Pathology, Marche Polytechnic University, Italy. Because this is the only tertiary referral centre for Head and Neck pathology within Marche region, with a specialist diagnostic service for odontogenic lesions, the patient sample in the present study could be considered well representative of this geographical area. From each case, they were extrapolated the following information: age, sex, pathologic diagnosis, site distribution, and relapses. Because the 25-year period considered, histopathological slides of OT were re-evaluated by two pathologists to confirm the diagnosis, according to the current WHO criteria.
Results: Overall, 100 patients treated for OT from 1994 to 2018 and recorded at the Institute of Pathology, Marche Polytechnic University, Italy, constituted the sample of this study. The annual incidence rate of OT ranged from 0.13 to 0.39 per 100,000 per year, while life prevalence was 6.50 per 100,000. 131 surgical specimens were retrieved, corresponding to 100 primary OT and 31 recurrences. Mean age of occurrence for primary OT was 49.7 ± 20.1 years, with two peaks of frequency in the second-third decades and in the fifth decade. Regarding localization, posterior mandibular and anterior maxillary regions were the most commonly affected sites. Mean size of primary OT was 4.1 ± 1.7 cm, showing a significant difference between odontomas and the other OT ($p<0.05$). 27 patients developed tumour recurrences, and 4 of them showed a second recurrence over the years. The mean age at the first recurrence was 54 ± 19.7 years, with a peak of frequency in the fifth decade. Recurrent OTs were found more commonly in posterior mandible and anterior maxilla, and mean size was 4.1 ± 1.8 cm. Lastly, the mean recurrence time was 51.2 ± 34 months.
Conclusion: Although limited in its retrospective nature, these findings could be useful to determine the real incidence and prevalence of OT. Prevalence studies related to OT should be conducted in each tertiary referral center, in order to improve current epidemiological data.

Ambiguous clinical aspects making the diagnosis a challenge: oral syphilis

M. Lupatelli, M. Val, R. Marino, M. Ardore, S. Gandolfo, M.Pentenero.

Oral Medicine and Oral Oncology Unit, Department of Oncology, University of Turin, Italy

Aim: Syphilis is a re-emerging disease in the Western world: data from ECDC (European Centre for Disease Prevention and Control) showed that overall syphilis infection is increasing since 2010, especially among men who have sex with men (MSM). We present a case series of secondary oral syphilis diagnosed through clinical findings, serological laboratory assessments and histopathological analyses.
Case Series: Five males, aged between 24 and 59, had a diagnosis of secondary syphilis. At intraoral examination, single or multiple erosions and ulcers, often covered with greyish white pseudomembranes, located on buccal and labial mucosa, hard or soft palate, commissure of the lips, lateral borders and dorsum of the tongue were observed. Pain or regional lymphadenopathy were occasional findings. Two patients with oral lesions associated to palmar-plantar rush, also showed ocular and genital involvement. All patients had negative HIV test. When performed, histopathological examination revealed superficial and deep lymphocytes infiltrate with predominant plasma cells in a perivascular pattern. Diagnosis was reached in all the patients through specific serological tests (Anti-Treponema pallidum antibody or VDRL and TPHA).
Discussion: Syphilis is a systemic infectious disease caused by the spirochaetal bacterium Treponema pallidum subsp. pallidum. Transmission occurs mainly by sexual and close contacts with infectious lesions, blood transfusions and vertically during the pregnancy. Clinical manifestations are classified into four clinical stages: primary, secondary, latent and tertiary. In about two-thirds of patients the first clinical sign, the syphilis chancre, arises in the mouth where the upper lip in men and the lower lip in woman are the most common involved oral sites. The secondary stage is the result of haematogenous dissemination within 3 months of infection. In secondary oral syphilis, the most well-recognized lesions are multiple mucous patches, surrounded by erythema and covered by greyish/white pseudomembranes, and irregular linear erosions termed snail track ulcers, located more often on the soft palate, pillars, tongue and vestibular mucosa. The lesions are often painful and frequently associated with pharyngitis, tonsillitis and laryngitis.
The diagnosis of syphilis is a challenge for oral medicine practitioners as oral lesions may mimic several other diseases in the absence of any specific aspect. Usually lesions associated with secondary syphilis have non-homogeneous aspects including red patched and erosions sometime with pseudomembranes as observed in the present cases, while we only occasionally observed the presence of symptoms. Nevertheless, the non-specific presence of multiple symptomatic lesions potentially suggestive for an inflammatory disorder could lead to prescription of steroids which in turn have an immediate worsening effect. Such event, really useful to correct the

diagnosis, has to be promptly recognized in order to immediately stop a potentially harmful treatment.
Even in the presence of a clinical presumptive diagnosis, the diagnostic flow implies more than one step. The diagnosis is based on the identification of the pathogen in the lesion through direct tests (dark-field microscopy, histological examination and PCR) and on serological tests which are the mainstay in the diagnosis and follow-up of syphilis. In the clinical practice, the traditional algorithm includes a non-treponemal test (NTT), (e.g. RPR or VDRL test), confirmed by a treponemal test (TT) (e.g. TPHA or TPPA, or Anti-Treponema pallidum antibody). Benzathine penicillin G (2.4 million units administered intramuscularly in a single dose) remains the treatment of choice for primary and secondary syphilis. In this series patients were treated with BP with a complete healing in one month.

Immune-phenotype analysis in a large cohort of tongue squamous cell carcinoma patients

Marco Mascitti[1], Giuseppe Troiano[2], Barlattani Alberta[3], Zhurakivska Khrystyna[2], Carlo Caponio[2], Giuseppina Campisi[4], Andrea Santarelli[1], Lorenzo Lo Muzio[2]

[1]Department of Clinical Specialistic and Dental Sciences, Marche Polytechnic University, Ancona, Italy.
[2]Department of Clinical and Experimental Medicine, University of Foggia, Foggia, Italy.
[3]Department of Clinical Sciences and Translational Medicine, University of Tor Vergata, Roma, Italy.
[4]Department of Surgical, Oncological and Oral Sciences, University of Palermo, Palermo, Italy.

Aim: The recent success in the treatment of head and neck squamous cell carcinoma with checkpoint inhibitors has stimulated researchers in the understanding of the role that the immune system plays in cancer. The immune system interacts intimately with tumors over the entire process of disease development and progression to metastasis. Recently, Chen and Mellman classified cancer in relation to the immune system, distinguishing three phenotypes: Inflamed, Immune-escaped and Immune-desert. In this paper, we analyzed tongue squamous cell carcinoma (TSCC) samples, according to the aforementioned classification, in order to study the role of the immune system in this subtype of tumors.
Methods: In this study, a cohort of 211 randomly selected patients with TSCCs who were treated with curative intent at the Department of Maxillofacial Surgery, "Ospedali Riuniti" General Hospital, Ancona, Italy, between 1990 and 2017 were included. Clinical and radiologic data were obtained from patient medical records, and pathologic data were retrieved from the archives of the Sections of Pathology, Marche Polytechnic University, Italy. Pathological TNM (pTNM) classification of the TSCC cases was revised according to the 8th editions of the AJCC Cancer Staging Manual.
Inclusion criteria were: (a) primary TSCC; (b) no preoperative chemo- or radiation therapy nor adjuvant chemotherapy; (c) no human papilloma virus (HPV) infection. Tumors were classified on the basis of the immune infiltrated in: Inflamed, Immune-escaped and Immune-desert; and correlated with clinic pathological parameters.
Clinical endpoints examined were disease-specific survival (DSS) and disease-free survival (DFS). Follow-up time was calculated from the date of initial diagnosis to the date of recurrence (for DFS), to the date of death due to cancer (for DSS), or the date of the last visit without recurrence.
Results: Pathological analysis of immune-phenotype of TSCC samples revealed that: 68.2% (144/211) were classified as Inflamed, 19.9% (42/211) as Immune-Excluded, and 11.9% (25/211) as Immune-desert. DSS was significantly worse in patient with Immune-desert phenotype ($p < 0.05$).
Conclusion: The analysis of the immune-phenotype could be used to further stratify patients with TSCC. In particular, the Immune-desert phenotype seems to be prognostic of unfavorable long-term survival. A possible inclusion of this parameter in the clinical staging needs to be validated in further well-standardized studies.

Intra and post-operative bleeding and healing in patients using anticoagulant therapy: a large cohort study.

Marco Matarese[1], Mario Cherubino[1], Claudio Cosio[1], Carmelo Stelitano[1], Luca Ramaglia[2], Giovanni Matarese[1]

[1]Department of Biomedical, Odontostomatological, Sciences and of Morphological and Functional Images, School of Dentistry, University of Messina, Messina, Italy
[2]Department of Neurosciences, Reproductive and Odontostomatological Sciences, School of Medicine, University of Naples "Federico II, Naples, Italy

Aim: The aim is to evaluate intra and post-operative bleeding and healing during anticoagulant therapy with VKAs or DOACs in patients who underwent multiple extractions.
Methods: The study was carried out on 238 patients (average age 61.2) who needed from 2 to 6 extractions. All patients were divided into two groups (A or B) depending on the type of the anticoagulant therapy. Group A (44,1%) took VKA; these drugs have an

antagonistic action on the effects of vitamin K. 42 patients took Coumadin (Warfarin sodium, Bristol-Meyers Squibb Srl, Roma, Italia), the rest of group A (63 patients) took Sintrom (Acenocumarolo, Novartis Farma, Origgio, Varese, Italia). Group B(55,9%) took DOAC, direct oral anticoagulants, inhibit only selective coagulation factors. 40 patients were prescribed Pradaxa (Dabigatran etexylate mesylate, Boehringer Ingelheim it. Spa) , inhibitor for IIa factor. 60 were given Xarelto (Rivaroxaban, Bayer Spa), 24 patients Eliquis (Apixaban, Bristol-myers Squibb) and 9 patients Lixiana (Edoxaban tosylate, Daiichi Sankyo Italia Spa) the last three drugs mentioned inhibit Xa factor. Differently from Group A, Group B did not need a periodical blood collection to check INR, as the DOAC mode action extended the time of active partial thromboplastin (aPTT). Compared VKA to DOAC drugs have a half-life between 8 and 16 hours in patients with good renal function, higher bio-availability and reduced interaction with drugs and food. The antidote for Pradaxa, called Praxbind (Idarucizumab, Boehringer Ingelheim it. Spa) is a monoclonal antibody for hospital use only. Recently, the FDA have approved AndrexXA (Andaxanet, Portola Pharmaceuticals) as an antidote for Rivaroxaban and Apixaban, BevyxXa (Betrixaban, Portola Pharmaceuticals) as an inhibitor for Xa factor. In all Group A patients, cardiologists replaced VKA, with EBPM two days before and after surgery, in accordance with World Guidelines (WFO) if INR >3; while all Group B patients didn't need a therapeutic bridge. The Group B protocol consisted of a temporary suspension of DOAC for 24 hour before surgery depending aPTT and creatinine clearance in each patient. For all 238 patients a minimally invasive surgical approach was used; bleeding and hemostasis were controlled by using fibrin sponges, sutures and sterile gauze compresses. Ice was applied in the post- operative phase and a cold, liquid diet was reccomended to reduce destabilizing the coagulant and further bleeding. All patients were given antibiotics for 5 days, to be taken 1 day before surgery and 4 days after. We use visual examination for intra-operative bleeding and Iwabuchi classification for post-operative bleeding; also the healing was assessed by visual examination.

Result: there was no great difference in the amount of bleeding among patients in the same group. Group A showed more intra-operative bleeding. In Group A 11 patients showed a post-operative hemoragical complication for the next 7 days, while 5 patients in Group B had slight bleeding for 8 hours after surgery. Post-operative healing at 15 days was comparable between the Groups .

Conclusion: This study deduced that using DOAC drugs results in less intraoperative bleeding, fewer post-operative hemoragical complications and an easier administration of the drugs. However, further close collaboration between dentists, cardiologists and various medical specialists is essential for patient treatment and follow up in order to eventually modify drug prescription or evaluate temporary anticoagulant suspension.

New perspectives on the role of herpes simplex virus type 1 (HSV1) in the pathogenesis of functional intestinal disorders

E. M. Mattiuzzo[1] , S. Sivolella[1], J. Conti[2], E. Stellini[1], P. Brun[2]

[1]University of Padua, Department of Neurosciences, Section of Dentistry, Padua, Padua, Italy
[2]University of Padua, Department of Molecular Medicine, Section of Microbiology, Padua, Italy

Aim: The purpose of this communication is to present a new research about functional gastrointestinal diseases (FGIDs) related with dysmotility. It is based on the hypothesis of an enteric nervous system (ENS) damage caused by the HSV1 virus reactivated in the oral cavity and swallowed with saliva both during oral herpetic infection (recrudescence) and asymptomatic phase.

Methods: Three literature reviews using Pubmed were conducted to analyze the relation between asymptomatic shedding of HSV1 into saliva and damage to ENS caused by HSV1 infection who leads to many FGIDs. The first one was about detection of asymptomatic shedding of HSV1 into saliva samples using the following search criteria: ("herpesvirus 1, human"[MeSH Terms] AND ("saliva"[MeSH Terms] OR "saliva"[All Fields])) OR ("mouth"[MeSH Terms] OR "mouth"[All Fields] OR ("oral"[All Fields] AND "cavity"[All Fields]) OR "oral cavity"[All Fields])) AND (asymptomatic[All Fields] AND shedding[All Fields]). The second one about the ENS damage caused by HSV1 using the following mesh:("enteric nervous system"[MeSH Terms] OR ("enteric"[All Fields] AND "nervous"[All Fields] AND "system"[All Fields]) OR "enteric nervous system"[All Fields]) AND ("viruses"[MeSH Terms] OR "viruses"[All Fields] OR "virus"[All Fields])) AND ("infection"[MeSH Terms] OR "infection"[All Fields]. The third one about the FGIDs related with HSV1 infection using this search formula: ("gastrointestinal diseases"[MeSH Terms] AND ("herpesvirus 1, human"[MeSH Terms] OR "human herpesvirus 1"[All Fields] OR "hsv1"[All Fields]) In vitro, in vivo and clinical studies published in English between 2000 and January 2019, including systematic reviews, were selected. Case reports, with HIV-positive subjects or patients on treatment with antiviral drugs, which included other associated

pathologies as cancer were excluded. Articles which fulfilled the inclusion/exclusion criteria were identified for a full-text reading

Results: For the first research 34 potentially relevant studies were found but only 6 articles were focused on our purpose. For the second one there were 71 results but just 7 inherent the Herpesviridae family. The third research ended with 118 articles, 8 of which were selected.

Conclusion: There is some evidence of asymptomatic shedding of HSV1 from the oral cavity, but at the same time there's a lack of clinical data that asses the frequency of reactivation of mature and infectious particles of HSV1 that can be found in the saliva of asymptomatic adult subjects. It has been demonstrated on animal study models that intragastric or vaginal HSV1 inoculation establishes a latent infection in the myenteric ganglia of ENS. HSV1 infection makes enteric neurons recruit macrophages via production of a specific chemoattractant factor. The resulting inflammatory reaction is mandatory for intestinal dysmotility, and many relations between gastrointestinal diseases and HSV1 were highlighted. The future research will be focused on the association between cultural methods on Vero cells (HSV1 susceptible and permissive cells for HSV1) and the molecular techniques based on the use of real-time PCR and specific oligonucleotide (which will confirm the presence of HSV1 in the cell culture). At the same time the possible presence of FGIDs associated symptoms will be evaluated using questionnaire in patients whose saliva will be collected and screened for the presence of HSV1.

MRONJ: an 8-year retrospective study of 100 cases in a single specialist oral surgery unit

Vittorio Zavaglia[1], Alessandra Nori[1], Federico Mazzoni[2], Giuseppe Troiano[3], Claudia Arena[3], Marco Mascitti[2], Maurizio Procaccini[2], Andrea Santarelli[2].

[1]Special and Surgical Stomatology Department, "Ospedali Riuniti" Hospital of Ancona, Ancona, Italy
[2]Department of Clinical Specialistic and Dental Sciences, Marche Polytechnic University, Ancona, Italy
[3]Department of Clinical and Experimental Medicine, University of Foggia, Foggia, Italy

Introduction: Medication related osteonecrosis of the jaw (MRONJ) is a potential adverse effect related to the use of several drugs, including antiresorptive and antiangiogenic drugs. This pathology is triggered by a continuity solution of the mucosa, such as dental extractions, and is characterized by the progressive bone destruction in the maxillofacial region. The presence of all the following characteristics may suggest that the patient is affected by MRONJ: current/previous treatment with antiresorptive or biological agents; exposed bone or bone that can be probed through a fistula that persists for more than 8 weeks; no history of head and neck radiotherapy or metastatic disease to the jaws. The aim of this retrospective study is to present a 8-year case series follow-up in a group of patients with MRONJ in treatment with antiresorptive or antiangiogenic agents for osteoporosis or cancer that attack the bone tissue.

Methods: We report a case series of 100 consecutive patients, from 2011 to 2018 affected by MRONJ. They were divided in two groups on the basis of the pathology for which the drug was originally prescribed: group 1 (cancer) and group 2 (osteoporosis). The patients were also divided in 3 groups based on previous/current administered therapy: group A (only bisphosphonate), group B (denosumab), and group C (other drugs). The patients of group 1 were treated against osteoclast-mediated bone loss due to bone metastases. Age, sex, type of therapy, systemic and local risk factors, grade of MRONJ, tumor type, surgical treatment, and recurrence were recorded. Treatment depended on the stage of MRONJ, consisting in medical and minimally-invasive surgical procedures. Follow-up consists in regular clinical and radiological evaluation at days 10, 30, months 3, 6, and 12, to ascertain the absence of recurrences.

Results. 100 patients with MRONJ were selected (74 patients in group 1 and 26 in group 2). Our results showed a mean age of 67.5 ± 12.5 years. The mean administration time of drugs in oncological patients was 32.6 ± 37.8 months. According to MRONJ staging, 49 cases were Stage 1, 29 cases in Stage 2, and 22 in Stage 3. The lesions were predominantly located in the mandible (n = 67). The most common predisposing factor was periodontitis (n = 19), while regarding systemic risk factors was long-term use of systemic corticosteroids (n = 26). 18 cases of recurrent MRONJ were observed. Regarding recurrence risk, no statistical differences were observed in the studied groups.

Conclusion: These results seem to suggest that patients who developed MRONJ have the same risk of recurrence regardless of the type of drug or the underlying disease. For prevention of MRONJ recurrences, periodical dental examinations are recommended.

Giant cell lesions associated with hyperparathyroidism: clinico-pathological features, diagnostic and therapeutical management on 12 patients.

P. Mezzapesa[1], F. Dell'Olio[1], A. Carrassi[1], G. Barile[1], Di Nanna[1],

P. Lorusso[2], L. Limongelli[1], G. Favia[1]

[1]Complex Unit of Odontostomatology, DIM, Interdisciplinary Department of Medicine, Aldo Moro University of Bari, Italy
[2]Unit of Anesthesiology, DAE, Emergency Department, Aldo Moro University of Bari, Italy

Aim: Central and peripheral giant cell lesions of the jaws are benign lesions characterized by the presence of multinucleated giant cells likely derived from osteoclasts. While primary giant cell lesions are usually single and generally heal after surgical excision, those associated with hyperparathyroidism can often be multiple and recurrent, and require detection and resolution of the causes of the endocrine unbalance (mainly parathyroid adenomas) other than a surgical approach in order to reach the resolution of oral manifestations. The aim of this study was to describe diagnostic and therapeutical management of 14 giant cell lesions secondary to hyperparathyroidism.
Methods: 12 patients (9 females and 3 males) came to our attention in the Complex Operating Unit of Odontostomatology of the "Aldo Moro" University of Bari between 2010 and 2018, showing overall 14 lesions clinically suggesting a diagnosis of giant cell lesions. Every patient underwent oral examination, panoramic radiogram and computed assisted tomography to assess lesions' real extension and the relation with bone. Surgical excision was performed, rotative and piezo-surgical tools were used to remove all pathological residual from the bone. Once histopathological examination confirmed the clinical diagnosis, standard blood tests, markers of bone metabolism and of parathyroid function, such as serum levels of calcium and phosphate, bone alkaline phosphatase, 25-hydroxycolecalciferol, parathyroid hormone dosage, clearance of creatinine and glomerular filtration rate, were investigated; moreover, neck ultrasonography was also prescribed in order to assess the structure of parathyroid glands and to find pathological lesions. Patients received internist and general surgeon's evaluation for the treatment of hyperparathyroidism. Clinical follow-up was performed monthly, and radiological one, with panoramic radiogram, was carried out every three months during first year from surgical excision and every six months during the second one.
Result: Among 12 treated patients, 9 presented brownish gingival nodular lesions, diagnosed as peripheral giant cell lesions, generally involving one or more teeth, while 3 patients showed intra-bone radiolucent unilocular or multilocular lesions, diagnosed as central giant cell lesions, occasionally reported during routine radiological exams. All patients had a diagnosis of hyperparathyroidism, which causes treated by general surgeons were: parathyroid hyperplasia in 3 cases, parathyroid adenoma in 7, 1 case of parathyroid carcinoma and 1 case of cyst arisen in ectopic parathyroid glands located in thyroid gland. All lesions, treated using our diagnostic and multidisciplinal protocol, healed, without recurrence after a mean follow up of 2 years. No signs of paresthesia of inferior alveolar nerve were found during follow up of central lesions of the mandible.
Conclusions: We can affirm that giant cell lesions related to hyperparathyroidism can affect both soft and hard tissues in the oral cavity. First and second level radiological exams are useful to evaluate the real extension of the lesions, especially in case of central ones. A local surgical approach followed by a systemic treatment of hyperparathyroidism can widely resolve the problem and prevent recurrences.

Oral mucositis in patients suffering of acute lymphoblastic leukemia

C. Monsone, R. Nucera, A. Artemisia, E. Gatto, A. Lo Giudice, A. Militi, A. M. Bellocchio, R. Castellaneta, L. Rustico, M. Portelli.

University of Messina - Dept. of Biomedical Sciences, Dental Sciences and Morpho-Functional Imaging Dental School - Oral Pathology

Aim: Leukemia is the most common form of cancer in childhood. The disease is characterized by an high incidence of oral complications at diagnosis and during subsequent treatment. Oral complications can be divided in three groups. Primary lesions are induced by the infiltration of the oral structures by malignant cells: gingival infiltration and infiltration of bony oral structures. Secondary lesions are the result of the myeloblastic character of the disease. This group contains symptoms of anemia, increased bleeding tendency and increased susceptibility to infections. Tertiary lesions are induced by the antileukemic treatment patients receive. The aim of this study is to describe the oral complications in young patients with acute lymphoblastic leukaemia and the methods of prevention and management before, during and after the cancer treatment.
Methods: Authors describe in particular the oral mucositis (OM) that is a painful and inflammatory ulcerative lesion occurring as an adverse effect during chemotherapy in young patients with acute lymphoblastic leukemia (ALL). Oral mucositis occur in more than 40% of patients treated with standard dose of chemoterapy drugs and in more than 70% of patients treated with high dose of chemoterapy drugs. Mechanisms that lead to OM are rather complex and not only related to the citotossic effects of drugs on the rapid turn-over cells of the oral epithelium.

Chemotherapy drugs block the reproductive capacity of basal ephytelium cells. The absence of new cells produce a thinning of oral mucosa, that becomes atrophic and predisposed to ulceration. This condition may cause significant systemic anomalies such as malnutrition, opportunistic infections, and delay in the chemotherapy course.
Result: Severe oral mucositis often causes cancer patients to partially or completely discontinue/ modify cancer therapy regimen, which adversely affects the curative effects of cancer. Some individual characteristics such as age, sex, nutrition, oral hygiene, salivar secretion, smoke and genetics patterns can influence the onset and the gravity of oral mucositis. The most common chemotherapy drugs that can produce oral mucositis are: etoposide, metotrexato, 5-fluoruracile, cisplatino, citarabina, irinotecan, paclitaxel e dacarbazina. Oral mucositis can interest every part of the oral mucosa, however the most frequent zone are the non cheratinized areas such as the internal part of cheeks and lips, soft palate, lateral and inferior part of the tongue and oral flor. Therefore, the control of oral mucositis is important and indispensable for improvement of quality of life and prognosis of patient affected by acute lymphoblastic leukaemia.
Conclusion: It is necessary to emphasise the importance of early detection of OM through a close clinical oral examination of children and adolescents with ALL undergoing to chemotherapy. Pain and infection control and the maintenance of good levels of oral hygiene are fundamental during the management of OM. Therefore, dentists need to be part of the oncology care team, and thus contributing and helping with ALL treatment.

Role of intraoral ultrasound in evaluating tumor depth and thickness: case report

A. Montori*, F. Rocchetti, L. D'alessandro, G. Tenore, A. Del Vecchio, V. Cantisani, U. Romeo

Department of Oral and Maxillo-Facial Sciences, Chief: Prof. Barbato E. Sapienza University of Rome, Italy

Aim: The management of patients affected by early stage (T1-T2) of oral squamous cell carcinoma (OSCC) clinically N0 is still controversial. In fact, even if in 30% of cases the post surgical follow up has shown the presence of occult metastases in latero-cervical lymph-nodes; on the other hand, in 70% of patients with OSCC clinically and radiographically N0, the selective latero-cervical lymph-nodes dissection proved to be an overtreatment. Tumor depth of invasion (DOI) is the extent of tumor growth beyond lamina propria; it is different from tumor thickness that includes exophytic and endophytic growth. The Literature considers DOI as the most important prognostic factor in prediction of local recurrence and occult lymph-node metastases; nevertheless a precise cut-off value of DOI, indicating the need of a neck selective surgical treatment is still uncertain. Moreover, in OSCC cases with DOI≤4mm or close to implant-prosthetic rehabilitations, Computed Tomography and Magnetic Resonance (MRI) are unable to detect the tumor. The question is whether an alternative diagnostic method could detect reliable values of DOI, in order to provide a pre-operative indication to latero-cervical lymph nodes selective dissection in stage cT1-T2 N0 M0 patients. Ultrasonography is a non-invasive, radiation free, easy-to-use and inexpensive exam used in oral pathology for the diagnosis of: mucoceles, salivary glands diseases, lipomas and vascular lesions. This case report describes an intraoral ultrasound (IUS) application in the evaluation of oral cancer parameters that influence therapy and prognosis and the proposal for its inclusion in OSCC diagnostic flowchart.
Methods: A 80-year-old male patient with negative history for risk factors associated with oral cancer, presents an OSCC on the left side of tongue. The patient brought at the first visit, an head and neck MRI with/without constrast agent. The IUS of the lesion was performed by E-CUBE 15 EX scanner (Alpinion, Seoul, Korea) with linear intraoperative "hockey stick" probe with 8-17 transducer MHz, while the neck ultrasonography was performed by a 3-12 MHz transcutaneous linear probe at the Operational Simple Unit of Diagnostic and Ultrasonographic Innovations. The DOI was calculated by intraoral ultrasound device and it was matched with the correspondent parameter derived by post-operative histological specimen examination and with the tumor total thickness measured also by the IUS. The procedure was done to investigate a correlation between the two types of growth. It was also verified whether the aspecific lymphadenopathy detected by ultrasound corresponded to lymph-node metastasis, then confirmed by TNM.
Result: The DOI calculated by the IUS was 4mm while it was 3mm at the histological examination. So the IUS seemed not to underestimate DOI. MRI reported one pathological lymph node in left laterocervical region appearing as a non-specific lymphadenopathy on neck ultrasonography; this has been confirmed as metastasis by the TNM. The total histological thickness was 5mm.
Conclusion: The IUS seems not to underestimate DOI, then it could be considered a diagnostic support for OSCC surgery and especially for targeting those patients who need selective treatment of the neck. Difference between DOI and thickness

values confirm that thickness could be a misleading parameter in predicting disease biological behavior. Ultrasonography of neck lymph nodes, performed contemporarily to IUS, could be used as a first step to formulate a diagnostic suspicion of nodal metastasis in OSCC N0 clinical staged patients.

The "dark side" of glucose transporter 1 (GLUT1) in opmd and oscc: an experimental study

Mattia Moretti[1*], Alessandra Lissoni[1], Chiara Moreschi[1], Gianluigi Arrigoni[2], Claudio Doglioni[2], Giorgio Gastaldi[1], Silvio Abati[1]

[1]Vita-Salute San Raffaele University - Dept. of Dentistry, Dental Clinic - IRCCS San Raffaele Hospital, Milan
[2]Vita-Salute San Raffaele University - Pathology Unit - IRCCS San Raffaele Hospital, Milan

Aim: Oral pre-malignant and malignant diseases are a group of clinical conditions whose diagnosis, therapy and follow-up are complex and often belated. Therefore, it is essential to acknowledge and identify possible evolution's markers of OPMDs, in order to correctly plan the patient's care pathway. Among these, the proteins involved in glucose metabolism are promising: GLUT1 is an integral membrane glycoprotein involved in basal glucose uptake.
Methods: This study has been performed in a cohort of 43 patients, afferent the Oral Medicine and Oral Pathology Unit, Dept. of Dentistry, San Raffaele Hospital, Milan, showing clinical lesions compatible with OPMDs [Leukoplakias: 19/43 (44,19%); OLPs: 16/43 (37,21%)] and OSCC [8/43 (18,60%)]. In order to confirm the diagnosis of the oral medicine expert, after obtaining informed consent, incisional biopsies were performed, following the 14 days-rule. The specimens were routinely processed by the pathologist: serial sections from the samples were dyed with the immunohistochemical technique using the streptavidin-peroxidase method and monoclonal antibodies anti-GLUT1. The staining intensity was classified as 1,2,3 for respectively weak, moderate and strong intensity by two observers, that analyzed independently the samples to exclude any possible bias before conveying to the final evaluation. Statistical analysis was performed using the Pearson Chi-square and Fischer's exact test (JMP 9.01 software).
Result: The pathologic examination allowed the stratification of the samples by histologic features as follow: 12 keratoses without associated inflammatory signs (27,91%), 18 lesions with chronic lichenoid infiltrate (41,86%), 5 lesions associated to dysplastic changes (11,63%) and 8 carcinomas (18,60%). Analyzing the staining intensity of GLUT1 in those groups, it was possible to underline some interesting findings; in the lesions without inflammation, the staining was weak in 8/12 (66,67%), moderate in 4/12 (33,33%) and strong in no lesions. On the counterpart, for the lesions characterized by inflammatory elements the staining was weak in 7/18 (38,89%), moderate in 11/18 (61,11%) and strong in no lesions. Therefore, in the dysplastic lesions, the staining was weak in no lesions, moderate in 3/5 (60,00%) and intense in 2/5 (40,00%) while in all cases of oral cancer the staining intensity was strong. These data entail a statistically significant difference in the staining intensity of GLUT1 between the lesions with and without inflammation, the dysplastic lesions and the carcinomas ($p < 0,0001$).
Discussion: The increasing marker's expression respectively in keratoses, inflammatory lesions, dysplastic areas and OSCC is an important finding: the evidence-based literature provides only a few studies about the role of GLUT1 in the inflammatory diseases of the oral mucosa and its involvement in malignant transformation, while well known is its over-expression in many of the human neoplasms, including the OSCC, as we confirmed. This is connected to increased glycolysis-related energetic supply typical of the tissues stressed by an afinalistic growth. Furthermore, the marker's expression in the lesions with an inflammatory substrate, which is higher in lesions with erosive clinical appearance compared to those with keratotic, reticular or atrophic features, could suggest the role of inflammation in the multi-step oral carcinogenesis. The role which is certainly played by GLUT1, a promising marker useful for the identification of lesions more prone to evolve into cancer, that needs a more strict follow-up.

Recurrence of leiomyosarcoma with oral localization presenting in a symptomatic dental context: a case report

Chiara M. Morini, Fabiola Toma, Pietro Montemezzi, Beatrice Mainardi, Attilio Peri, Alessandra Lissoni, Silvio Abati

Oral Pathology Unit, Dept. of Dentistry, IRCCS San Raffaele Scientific Institute, Milan, Italy, Vita-Salute San Raffaele University, Milan, Italy

Aim: Leiomyosarcomas (LMS) account 10-20% of soft tissue sarcomas, arising in adults and affect women more frequently. It is a rare entity in the head and neck, it manifests as a solid, non-painful mass, accounting for 1% of malignant neoplasms in this area. Only 0.065% of the LMS had an intra-oral location because of the lack of smooth muscle at this side. Therefore it has been proposed that tonaca media of blood vessels might be the origin of oral

LMS (vascular subtype). The exact etiology of LMS is uncertain, both viral and traumatic hypotheses were taken into consideration. The definitive diagnosis for LMS is only through surgical biopsy and histopathological examination. LMS is treated with surgery followed by primary and adjuvant radiotherapy or in selected cases with hadrontherapy.
Case presentation: A male patient of 48 years old with a medical history of G3 right latero-cervical LMS treated with hadrontherapy came for dental pain related to the first quadrant. The clinical intra-oral examination showed an exophytic gingival neoformation that was immediately biopsied, with the suspect of malignancy. The histological diagnosis was sarcoma with a leiomyosarcoma differentiation. OPT examination reported non-recoverable teeth, and surgical extractions of 17, R16, 14, 13 and 12 were performed. The patient was immediately referred to the oncologist for the further investigations and treatment that included a new cycle with hadrontherapy.
Result: NMR showed the gingival lesion infiltrating the alveolar bone through its whole thickness and with maximum extension on the buccal side. The lesion developed cranially and anteriorly the buccal space and the buccinator muscle, and the anterior inferior surface of the maxillary sinus indissociable to the periosteum but with intact cortices. The right maxillary sinus membrane presented inflammatory mucosal thickening. The dimension of the lesion was 25x25 mm on the axial plane and a sagittal extension of about 27 mm.
Conclusion: Occurrence in the oral cavity of LMS is considered extremely rare. The clinical objective examination gave an immediate suspect of malignancy and the histology confirmed the suspect. Interestingly the patient complained for dental pain and it wasn't interested of the gingival mass. Oral LMS are frequently asymptomatic and the dental pain has allowed us to highlight a worse clinical situation. In the context of head neck tumors, periodic follow up by the dentist is extremely useful, as well as proper assessment is essential to safeguard the patient's health.

Is autologous platelet concentrate application effective for prevention of medication-related osteonecrosis of the jaw? A pilot study

D. Pacifico, A. Antonelli, F. Bennardo, Y. Brancaccio, C. Buffone, A. Giudice

School of Dentistry, Department of Health Sciences, Magna Graecia University of Catanzaro

Aim: Medication-related osteonecrosis of the jaw (MRONJ) is a common complication occurred in patients treated with bisphosphonates or anti-resorptive drugs. MRONJ is an insidious dental-medical complication that appears to be associated with invasive dental procedures such as extractions, implant placement or other procedures involving bone surgery performed in these patients. Although several strategies have been proposed for the treatment or prevention of MRONJ, the elimination of any potential infection sites seems to be the best approach to avoid the onset of MRONJ. The aim of this pivotal study is to show if a protocol based on using autologous platelet-rich fibrin (PRF) can improve the post-extraction alveolar bone healing processes or prevent the bone necrosis in patients with a high risk of MRONJ.
Methods: In our study we considered consecutive patients in treatment with bisphosphonates or anti-resorptive drugs who required extraction of non salvageable teeth. Eligibility criteria were 1) age 18 years and older who used intravenous BPs or anti-resorptive drugs for at least 6 months, 2) ability to complete the present clinical trial, 3) no history of radiation therapy to the jaw, 4) need to remove at least two highly compromised dental elements in the same jaw, 5) No clinical signs of MRONJ recorded during the first visit. Exclusion criteria were 1) teeth extraction in the 3 months before the study, 2) pregnant or breastfeeding women, and 3) confirmed or suspected hypersensitivity caused by the medication used. Clinical and radiological examinations were carried out to determine the condition of every residual teeth and bone status. All patients were initially treated with antibiotic, professional dental hygiene and mouth rinse with chlorhexidine 0.2%. Protocol surgical extraction was performed under local anaesthesia by an experienced oral surgeon. After teeth extraction, one site was filled with L-PRF membranes and one site was only sutured with a crossed-over mattress to approximate the wound edges. After surgery, patients were given standard post-operative instructions with antibiotic therapy according to SIPMO protocol. Sutures were removed 7 days after surgery. Initially patients were followed up at 7 and 14 days by a masked outcome assessor analysing the status of post-extractive sites. Follow-up was performed after 1, 2, 4 and 6 months.
Result: Six patients with a high risk of MRONJ with the need to remove at least two highly compromised dental elements matched all the inclusion criteria. Five women and 1 man (age range 59 to 81 years; No smoking or drinking habits) were included: 3 patients had osteoporosis, 2 patients had breast cancer and 1 patient had prostate cancer. Medication-related osteonecrosis of the jaw occurred in 2 post-extraction sites; no statistical differences could be reported regarding age, gender, duration of bisphosphonate

treatment and patients' under-lying diseases.
Conclusion: Even with many limitations, the proposed surgical protocol can be a possible choice for patients treated with intravenous anti-resorptive drugs who need teeth extraction. However, in this first report the authors found similar findings. No significative differences were found in site treated with o without PRF in terms of prevention of MRONJ. Further prospective, possibly randomized studies are necessary to determine if this statement would be the same with larger patient samples in different clinical settings.

Do the changes in oral microbiota correlate with plasma nitrite response?

Khrystyna Zhurakivska[1], Giuseppe Troiano[1], Mario Dioguardi[1], Marco Mascitti[2], Andrea Santarelli[2], Federica Canepa[3], Olga Di Fede[3], Lucio Lo Russo[1]

[1]Department of Clinical and Experimental Medicine, University of Foggia, Foggia, Italy
[2]Department of Clinical Specialistic and Dental Sciences, Università politecnica delle Marche, Ancona, Italy
[3]Department of Surgical, Oncological and Oral Sciences, University of Palermo, Palermo, Italy

Aim: It is known that dietary NO3– is reduced in the oral cavity by certain microbes which reside in the mouth. Once ingested, NO2– is non-enzymatically reduced to NO in the gastric acidic milieu. Then, NO3– and remaining NO2– are absorbed in the small intestine. Plasma NO2– can then be reduced to NO and participate to the regulation of various biological processes. Complementary to endogenous NO production, this cycle of dietary NO3– being converted to NO in physiology is known as the nitrate-nitrite-nitric oxide pathway and the oral microbiota plays a fundamental role in its regulation. The alteration of salivary NO3- metabolism following the use of antibacterial mouthwashes has been deeply demonstrated. However, in order to evaluate the real impact of oral microbiota alteration on the ciculating NO species, an evaluation of their plasmatic changes is necessary. The aim of the present review is to systematically analyze the scientific literature in order to define whether the alterations of oral microbiota may have repercussions on plasmatic content of NO metabolites.
Methods: Electronic databases were screened independently by two authors in order to select studies suitable for inclusion in this revision. The following protocol was used: "oral bacteria" and (nitrate OR nitrite OR nitric). Only clinical studies where the blood NO3- and NO2- measurements were available and correlated with oral microbiota variations were included.
Result: The primary outcomes of the review regarded the correlation between the changes in oral microbiota and plasmatic concentration of NO species. The secondary outcomes consisted of salivary NO2- changes and blood pressure changes in relation to the variation in oral microbiota and identifying of NO3-reducing species. Ten studies were included in final qualitative analysis. The designs of the experiments were almost heterogeneous among the studies, so it was not possible to perform a quantitative analysis. In six included studies the effect of various mouthwashes on NO3- metabolism was investigated, providing discordant results among the studies. Four studies detected a significant negative influence of the mouthwash on plasmatic nitrite concentration ($p<0.05$), meanwhile other two studies found no alteration of plasmatic nitrate and nitrite by mouthwash compared to placebo. Other four studies concerned the indentification of oral species and their correlation with plasmatic NO2- changes. The most abundant species emerged to be: Prevotella melaninogenica, Veillonella dispar, Hemophilus parainfluenzae, Neisseria subflava, Veillonella parvula, Fusobacterium nucleatum subsp. nucleatum, Campylobacter concisus, Leptorichia buccalis, Prevotella intermedia. The secondary outcomes regarded the salivary NO2- changes following mouthwash intervention, confirmed a significant influence of the mouthwash on salivary nitrite concentration compared to the controls. In five of the included studies also the Blood Pressure (BP) changes were evaluated in correlation with antibacterial mouthwashing. Only three studies suggested a significant increase of systolic BP following the mouthwash compared with controls.
Conclusions: while the role of oral bacteria has been unequivocally demonstrated in the regulation of salivary NO3- metabolism, their influence on plasmatic concentration of NO species remains ambiguous. Further studies with larger samples are necessary in order to demonstrate if an alteration in oral microbiota composition may influence the blood content of NO3-/NO2-/NO and, consequently, all the biological processes depending on them.

An epidemiological clinical study on 45 lesions of jaw bones

Henri Panajoti[2], Matteo Galullo[2], Matteo Nagni[2], Claudia Caravetta[1], Raffaele Vinci[3], Silvio Abati[3]

[1]Student, Dental School, Vita-Salute University and IRCCS San Raffaele Hospital, Milan, Italy
[2]Oral Surgery Specialization School, Vita-Salute University and IRCCS San Raffaele Hospital, Milan, Italy
[3]Associate Professor, Department of Dentistry, IRCCS San Raffaele

Hospital, Milan, Italy

Aim: Lesions of jaw bones are tipically benignant, characterized by slow and expansive growth.
Cystic lesions of the jaws are pathological bone cavities, tipically filled with fluid. Lesions of the jaws are classified according to the "2017 World Health Organization's Classification of Head and Neck Tumors" by prof. Takata and prof El-Naggar. Many epidemiological studies have focused on the incidence of the cysts of maxillary bones but, in literature, there are no studies based on the recent last WHO classification. The aim of this study is to describe the incidence of the main clinical forms, on epidemiological basis, through a retrospective clinical study on 45 patients treated in the Department of Oral Surgery of San Raffaele Hospital, in Milan, during year 2017; data about localization, dimensions and post-surgery re-ossification were collected. Results were compared with those of the most relevant literature.
Methods: In this study 45 cystic lesions of the jaws, from 45 patients treated in the Department of Oral Surgery of San Raffaele Hospital, have been analized. In this study have been included 45 patients, 24 male and 21 female; the age was between 15 and 80 years old. Histopathological examinations were made by the Histology and Pathology Department of San Raffaele Hospital in Milan. Clinical and radiological data were collected, lesions were enucleated and examinated and the diagnosis was made on the basis of the 4th edition of "World Health Organization's Classification of Head and Neck Tumours". Results were compared with those of the most relevant literature on the subject.
Result: The radicular cyst represent the most common form of odontogenic cysts, followed by follicar cyst, odontogenic keratocyst and lateral parodontal cyst. In this study, radicular and follicular cysts show a clear preference for the jaw, while all keratocysts were associated with the upright branch and the mandibular branch. At the OPT, lesions show a dimension between 2cm and 6cm.
Conclusions: Our study reported the incidence of the main clinical forms of cystic lesions of the maxillary bones, in association with sex, age and anatomic distribution. From this study it is clear that most of the cystic lesions are associated with swelling and / or algic symptomatology.

Oral malignant melanoma misdiagnosed for a benign melanotic macula: a case report

Lorenzo Perini[1*], Alessandra Lissoni[1], Letizia Carenzi[1], Luca Cisternino[1], Stefano Bondi[2], Matteo Trimarchi[2], Silvio Abati[1]

[1]Università Vita-Salute San Raffaele - Dip. di Odontoiatria, Dental Clinic - IRCCS Ospedale San Raffaele – Milano, Italy

[2]Università Vita-Salute San Raffaele – Dip. Di Otorinolaringoiatria – IRCCS Ospedale San Raffaele – Milano, Italy

Aim: This case report has the purpose to describe a singular case of oral malignant melanoma at the IV stadium, previously misinterpreted elsewhere as a benign melanocytic macula. Melanoma is a malignant tumor, predominantly cutaneous, that origin from the melanocytes. Oral malignant melanoma (OMM) is quite rare, accounting just for less than 0.5% of all malignancies, although in the last years it has been observed a higher incidence of the cutaneous melanoma due to an increased exposition to the sunrays. The onset of the cutaneous melanoma is strictly related to the sunburns caused by excessive solar exposition, especially during the young age. People with light skin color and blond hair have a greater chance to develop this neoplastic lesion.
Case report: a 45 years old male patient, light-smoker (2 cigarettes a day from 20 years), came to the Oral Pathology Unit of San Raffaele Hospital, Milan, for a second opinion of his condition. He showed an ulcerated melanocytic lesion starting from the facial gingiva on the central and lateral right incisors that extended palatally to one-third of the hard palate. He reported that the lesion was already observed and investigated in 2013: the biopsy resulted negative and the histology diagnosed a benign melanocytic macula. As years went by, the lesion evolved, ulcerating the midline of the hard palate. A punch biopsy was immediately performed to prove the suspects of a malignant lesion. The histology confirmed the presence of a chorion's infiltrating melanoma. Radiologic exams, such as the CT of the maxilla with a contrast agent and NMR, were requested to better figure out the entity of the lesion. The results didn't add many other details, except the uptake of the contrast agent in the latero-cervical lymph nodes. The multidisciplinary group with oncologists, radiologists, otolaryngologists, and the oral medicine team had several encounters to establish the best and more effective surgical treatment for the patient. The final decision was to be more conservative as possible, as expressively requested by the patient. The surgery started with the extraction of eight teeth in the superior maxilla, from the second right premolar to the left canine, performed by the oral medicine expert and the oral surgeon, then the otolaryngologist finalized the complete removal of the lesion through a mucosectomy of the hard palate and the partial removal of the superior alveolar process. The mucosa of the palate was replaced with an epithelial graft taken from the upper neck in order to be able to start immediately the radiotherapy cycle. The external jugular chain lymph nodes and the sub-mandibular salivary glands were removed as well. The histology of the tissues removed during the 12-hours intervention

classified the lesion as lentiginous melanoma in situ, but fortunately, the lymph nodes were free from neoplasia. The surgery was effective and the patient was discharged, after the insertion of a tracheostomic cannula with a nasal-gastric probe. The patient is currently following the radiotherapy protocol and did request a pain therapy to relieve his condition. His 1-year survival rate has been estimated around 15%.
Conclusion: Malignant melanocytic lesions in the oral cavity are extremely rare, but not impossible. It is always important to re-evaluate all the suspect lesions, following scrupulously the 14-days rule, even after a previous benign histology diagnosis.

Oral lichen-like reaction in chronic graft versus host disease

Chiara Rigon[1], Anna Grigoletto[1], Ludovica Pampaloni[1], Annalisa Angelini[2], Christian Bacci[1]

[1]University of Padova, Department of Neurosciences, Section of Clinical Dentistry, Giustiniani Street 2, 35128 Padova, Italy
[2]University of Padua, Department of Cardiac, Thoracic and Vascular Sciences, Section of Pathological Anatomy, A. Gabelli Street 61, 35128 Padova, Italy

Aim: This case report presents the process of differential diagnosis between a lichen and an oral lichen-like reaction in chronic Graft Versus Host Disease (GVHD). GVHD is a complication of Hematopoietic Stem Cell Transplantation (HSCT) that affects multiple organs.
Methods: A 30-years-old female patient with a diagnosis of lymphoblastic lymphoma, treated by chemotherapy and transplantation of bone marrow, has been sent to our Unit of Oral Pathology and Medicine of the UOC Dental Clinic of University of Padova for suspected lichen of the oral mucosa. Oral investigation showed erosive lesions of the vestibular adherent gingiva on the frontal group of both dental arches, erythematous lesions of the buccal mucosa on the left inferior arch, disepithelization areas with eritroleukoplastic patches on the tongue, warty and in relief lesions of the hard palate and Wickham striae of the vestibular area of the cheeks. A swab for mycotic and bacteriological assessment and Velscope investigation (Vx® System LED Dental Inc) has been carried out. It has been taken an incisional biopsy of 0.4x0.3 cm dimensions of the interproximal vestibular papilla between 42 and 43 for histological examination and a 0.5 cm diameter punch more apically for direct immunofluorescence examination. The surgery has been performed under a single dose of Clarithromycin 500 mg taken as antibiotic prophylaxis one hour before the treatment, as suggested by Hematology Department, and under local anesthesia by use of 3% mepivacaine hydrochloride without vasoconstrictor.
Result: Clinical, histological and microbiological results demostrated lichen-like reaction compatible with chronic GVHD and actinomyces and candida albicans infections. Velscope reveals sites with improved fluorescence, corresponding to eritroleukoplastic areas. It has been excluded the hypothesis of lichen and reached the diagnosis of an oral lichen-like reaction in a patient with chronic GVHD.
Conclusion: A definitive differential diagnosis between oral GVHD and liken is difficult, in particular if GVHD occurs in the form of oral lichen-like reaction. For a correct diagnosis of GVHD, literature suggests a present and remote anamnesis of the patient and an accurate objective examination, with exclusion of any teeth pathologies and micotic or bacterial infections. The biopsy and a collaboration with the pathologist are essential, in order to reach, as in this emblematic case, a clinical-pathological correct diagnosis. The therapy of GVHD with oral signs and symptoms is provided by the hematologist. In the case report, the patient has been treated with immunomodulatory therapy and, according to the guidelines, the follow up for oral manifestation of GVHD has been planned every 6 months.

Prognostic value of a non-invasive procedure based on DNA methylation analysis in patients surgically treated for oral cancer

R. Rossi[1], D. B. Gissi[1], L. Morandi[2], A. Tarsitano[3], A. Gabusi[1], L. Sozzi[1], L. Luccarini[1], L. Montebugnoli[1]

[1]Department of Biomedical and Neuromotor Sciences, Section of Oral Sciences, University of Bologna, Italy
[2]Department of Biomedical and Neuromotor Sciences, Section of Anatomic Pathology "M. Malpighi" at Bellaria Hospital, University of Bologna, Italy
[3]Department of Biomedical and Neuromotor Sciences, Section of Maxillo-facial Surgery at Policlinico S. Orsola-Malpighi, University of Bologna, Italy

Aim: Patients treated for Oral Squamous Cell Carcinoma (OSCC) showed a significant risk to develop a local recurrence or a second primary tumor during follow-up period. Recently we developed a non-invasive assay based on oral brushing as method for collecting samples followed by DNA methylation analysis of a set of 13 genes to early detect OSCC. In the present study this procedure was applied to a group of patients surgically treated for OSCC. Aim of the study is to evaluate whether the presence of a test positivity is associated with a poor prognosis in terms of locoregional control (LRC) of disease.
Methods: The study population included 42 consecutive patients who had completed OSCC treatment at least 6 months prior to brushing collection. Two oral brushing specimens were collected from each patient

during routine follow-up visits after primary oral cancer surgical treatment: the first one from the regenerative area after OSCC resection and the second one in clinically normal distant mucosa. In all brushing specimens the DNA methylation level of ZAP70, GP1BB, KIF1A, ITGA4, LINC00599, MIR193, MIR296, TERT, LRRTM1, NTM, EPHX3, FLI1 and PARP15 was evaluated by quantitative Bisulfite-Next Generation Sequencing (NGS). Each sample was defined as a numeric or a dycotomic variable (positive or negative in relationship to a pre-determined cut off value). One Way ANOVA analysis and Kaplan Meier method were used to evaluate the presence of any significant difference between the group of patients who experienced a second neoplastic manifestation and the group who did not. P values < 0.05 were considered statistically significant in all analyses.

Result: 6/42 (14,3%) patients developed a second neoplastic manifestation during follow-up period (mean follow-up: 14.3 months): 5 patients showed positive samples from regenerative areas and 3 of them also positive samples from distant healthy mucosa. Among samples from regenerative areas, 11 patients with positive samples have not shown up to date any second manifestation, while in the group of 26 patients with negative samples only one developed a second neoplastic manifestation. Among samples from healthy distant mucosa, 4 patients with positive samples have not shown up to date any second manifestation, while in the group of 35 patients with negative samples 3 patients developed a second neoplastic manifestation. The positivity to the test resulted significantly related to a worse LRC of disease ($p<.05$), both regarding brushing samples collected in regenerative area after cancer resection both regarding brushing samples collected in distant mucosa.

Conclusions: These preliminary results seem to indicate that our novel assay based on quantitative bisulfite NGS analysis could be a useful non-invasive method to identify surgically treated OSCC patients at risk of developing a second neoplasia. Further studies with larger cohort of patients and with long follow-up period are needed to elucidate the prognostic potential of our assay.

Multiple myeloma and macroglossia: a case report

Rossi M., Bosotti M., Porrini M., Candotto V., Rey L., Bossi E., Marino S., Spadari F.

Department of Biological, Surgical and Dental Sciences - University of Milan - Unit of Oral Pathology and Medicine - Maxillo-Facial and Odontostomatology Unit - Ospedale Maggiore Policlinico, Fondazione IRCCS Cà Granda Milano, Italy

Aim: Macroglossia may be caused by a wide variety of congenital and acquired clinical conditions. The most common causes of tongue enlargements are vascular malformations such as lymphangioma or hemangioma and muscular hypertrophy in the Beckwith-Wiedemann's syndrome. Other causes include acromegaly, mucopolysaccharidosis, glycogen storage disease, neurofibromatosis, multiple endocrine neoplasia, myxedema, Simpson-Golabi-Behmel syndrome and amyloidosis.

Amyloidosis is a systemic disease characterized by extracellular deposition in various organs of different precursor proteins. There are about 30 different types of amyloidosis, each due to a specific protein misfolding. The four most common types of systemic disease are light chain (AL), inflammation (AA), dialysis (Aβ2M), and hereditary and old age (ATTR). Macroglossia is the most frequent oral manifestation in 10% of patients with cardiac amyloidosis, and may be the first clinical evidence of disease. We report a case report of a female patient with macroglossia, as the first sign of AL systemic cardiac amyloidosis.

Methods: An 82-year-old female patient was referred to our hospital unit for an abnormal increase in the volume and size of her tongue.During the clinical examination, the patient reported that in the last three months she suffered of dyspnoea and respiratory difficulties, during physical activities.

For about thirty years the patient has suffered from monoclonal gammopathy IgGl, developing a multiple myeloma IgGl. She has undergone cycles of chemotherapy, steroid therapies, thalidomide over the years. At the time of the examination she was not taking any medication, despite having a chronic myeloma anaemia. Intraoral examination showed a significant increase in the lateral edges of the tongue, with signs of tongue diapneusia associated with sub-mandibular limphoadenopathies. The patient complained speech disorders and dysphagia associated with chronic dental microtrauma and dry mouth. Medical history of the patient reported a cardiac amyloidosis AL and further diagnostic assessment were performed.

Results: The blood parameters showed anaemia (haemoglobin 9,7 gr/dL), mean corpuscle value of 106,3 fl, red blood cells count 2,87 and elevated Natriuretic Peptide type B (BNP) 238 pg/ml (n.v. 0.0-60.0). Echocardiography revealed abnormal ventricular wall's thickness and concentric hypertrophy. In addition, a reduced left ventricular chamber size, mitral and tricuspid valve insufficiency and filling patterns indicative of cardiac amyloidosis were observed. Microscopic examinations of tongue tissues showed AL amyloid infiltrations with positive Congo Red stain. Immunofixation reactions revealed monoclonal free lambda light chain in gamma region.

Conclusion: In the Amyloidosis AL the amyloid protein derives from the light chains of immunoglobulins (AL)

in the presence of a plasma cell dyscrasia. This form can occur in 10% of patients with multiple myeloma. In the systemic forms of Amyloidosis AL there is an involvement of several organs. The heart is the mainly involved organ with restrictive cardiomyopathy and consequent cardiac insufficiency that affects the prognosis, the therapies and the clinical course. Cardiac amyloidosis is an aggressive and irreversible condition with a rapid clinical course. Unfortunately the diagnosis is often delayed. Macroglossia which can occurs in Amyloidosis AL, could be considered a predictive and peculiar clinical sign that could direct the clinician to correct cardiological therapeutic directives.

The potential role of intraoral ultrasound for the evaluation of the depth of invasion of oral squamous cell carcinoma of the tongue: report of two cases

Dario Di Stasio[1], Diana Russo[1], Romano Antonio[1], Esposito Vincenzo[1], Montella Marco[2], Serpico Rosario[1], Lucchese Alberta[1], Laino Luigi[2]

[1]Multidisciplinary Department of Medical and Dental Specialties, University of Campania- Luigi Vanvitelli, Naples, Italy
[2]Department of Mental and Physical Health and Preventive Medicine, University of Campania- Luigi Vanvitelli, Naples, Italy

Aim: The purpose of this study is to investigate the usefulness of ultrasound (US) for the identification of the Depth of Invasion (DOI) of Oral Squamous Cell Carcinoma (OSCC) of the tongue, through the comparison of US-DOI with the histopathological DOI.
Methods: We present two casesof patients with intraoral lesions, referred to Oral Pathology Division of Multidisciplinary Department of Medical-Surgical and Dental Specialties of the University of Campania "Luigi Vanvitelli" in which the US-DOI was compared with the histopathological DOI. TheUSexaminationswereperformed with a portable GE Logiq-e R7 ultrasound machine with a high-frequency hockey stick probe (8-18 MHz). Following the ultrasound examination, the patients underwent excisional biopsy; histopathological examination has been performed.
Result: Case 1: A 61-years-old womanshowed an ulceratedlesion of 2 x 2 cm in the left margin of the tongue, not bleeding, with irregular margins, firm in consistency. Ultrasound examination showed a hypoechoicarea with undefined margins of 2.026 cm of length, 5.056 mm of depth and a US-DOI of 4,002 mm.The histopathological diagnosis was infiltrating OSCC (G2) with an extension of 2 x 1,7 cm, and a DOI of 4 mm; the excisions margins were free. Case 2: A 72-years-old woman presented an exophytic lesion about 2 x 1,5 cm on the right margin of the tongue, not bleeding, with irregular margins and soft consistency. The ultrasound image showed a hypoechoic area, with undefined margins of 2.3 cm of length, 5 mm of thickness and a US-DOI of 0,857 mm. After performing an excisional biopsy, the histopathological diagnosis was micro-infiltrating OSCC (G1) with an extension of 1,7 x 1,6 cm and a DOI < 1 mm; the excisions margins were free.
Conclusion: The data obtained from this preliminary study, although conducted on two patients only, are extremely promising. The comparison between the US-DOI and the histopathological DOI has shown a concordance of results. These results highlight the need to expand research on alternative devices in the study of oral diseases.

The relationship between celiac disease and oral health impact profile: analysis of recent findings in a literature review

Cristina Maria Rosa Scoglio, Roberto Lo Giudice, Giulia Amoroso, Stefania Marino, Francesca Gorassini, Roberta Mastroieni, Luca Fiorillo, Gabriele Cervino, Marco Cicciù

Department of Biomedical and Dental Sciences and Morphological and Functional Imaging, University of Messina

Aim: Oral health is today considered one of the fundamental parameters related to the patient's general health and social routines. Oral health status enable individuals to run their daily activities such as mastication, articulation, and socialization, without any kind of discomfort, restriction and pain. Today, it is growing the importance of prevention and maintenance of high standard of oral hygiene and control; however, some pathologies may be connected with systemic disease and not affect the oral cavity structures directly. Sometime, the presence of tooth enamel lesions correlated with soft tissue lesions is just a symptom or a trigger sign for a deeper and undetermined disease; among them there is the Celiac Disease (CD). CD is a long-term autoimmune disorder that affects the small intestine; this is due to a constant intolerance to gluten proteins in genetically susceptible individuals. CD is caused by a reaction to gliadins and glutenins found in wheat. Besides the gluten-free diet (GFD) seems to better influence the oral health status of the CD patients. Numerous published papers underlined how specific oral signs and symptoms can be classified as risk factor signals for CD. However, the topic is still debated, and currently, the right frequency of these oral manifestations in potential celiac patients has not yet been classified and recorded. For this reason, the purpose of

this revision was to scan the international data highlighting the relationship between celiac patients and the oral health impact profile. A comprehensive review of the current literature from march 2008 to 2018 was conducted according to the PRISMA guidelines by accessing the NCBI PubMed database. The PubMed-Medline resource database was applied through advanced researches. Thanks to keywords such us "oral health", "glutens", "diet" , the result was of 230 papers. All of these titles were evaluated in order to exclude: irrilevant titles, irrilevant abstracts, letters, editorials, case reports, animal studies, in vivo/in vitro studies , studies of testing medication and/or new treatment methodologies, studies with number of subjects less than 20, single case reported , studies with weak methodology far from oral cavity investigations. So finally, 9 papers were recorded and screened in this revision paper with low or moderate risk of bias. The studies were different in terms of structure, findings, outcomes, and diet quality evaluation, and for this reason, it was not possible to realise a meta-analysis of the recorded data. This manuscript offers some observational evidence to justify the advantages of gluten-free diets related to a better oral health status in the patients involved to achieve a good quality of life. Despite this research and the vast amount of CD patients (15.278), the study is not significative and representative because it presents high heterogeneity criteria and methods for evalution.

Salivary metabolomics in oral cancer: a systematic review

Rita Antonelli[1], Giacomo Setti[2,3], Margherita Pezzi[1], Thelma Pertinhez[4], Diana Cassi[1,2], Paolo Vescovi[1], Cristina Magnoni[5], Marco Meleti[1]

[1]Centro Universitario Di Odontoiatria - Unit of Oral Medicine and Laser Surgery, Department of Medicine and Surgery - University of Parma
[2]Unit of Dentistry and Oral-Maxillofacial Surgery, University of Modena and Reggio Emilia
[3]Molecular Medicine PhD School, University of Parma
[4]Department of Medicine and Surgery, University of Parma, Parma - Transfusion Medicine Unit, Azienda USL-IRCCS di Reggio Emilia, Reggio Emilia
[5]Unit of Dermatology, Chi.Mo.Mo Department, University of Modena and Reggio Emilia

Aim: An interesting, rapidly developing field of research for oral and systemic disease diagnosis is the qualitative analysis of saliva. The term "salivomics" encompasses all the –omics approaches to salivary analysis. Metabolomics is the study of concentrations and fluxes of metabolites, molecules with low weight (MW), present in biofluids or tissue that provides detailed information on biological systems and their status. The present systematic review aims to answer to the question: "Is there evidence that support the use of salivary metabolomics for diagnosis of oral squamous cell carcinoma (OSCC)?"

Methods: A multiple database research (Medline, Scopus, Web of Science) was set, using as entry terms: "saliva and oral carcinoma", "saliva and oral cancer", "saliva and squamous cell carcinoma", "salivary biomarkers and oral carcinoma", "salivary biomarkers and oral cancer", "salivary metabolomics". Screening of the databases was performed, between September 2018 and January 2019. English literature published after 2000 was taken into consideration. First level screening was performed on titles and/or abstracts. In case of controversial titles/abstract, full-text were evaluated. Papers reporting details on salivary sampling and analysis for basic and translational research and/or diagnostic purposes regarding oral cancer were considered. Only studies performed on humans and providing exact information concerning diagnosis were included. Case reports, conference proceedings, personal communication, letter to editor, reviews, were excluded. Studies focused on the use of salivary biomarkers in patients with systemic diseases or oral manifestations of systemic disease were excluded. Papers dealing with systemic microbial infections, hormones, drug dosage, were further excluded. Studies specifically reporting on biochemical methods, technological, devices were excluded Literature eligible on the selected inclusion/exclusion criteria was double-checked, including reference lists in order to identify papers possibly not considered in the previous selection. Quality assessment for selected papers (National Institute of Health (NIH) questionnaire "Study Quality Assessment Tool") was performed by two reviewers, scoring as "good" (100-80%), "fair"(70-50%), "poor"(<50%) depending on % positive/negative answers. Literature level of evidence was assessed using the Oxford Center for Evidence-Based Medicine (CEMB) classification.

Result: Thirteen papers out of 4198 fulfilled the inclusion/exclusion criteria. Quality assessment results were discussed by reviewers in case of disagreement. Papers labeled as "good" were 0, "fair" 12 and "poor" 1. Most frequent risk of bias (ROB) encountered were the lack of sample size justification, the absence of concurrent controls, the choice to not blind the status of participants (e.g. disease/healthy) by the investigators. Such ROB were identified in all of the 13 papers. Selected studies reported the use of 11 methods for metabolome investigation, also in combination; most frequently applied were TOF MS-CE, ELISA and UPLC ESI/TOF MS. Most frequently investigated metabolites that revealed a strong association with OSCC were:

pyruvic acid, glycine, proline and choline.
Conclusions: According to the present systematic review, no good quality evidence, up to now, exists to support the use of salivary metabolites. Studies selected present frequent ROB, such as a lack of sample size justification and absence of a blind process for the evaluation of saliva. Further studies, taking into account such ROB are necessary.

Oral pemphigus vulgaris in a patient with Hashimoto thyroiditis: a case report

Giacomo Setti[1,2], Pierantonio Bellini[1], Carlo Bertoldi[1], Lucia Panari[1], Luisa Benassi[1], Cristina Magnoni[1], Ugo Consolo[1]

[1]Chi.Mo.Mo Department, University of Modena and Reggio Emilia
[2]Molecular Medicine PhD School, University of Parma, Italy

Aim: Pemphigus comprises a group of potentially life-threatening diseases characterized by cutaneous and mucosal blistering, pemphigus vulgaris (PV) being the most common form. The disease has a fairly strong genetic background (e.g.: Ashkenazy Jews and populations of Mediterranean origin). PV may be associated with other autoimmune disorders, such as rheumatoid arthritis, myasthenia gravis, lupus erythematosus and pernicious anemia. The oral cavity is a frequent site of initial presentation, and the buccal mucosa, palate, and gingiva are the most commonly affected areas. Since mucosal blisters erode quickly, erosions are often the only clinical findings. Due to similarity to other erosive diseases, diagnosis can be in some cases challenging and must be supported by histological and immunological confirmation. Here we report a case of oral PV with primary oral mucosa involvement.
Methods: A 40 years old woman was referred in February 2019, for the evaluation of oral cavity. The patient was hospitalized 2 months before because of a painful acute episode of gingivitis, accompanied by submandibular nodes enlargement, slight and intermittent fever without a time pattern, swellings of hands and feet and strong anorexia. The patient had history of Hashimoto thyroiditis and anemia; other dermatological, systemic, degenerative diseases or neoplasms were excluded. She reported about the administration of 1 month of corticosteroids and antibiotic therapy, followed by progressive lesions healing. Except for a complete blood test, nor biopsies or other lab tests were performed during hospitalization. After hospital discharge, professional oral hygiene was performed into a private practice, with home administration of chlorhexidine mouth rinses. Oral examination revealed multiple erosions, involving both keratinized and non-keratinized mucosa. Gingival erosions weren't involving the apex of interdental papillae. Large erosion with scab was appreciable on the lip vermilion. Soft palate and cheek mucosa were also affected, with a small intact blister and lesions worsening due to masticatory trauma, respectively. Nikolsky sign was slight positive, with epithelial separation and peeling only in correspondence of blisters. Extra-oral examination was not conclusive for skin, scalp, nasal mucosa and eyes involvement. Differential diagnosis included pemphigus, pemphigoid, erosive lichen planus, erythema multiform, lupus erythematosus, connective tissue disease, adverse drug reaction and hypersensitivity reaction. A double mucosal biopsy (for Hematoxylin/Eosin staining and direct immunofluorescence (DIF)) was performed under local anesthesia. Histology specimen was collected from perilesional mucosa and a DIF sample from an uninvolved area. Moreover, a blood sample was taken in order to perform indirect immunofluorescence (IIF) examination and enzyme-linked immunosorbent assay (ELISA) test.
Result: Histology report highlighted the presence of an acantholytic mucosa, over the basal and the spinosum layer. Inflammatory cells (particularly neutrophils) were present into the submucosal chorion. Sample was compatible with PV. Moreover, DIF reported strong positivity for IgG and IgA at basal and supra-basal layers, with very low title of IgM and C3 through keratinocytes. In addition, IIF on monkey esophagus substratum was strongly positive for human-antiserum IgG. ELISA titers for Dsg1 and Dsg3 were 32.68 U/ml and 130.17 U/ml respectively, confirming a high auto-antibody activity. Diagnosis of pemphigus vulgaris was stated.
Conclusion: Between the period of biopsy and laboratory results, the patient also developed scalp and genital mucosa lesions. Oral corticosteroid therapy 1mg/kg was administrated to achieve disease control. In an admittedly short follow up, patient showed a good disease control, without new blisters. For achieving a complete remission and maintenance, further rituximab adjuvant therapy was taken into consideration.

Oral nodular fasciitis in a pediatric patient: a case report

Alessandra Nori[1], Andrea Tesei[1], Alfredo De Lillo[2], Michele Giuliani[2], Marco Mascitti[3], Erminia Coccia[3], Andrea Santarelli[3], Zavaglia Vittorio[1]

[1]Surgical and Special Stomatology, "Ospedali Riuniti", Ancona, Italy
[2]Department of Clinical and Experimental Medicine, University of Foggia, Foggia, Italy

[3]Department of Clinical Specialistic and Dental Sciences, Marche Polytechnic University, Ancona, Italy

Aim: Nodular Fasciitis (NF) is rare lesion caused by proliferation of fibroblasts and myofibroblast in deep fascia. It was first described by Konwaler and Weiss in 1955 as "subcoutaneous pseudosarcomatous fasciitis". Oral NF is a rare lesion, it was reported that only 6 cases were described in literature. NF generally appears as a rapidly growing nodule, capable of growing up to 5 cm in few weeks. Skin above the nodule is mobile and in half of the patients the nodule is painful. Pathogenesis is yet unclear and the main differential diagnosis of NF is sarcoma due its high cellularity and rapid growth. A 10-year-old male patient was referred to "Ospedali Riuniti" General Hospital, Ancona, Italy, with a painful swelling located on the posterior region of the left mandible. This lesion appeared 1 month previously, but no discharge or numbness were referred. Oral examination revealed ulcerated mucosa near 3.6 and 3.7 elements and posterior region, the mass was non-tender and firm at palpation. The lesion covered by red but not bleeding mucosa measured 2 cm approximately in diameter. No useful data can be recorded by x-rays analysis.
Methods: To avoid distress and considering young age and collaboration degree of patient, resection under general anesthesia was performed. A mucoperiosteal flap was conducted in vestibular surface of left mandible from 3.6 to retromolar trigon. Cleavage and resection of the lesion and 3.7 element was executed paying attention to dissecting off adjacent muscle fibers. 3-0 silk suture was used to close surgical wound. Postoperative course was uneventful, and no evidence of recurrence was found after a 3-year follow-up.
Results: Gross examination of the specimen revealed an ulcerated lesion of polypoid appearance measuring 2 x 1.8 cm. Histological analysis revealed proliferation consisting of mainly fusate cells organized in variously intertwined bundles and with a pseudonodular growth appearance. Immunohistochemistry was positive for: Vimentin, Actin ms, Actin ml, and CD68 (focal). No immunostaining was observed for: S100, NF, Desmin, and Cytokeratins.
Conclusion: NF generally appears as a rapidly growing nodule that can simulate malignancy, capable of growing up to 5 cm in few weeks. In oral NF most of the lesion are in buccal mucosa but also upper lip or parotid glands. Only one case report described tongue or mental region NF. Most frequently, regions affected are submitted to chronic trauma, but pathogenesis remain unknown. Clinically, NF appears more commonly in adult patients, with a mean age of 42.2 years and male to female ratio of 1:5. Usually the lesion is circumscribed and adherent to the deepers level. Treatment of choice is conservative surgery even if in literature there are documented cases with spontaneous regression after 3 months without signs of recurrence. The histological variability of NF influences the response to Magnetic Resonance Imaging (RMI) and, although other studies are needed, it seems that RMI can play a role in the diagnosis of NF.

Nicotinamide N-Methyltransferase: potential involvement in odontogenic lesions

Lucrezia Togni1, Marco Mascitti1, Davide Sartini1, Giovanni Giannatempo2, Lorenzo Lo Muzio2, Maurizio Procaccini1, Andrea Santarelli1, Corrado Rubini3, Monica Emanuelli1

1Department of Clinical Specialistic and Dental Sciences, Marche Polytechnic University, Ancona, Italy.
2Department of Clinical and Experimental Medicine, University of Foggia, Foggia, Italy.
3Department of Biomedical Sciences and Public Health, Marche Polytechnic University, Ancona, Italy.

Aim: Odontogenic tumours (OT) constitute a group of heterogeneous diseases that range from hamartomatous tissue proliferations to benign and malignant tumours with metastatic potential. OT account for less than 1% of all neoplasms and their etiopathogenesis is still unknown. Most OT arise ex novo, while some lesions may originate from pre-existing odontogenic cysts. Most of them are benign; however, some entities show local aggressiveness, infiltrative potential and high recurrence rate, based on the accuracy of the surgical resection. Recurrences can also occur after 10 years, so long-term clinical and radiological follow-up is required. The present study focused on the expression of the Nicotinamide N-methyltransferase (NNMT), since its biological significance, in odontogenic lesions, has not yet examined. The study aim was to correlate the expression NNMT, to clinicopathological data in patients affected by OT. Finally, it intended to lay the foundations for future identification of new therapeutic strategies based on targeted therapies.
Method: The study included 105 surgical resection specimens obtained from 50 Ameloblastomas (AM) and 55 Odontogenic Keratocysts (OKC), related to 55 patients. Data were retrieved and cataloged from clinical records and from the archive of the Institute of Pathology of Marche Polytechnic University. 4-µm serial sections from formalin-fixed, paraffin-embedded blocks were cut for each case and mounted on poly-L-lysine-coated glass slides. The sections were incubated overnight (4°C) with the polyclonal rabbit anti-human NNMT antibody (Richard Weinshilboum, Mayo Clinic, Rochster, MN, USA) diluted 1:1500 in a humidified chamber. NNMT

cytoplasmic staining of epithelial and stromal cells was observed. To evaluate the extension of NNMT expression, the mean percentage of positive cells was determined from the analysis of 1000 cells at x40 magnification. Staining intensity of NNMT was scored and reported into a dichotomous scale: "-" (negative or incomplete, weak or barely perceptible cellular staining); and "+" (complete, moderate to intense, circumferential cellular staining).

Results: No statistical differences between NNMT expression and clinicopathological data were found, both in epithelial and stromal cells of AM and OKC (P>0.05). Considering AMs, a significantly lower expression of NNMT was found in epithelial and stromal cells of Acanthomatous pattern compared to Follicular and Plexiform patterns (P=0.0411 and 0.0425, respectively). Furthermore, the epithelial cells NNMT expression was significantly higher in recurrent than primary tumors (48.0 vs 34.6, P=0.0430). This result was confirmed by staining intensity, showing more cases scored as "+" in recurrent than primary AM (17 vs 10 cases, P=0.0470). Regarding OKC, the extension of NNMT expression was significantly higher in primary OKC than in recurrences (P=0.0014); while stromal cells showed marked positivity for NNMT in recurrent OKC (P=0.0127). Staining intensity of NNMT confirmed these results, with epithelial staining being more intense in primary OKC (24 vs 6 cases, P=0.0276) and stromal staining being more intense in recurrent OKC (24 vs 1 cases, P=0.0018). The interobserver concordance index, calculated using weighted Cohen's Kappa, was excellent (0.885).

Conclusion: This is the first study to evaluate NNMT expression in odontogenic lesions, showing a significant correlation between NNMT extension and clinical forms, both in AM and OKC, suggesting the presence of molecular and metabolic differences between these entities.

A misleading infection in a psoriatic patient: a challenging diagnosis of orocutaneous leishmaniasis

V.A. Panzarella[2], P.B. Tozzo[4], K. Zhurakivska[3], M. Dioguardi[3], F. Canepa[1], R. Mauceri[1,2], G. Campisi[1]

[1]Department of Surgical, Oncological and Oral Sciences, University of Palermo, Palermo, Italy
[2]Oral Medicine and Dentistry for patients with special needs, AUOP "P. Giaccone" of Palermo, Palermo, Italy
[3]Department of Clinical and Experimental Medicine, University of Foggia, Foggia, Italy
[4]U.O.C. of Stomatology, A.O.O.R. "Villa Sofia-Cervello" of Palermo, Palermo, Italy

Aim: Leishmaniasis is a parasitic disease caused by a protozoon of the genus Leishmania transmitted by sand-fly vectors of the genus Phlebotomus or Lutzomyia . It is endemic in 88 countries, particularly localized in areas of the tropics, subtropics, and southern Europe; in humans, it has been classified in three major clinical types: visceral, cutaneous and mucocutaneous with a wide spectrum of clinical manifestations. Mucosal lesions usually involve the upper respiratory tract, with a predilection for nose and larynx. Oral involvement is unusual and in most cases it becomes evident after several years of resolution of the original cutaneous lesions. Oral lesions classically appear as mucosal ulcerations, mainly in the hard or soft palate.

Methods: We report a case of a man who has attended our sector of Oral Medicine (University Hospital Policlinico "P. Giaccone" Palermo, Italy) with a persistent nodular lesion in the right lower lip.

Result: A 47-year-old caucasian man presented at the Oral Medicine Unit of the University Hospital of Palermo (Sicily) in June 2018 complaining about a one-month sore swelling involving the right lower lip. He was a heavy smoker (20 cigarettes daily for 26 years) with medical history of cutaneous psoriasis treated with methotrexate and cyclosporine. Oral clinical examination revealed a whitish-ulcerated lesion with a nodular aspect extending into the right side of: oral commissure, lower lip and buccal mucosa. On palpation, the lesion was firm and fixed to adjacent tissues. Oral hygiene was poor, lower incisors were missing and no mechanical trauma was present. A suspicion of oral squamous cell carcinoma (OSCC) was raised. A biopsy was performed, showing nonspecific inflammatory reaction; patient underwent head and neck magnetic resonance imaging detecting an ovalar lesion measuring 1.2 x 2.9 x 2.1 cm with evidence of swollen submandibular lymph nodes. At the following appointment, the patient reported the evolution of the cutaneous psoriatic ulcers to the right harm, knees and especially foot towards a suppurative aspect: decision was taken to refer the patient to the dermatologic and infectious disease unit for further investigations; he underwent imaging, serological test and a polymerase chain reaction test on skin mucosa biopsy samples. Based on the results, the diagnosis of mucocutaneous Leishmaniasis was established: patient underwent proper treatment with complete remission of the lesions.

Conclusion: In humans, the clinical forms caused by the protozoan species of Leishmania vary from visceral, cutaneous and mucosal leishmaniasis. Visualization of parasite by direct microscopy of lesion smears is a gold standard nevertheless, its evidence into mucosal lesions can be difficult to diagnose. In this case, the diagnosis was particularly challenging because the clinical characteristics of the oral lesion mislead towards an OSCC. Moreover, the onset of the

cutaneous lesions were mistaken with the psoriatic ones.

The tumor/stroma ratio as an independent prognostic factor in patients with carcinoma of the tongue

Giuseppe Troiano [1], Marco Mascitti[2], Claudia Arena[1], Nunzio Francesco Testa[1], Maurizio Procaccini[2], Andrea Santarelli[2], Lorenzo Lo Muzio[1]

[1]Department of Clinical and Experimental Medicine, University of Foggia, Foggia, Italy
[1]Department of Clinical Specialistic and Dental Sciences, Marche Polytechnic University, Ancona, Italy

Aim: Oral squamous cell carcinoma is one of the most common neoplastic disease in humans. Such tumor is associated with a high rate of aggressiveness and low survival rate of patients. The tongue is the most commonly involved subsite, and this particular subgroup of tumors is characterized by a higher rate of lymph-node involvement and local invasion. Despite an improvement of treatment modalities, the overall 5βyear survival rate for OSCC is about 50%. The tumor-stroma ratio is the proportion of tumor cells in the stroma, such parameter has demonstrated to be an independent prognostic factor for some types of human cancer. The aim of this study was to investigate the role of the tumor-stroma ratio as an independent prognostic factor in tongue squamous cell carcinoma.
Methods: A retrospective analysis was performed on formalin fixed paraffin embedded tissue of patients surgically operated for tongue squamous cell carcinoma at the Marche Polytechnic University in the last 30 years. Patients who underwent neoadjuvant radiotherapy or chemotherapy were exclude from this cohort. Two pathologist independently performed an analysis of the tumor / stroma ratio. In case of disagreement a final decision was taken in a joint session.
Result: A total of 211 patients met the inclusion criteria and were included in this study. No significant correlations were found between tumor / stroma ratio and tumor size, age of the patients, grade, stage, gender and relapse in patients with tongue squamous cell carcinoma. However, results of this study revealed that patients suffering for tongue squamous cells carcinoma with a lower tumor / stroma ratio have a higher mortality rate.
Conclusions: The aim of personalized medicine is to provide the best treatment options of the basis of the clinical and molecular features of the disease. The research of prognostic factors able to predict the behavior of the neoplastic disease are fundamental for a correct stratification of patients with tongue squamous cell carcinoma. In this study, the tumor / stroma ratio revealed to be a potential independent prognostic factor. However, further studies are needed to confirm such preliminary findings.

Multimodal management of trismus in patients treated for head and neck SCC

Val Matteo, Marino Roberto, Ardore Marco, Lupatelli Melania, Gandolfo Sergio, Pentenero Monica

Oral Medicine and Oral Oncology Unit, Department of Oncology, University of Turin, Italy

Aim: Treatment of head and neck squamous cell carcinoma (HNSCC) may lead to several late side effects, including dysphagia, salivary hypofunction, mucositis, and trismus. They have a severe negative impact on the overall quality of life of patients and may contribute to post-treatment depressive disorders. Particularly, trismus is the second most burdensome side effect of oncologic therapy for HNSCC. It occurs in 5.7% to 87% of patients, resulting in a reduced maximal interincisal opening distance (MID). Trismus can lead to impaired biting, chewing, speaking, laughing and oral hygiene, thus resulting in higher incidence of dental caries and periodontal disease. Surgery may favour trismus because of scarring involving masticatory muscles, while radiation therapy may induce fibrosis of both temporomandibular joint and masticatory muscles. Trismus usually occurs 3 to 6 months after radiotherapy is completed, and can worsen even in the following 2 years. The present prospective cohort study describes the effectiveness of multimodal treatments aiming at reducing HNSCC related trismus.
Methods: Patients treated for HNSCC related trismus from June 2016 entered the study. The endpoints of treatment were as follows:
1. MID 35 mm (measured between: the edges of the upper and lower incisors, or between incisal edge and edentulous crest or between edentulous alveolar ridges in case of edentulous patient)
2. Reduction in the VAS score >50% from the baseline
3. Reduction in fatigue related to mandibular movements >50% from the baseline
4. Good skills in the management of home oral hygiene and eating capacity.

Three treatment options were progressively applied where needed, in order to reach all the 4 endpoints.
First-line. Physiotherapeutic approach, favouring active and passive mandibular movements.
Second-line. Pharmacological treatment based on non-steroidal anti-inflammatory drugs (Ibuprofen

600mg), fibrinolytic (Bromelain 40mg) and/or muscle relaxants (Thiocolchicoside 8mg or Tizanidine 2mg) drugs represents the second line of treatment.
Third-line. Impedance-controlled microcurrent therapy (TENS) was performed as a third line of treatment. Patients had monthly controls in order to adjust active treatment. In the case of achievement of all the 4 endpoints or in the absence of further improvement for 3 months, the final gains were recorded and the patient entered the follow-up.
Results: Six patients (5 females and 1 male; average age 69.7±10.7) entered the study. All patients had surgery for primary tumour resection with flap reconstruction, 4 out 6 underwent neck dissection and adjuvant radiotherapy. The average radiation dose was 44.4±31 Gy. Treatment of trismus started in an average time of about 600 days and a complete response or a steady state were achieved after 163±65 days. Baseline mouth opening was 25.1±7 mm, the mean MID obtained at the end of the treatment was 35±12.5 mm. Four patients had a complete response, while in two patients a steady state with achievement of the endpoints 2, 3 and 4 was obtained. All patients maintained such results one year after the end of the active treatment.
Conclusion: An early treatment of trismus in HNSCC patients should be planned. Large part of treatment (e.g. physiotherapeutic approach or TENS) is self-performed at home, so that patients' compliance is essential for an effective treatment. Within such a frame a multimodal management is effective to reduce trismus and improve the quality of life in most of patients.

Survival rate and healing time of root canal treatment in patients under antiresorptive therapy: a 4-year prospective cohort study

Fausto Zamparini, Chiara Pirani, Maria Giovanna Gandolfi, Carlo Prati

Endodontic Clinical Section, Dental School, Department of Biomedical and Neuromotor Sciences, University of Bologna, Italy

Aim: A number of clinical studies suggests that extraction of compromised teeth must be limited in patients which received intravenous bisphosphonate therapy to prevent the development of medication related osteonecrosis of the jaw (MRONJ). In the same way, patients assuming antiresorptive therapy for osteoporosis have a lesser degree to develop the same pathology after tooth extraction, or after minor trauma. It would seem prudent to recommend in these two categories of patients some less-invasive alternatives to extraction, such as root canal treatment. The purpose of this prospective cohort clinical study was to evaluate the survival rate and healing time of compromised teeth and seriously compromised teeth that were endodontically treated in patients which received bisphosphonate therapy for at least 24 months. The complications observed during and after root canal treatments were reported.
Methods: The study design was a single-blind human longitudinal prospective cohort study. The study was conducted in one University Endodontic Clinical Department and in one private dental office between January 2009 and December 2018 by the same clinical staff.All patients included in this investigation were treated according to the principles established by the Declaration of Helsinki as modified in 2013. All procedures were conducted under local anaesthesia with no adrenaline. Briefly, rubber dam isolation was performed paying careful attention not to harm or damage the soft tissues with the clamp. A straight-line access was prepared using a diamond burs mounted on high-speed water-cooled hand-pieces (W&H, Austria). A modified step-back instrumentation technique was used as a routine procedure in which the coronal third was enlarged with Gates Glidden #3 or #4 burs at low speed. The apical third was prepared using stainless steel K-files under copious NaOCl and EDTA 17% irrigation. Intra-oral radiographs were used to evaluate the working length during the root canal instrumentation. Compacted warm gutta-percha points or carrier based with AH plus sealer were used. Great attention was given to avoid excessive overfillings. For compromised teeth which cannot be extracted due to intravenous BPS assumption teeth were retained at tissue level. After removing the first 3mm of coronal gutta-percha, a restoration was performed using a light cured glass-ionomer cement. Tooth restoration was monitored approx. every 6 months, during hygienic recalls. Patients with adequate root integrity were normally restored. The amount of remaining tooth structure determined the type of restoration. Teeth encompassed up to one marginal ridge were directly restored with composite resins. Cavities that encompassed more than one marginal ridge (both ridges, one ridge and one or more cusps) were restored with the use of posts.
Result: Thirty-five patients were treated for a total of 73 teeth. Sixty-one teeth were initial treatment, while 12 teeth were non-surgically retreated. A total of 45 teeth, showed a minimum follow-up of 4 years. Five flat retained teeth showed no apical lesions and remained clinically silent, while 2 were spontaneously lost during the follow-up. MRONJ (stage 1-3) was observed in 4 patients, three of which for previously performed extractions not related to endodontic treatment. One patients assuming oral ibandronate for osteoporosis developed ONJ after root canal treatment (MRONJ related to root canal treatment

was 1.6%). One flat retained tooth was spontaneously lost after 26 months with no signs of MRONJ.
Conclusion: Retention of flat retained teeth appears as a valid alternative to root extraction in patients assuming intravenous bisphosphonates.

Oral care in oncology patients: a review

M. Basilicata, C. Manieri, R. Franco, M. Iannò, D. Antonacci, G. Tarantino, A. Barlattani jr

UOSD Special Needs Dental Unit, Dir.Resp.: Prof.P.Bollero, Policlinico Univesity of Rome "Tor Vergata", Rome, Italy

Aim: Chemotherapy and radiotherapy lead to a series of oral complications including dental hypersensitivity, altered taste, xerostomia, osteonecrosis of the jaws, destruction of tooth enamel due to vomiting and mucositis with discomfort and pain.Therefore, the counselling of such patients regarding these complications, and the dietary and oral hygiene measures to be adopted to counter the same, is of paramount importance.This article reviews the treatment modalities and preventive measures essential to managing post-treatment complications in oncology patients from a dental perspective. It is important for dental professionals to be familiar with these side effects and discern how counsel their patients appropriately.
Methods: 21 articles in literature written between 2016 and 2019 have been analyzed to detect specific problems of oral cavity, identifying the main drugs and therapies that induce alterations. Patient education and prophylactic information are integral parts of the oral and systemic care for cancer patients.Treatment regimens are incredibly tiring for the patient and the best time to administer dental care is just before their next scheduled cancer treatment.When dental care is administered at that time, patient fatigue will most likely not interfere with dental treatment and white blood cells will be at the highest levels.Before any dental treatment, both the patient and the dentist should consult the team of oncologists for information on blood counts. Treatment should be administered when patient has the highest possible level.Sometimes antibiotic prophylaxis may be necessary and, before carrying out any oral hygiene treatment, chlorhexidine-based should be performed.Considering drug-induced hypoalivation, there will be a greater risk of caries onset. It is therefore essential to educate the patient on the importance of a correct diet.
Results: Due to the complexity of the disease and treatment, cancer patients require educated and experienced dentists in the prevention of complications.There are numerous oral care guidelines that dentists can present to patients, each one being primarily based on the need to maintain excellent oral hygiene. Meticulous recommendations such as: gently brushing teeth twice a day with an ultrasoft toothbrush and delicate toothpastes, possibly free of common agents such as sodium lauryl sulfate, have found positive effects in terms of reducing complications. The use of mouthwashes, gels, sprays, xylitol based aids and fluoride applications may also suggested. Nevertheless dentists should encourage patients who report redness, pain or sores on their lips to resort to immediate treatment for oral mucositis or infection, educating them on the possible subsequent effects of therapy has facilitated treatment.
Conclusion: The side effects of oncological therapies are often underestimated.Patients are less likely to consider side effects occurring in their mouth, as their first thoughts focus on more common effects such as hair loss or vomiting.The knowledge and skills of dental professionals regarding the prevention and treatment of complications and secondary injuries in cancer patients are sometimes insufficient. It is of great importance to provide these patients with the appropriate knowledge and tools to overcome these adverse effects, providing the best possible assistance in order to improve their quality of life, reducing serious complications that can lead to a temporary suspension of drug treatment. Although there is currently no gold standard protocol that gives predictable results in all cases, a multidisciplinary approach is highly required and the dentist must therefore be able to develop a personalized home care routine for the patient and his/her specific conditions.

Prevention and dental hygiene

Effects of differents scaling methods on zirconia vs titanium

Antonelli F.[1], Pasquantonio G.[1], Condò R.[1], Borzini L.[1], Casaglia A.[1], Cerroni L.[1]

[1]Department of Clinical Science and Translational Medicine University of Rome Tor Vergata

Aim: The number of products containing probiotics, viable bacteria with proven health benefits, entering the market is increasing. Traditionally, probiotics have been associated with gut health, and most clinical interest has been focused on their use for prevention or treatment of gastrointestinal infections and diseases; however, during the last decade several investigators have also suggested the use of probiotics for oral health purposes. The aim of this review is to examine potential mechanisms of probiotic bacteria in the oral cavity and summarize observed effects of probiotics with respect to oral health. The review focuses on probiotic lactobacilli and bifidobacteria, genera that are most used in various probiotic products.Keywords: Probiotics, Oral health, Lactobacillus, Bifidobacterium In oral Implantology bacterial contamination is one of the main issue as well as it can cause dental implant failure and influence its survival rate. In literature the actual aim is to understand how biomaterial surface characteristics could influence the bio-response. Roughness (Ra) of oral devices influences the initial phase of bacteria adhesion. Electronic Scan Microscopy studies confirmed that bacterial adhesion could be conditioned by dental enamel roughness or abrasion defects. In fact, bacteria are able to adhere in region in which they are protected from dislocation strengths. Therefore, plaque control is crucial for the prevention of inflammatory periodontal disease. Mechanical rotary or oscillating instruments, hand instruments, and ultrasonic scalers have been shown to be effective for plaque removal. The effects of scaling procedures on porcelain margins, on amalgam and composite resin restorations, on titanium, and on gold surfaces have already been studied. The purpose of this in vitro investigation was to evaluate the effect of 2 scaling procedures on the surface roughness of zirconia and titanium.

Methods: Disks (6mm in diameter and 2mm in thickness) of titanium grade 5 (TiAl6V4) and of zirconia (ZrO2-TZP-A BIO-HIP) were made by CAD/CAM milling machine. From each material, two groups characterized by different surface roughness were obtained. Mechanical instrumentation was performed by an EMS PIEZOMASTER 700 piezoelectric scaler. Two types of ultrasonic inserts were analyzed: one with a steel tip (EMS A-control), the other one coated with PEEK (EMS PI). For the manual instrumentation, an implant-specific curette in PEEK. To reproduce 10 years of professional hygiene each disc was subjected to 30 treatments of 1 minute alternated with 24h of incubation in artificial saliva at 37 ° C. Surface profilometer (Mitutoyo J-210) and SEM were used to analyze the surface before and after treatment..

Results: Control samples incubated at 37 °C for 30 days showed no variation in surface roughness. Roughness of Ti#1 (Ra=0,83±0,06) and Zr#1 (Ra=0,70±0,03), showed a reduction of surface roughness of about 67%, when treated with EMS A, while the samples of Ti#2 (Ra=0,29±0,05) showed an increase of surface roughness of about 43%. Zr#2 (Ra=0.16±0,02) proved to be very resistant to repeated instrumentation. A slight increment was observed only with EMS A while the PEEK ultrasonic insert and curette decreased the mean roughness of the samples of about 5% and 11% respectively. SEM analysis confirmed the surface roughness results.

Conclusions: Depending on the scaling methods

used in this study, titanium and zirconia surfaces undergo microscopic and macroscopic structural and morphological changes. These modifications influence both the engraftment and the bacterial adhesion. Several studies have shown that an increase in surface roughness corresponds to a quantitative and qualitative increase of bacterial biofilm: microorganisms are able to better defend themselves from the mechanical forces of removal. Smooth surfaces without scratches and with a very low Ra offer a greater obstacle to biofilm formation. The tip EMS A is not the most suitable instrument for Zirconia: it is less hard than the Zr and therefore the tip was worn out and had to be replaced frequently. PEEK ultrasonic instruments have proved to be very conservative towards the implant material surfaces. By using PEEK curettes we did not observed roughening of the 4 treated materials. On the contrary, there was a flattening of the surface, with a slight decrease of the Ra.

Clinical and microbiological changes in the oral cavity associated with the ramadan fasting

Aref E.[1], Bernier A.[1], Benvenuto V.[1], Marziali N.[1], Iovane C.[1], P. Cressoni P.[1], Harowon I.[1], Loi G.[1], Mitescu C.[1] , Occhipinti C.[1]

[1]University of Milan - Department of Biomedical, Surgical and Dental Sciences Ortognatodontics President Prof. G. Farronato
Dental Hygiene President Prof. C. Dellavia
Fondazione Irccs Ca' Granda – Ospedale Maggiore Policlinico
UOC Maxillo – Facial and Odontostomatology Unit – Director Prof. A. B. Giannì

Aim: To evaluate compared to standard parameters how changes in diet and frequency of feeding modify periodontal and microbiological indices and to identify guidelines aimed at the prevention of the oral problems of fasting in Month of Ramadan: Religious fasting of Muslim belief that the believing subjects refrain from taking food and drink from sunrise until sunset.
Methods: The study was conducted at the U.O.C. Maxillo-Facial and Odontostomatology unit of the hospital Policlinico in Milan.
A group of 15 subjects who followed the rule of fasting during the month of Ramadan were selected.
These subjects were evaluated in 2 different times: Time 0 (T0) in which from 30 days before the fasting period the subjects taken in consideration were standardized trought an initial treatment of professional oral hygiene.
The following indices were assessed 7 days before the beginning of Ramadan: FMPS and IP, FMBS and IS, DMFT; The salivary pH, the PSR and the white spots lesions (WSLS) have been assessed. In addition, a microbiological investigation has been carried out on several culture media. In this first phase the subjects were divided into group (A) which includes 8 subjects trained to the correct manoeuvres of oral hygiene and Group (B) which includes 7 subjects not educated to the correct manoeuvres of oral hygiene.
Time 1 (T1) to 7 days before the end of the fasting period in both groups (A) and (B) the indices were re-evaluated and the microbiological analyses performed with the same culture media used in T0.
Results: The results show an improvement in the periodontal indices analysed in educated patients (group A) compared to uneducated (group B); In fact, a decrease in the percentage of the plaque index of 42% and the bleeding index of 69% in educated subjects was highlighted, while a worsening of the aforementioned indices respectively by 28% and 117% in uneducated individuals, while they not show significant differences from a microbiological point of view.
Conclusions: The following study, though it did not show any significant variation of the microbial species sought after the fasting of Ramadan, showed that maintaining proper oral hygiene at home is also essential in a fasting diet.
As noted in this study, the Dental Hygienist confirms his important role in instructing, motivating and intercepting the causes that could threaten the oral health of patients who follow the practice of fasting, helping to preserve in this way, the health of their oral cavity.

Italia version of dental hygiene fear survey (dhfs) for anxiety assessment in patients undergoing dental hygiene

Zanette G., Berto A., Piovan S.[1], Mazzoleni S., Bacci C., Favero L.

[1]Department of Neurosciences (DNS), Dentistry Section, Chair of Dental Anesthesia, University of Padua, Via Giustiniani 2, 35128 Padova, Italy.
Director: Prof. Edoardo Stellini
[1]ULSS 2, Marca Trevigiana, Regione Veneto.

Aim: Anxiety may cause the patient to avoid routine dental treatments compromising oral health. The Dental Hygiene Fear Survey (DHFS) is a tool, used in English-speaking countries, for anxiety evaluation in patients undergoing oral hygiene treatments. In Italy there is a paucity of anxiety assessment tools, purposely available to the oral hygienist. The DHFS contains16 questions, divided into four categories, each relating to possible situations and related moods that the patient has to quantify using a Likert scale

on a range from 1 to 5, where: 1 = not at all, 2 = a little, 3 = somewhat, 4 = a lot, 5 = very much. The four categories of questions are the following:

- Fear of dental hygiene procedures: questions 3, 5, 14 and 15, with reference to specific stimulus related to the instruments used during a dental hygiene procedure.
- Lack of confidence in the operator: questions 4, 8, 9 and 11.
- Anxiety concerning the appointment: questions 7, 10, 12, 16.
- Fear of catastrophe: questions 1, 2, 6 and 13.

The final score can vary from a minimum of 16 to a maximum of 80.

The aims of this study are to validate and introduce into the clinical practice an Italian version of DHFS and to test it in a sample of Italian patients.

Methods: After study protocol approval by our ethical committee, DHFS was translated in Italian and administered to 241 Italian patients undergoing oral hygiene treatments. Patients clinical data were recorded and, for comparison with DHFS, further anxiety assessment was performed using the Italian version of Modified Corah's Dental Anxiety Scale (MCDAS), and the Visual Analogue Scale for Anxiety (VAS-A). Statistical analysis was performed using the following tests: Fisher's exact, Mann-Whitney, Kruskal-Wallis, Spearman's rank correlation coefficient and calculating the Cronbach's alpha to assess the internal reliability.

Results: The translated Italian version of the DHFS questionnaire has been named "Questionario sull'ansia per i trattamenti di igiene orale". The DHFS total score shows an average of 23 (19-27); the female gender shows significantly higher values of "Fear of dental hygiene procedures" and total DHFS. Regarding the relationships among DHFS, VAS-A and MCDAS, VAS-A and MCDAS scores show some correlation with the DHFS total score.

Conclusion: In conclusion, the results from our study suggest that the level of anxiety observed in patients is considered to be quite low, so it can give the false impression that the problem does not exist. A small population of anxious subjects is, however, a group of people that need more time and attention. In actual fact, we think that the Italian "Questionario sull'ansia per i trattamenti di igiene orale" is a useful tool to be introduced into clinical practice, as it is a valid and reliable scale to assess anxiety during dental hygiene treatments. Moreover, it allow the operator to treat patients more safely and efficiently, avoiding also the risk of those perioperative emergencies, typically triggered by anxiety. In this regard, the management of dental anxiety is a topic of paramount importance in clinical practice, being essential for both safety and overall quality of care. Bearing in mind the lack of literature on the topic and its importance in clinical practice, further studies are required.

Effect of different methods of cleansing on 2 denture base materials

Berardi C.[1], Panzironi G.[1], Sangermano R.[1], Condò R.[1], Pasquantonio G.[1], Cerroni L.[1]

[1]Department of Clinical Sciences and Translational Medicine. University of Rome Tor Vergata.

Aim: Removable dental prostheses are daily exposed to normal oral microbiota such as bacteria, fungi and viruses. Microorganisms, especially yeasts, can colonize the surface of removable devices and the adhesion of microbial plaque can be detrimental both to oral mucosa than to patient systemic health. A large body of evidence is available in literature indicating Candida as able to adhere to acrylic resin dentures. The retention degree of bacterial plaque, coloration, oral health and comfort are factors affected, directly or indirectly, by the surface roughness of the prosthesis. In denture base manufacture many dental materials are available, but poly(methyl methacrylate) (PMMA) is the most used. Polymerization shrinkage, allergies to the residual monomer, poor wear resistance, low fracture and flexural strength are inherent disadvantages of PMMA. Alternative materials such as Polyamide (PA) have been developed to overcome all these problems. Before and after the polishing process, PA surface could result rougher than PMMA one. Because of the high incidence of stomatitis in prosthetics patient, the correct hygiene of removable prostheses is necessary to maintain a healthy oral mucosa. Aim of this study is to compare the effects of different cleaning methods on the roughness of the surface of PMMA and PA prosthetic resins.

Methods: Thermopolymerizable ACRY POL R Ruthinium (rA) and polyamide resin PROTHEUS FLEX Techim (rP) resins were analyzed. 32 samples for each type of resin were analyzed on the Mitutoyo J-210 profilometer, 4 measurements for each sample.. The materials were divided into 8 groups and immersed for 10 minutes in different conventional and unconventional cleaners: Polident, Geldis (ex Brildent), Viakal, 5% hypochlorite, dishwashing liquid and vinegar. They were brushed with toothpaste and immersed for 23-24 hours in NaCl. Each cycle was performed for 30 consecutive days after which the surface roughness was analyzed by Electronic Scanning Microscope (SEM).

Results: A underwent minor changes when treated with Polident and Geldis, while it showed the greatest surface roughness with toothpaste and Viakal (about 40 and 46% respectively more than the control group). A noticeable increase in surface roughness is observed in rP samples compared to untreated ones: especially in case of use of dishwashing liquid and Polident (66% more than the control group), treatment with Geldis did not change the surface.. The results obtained by

profilometer analysis have been confirmed by SEM images: rP showed surface irregularities even after the final polishing, which appear more accentuated in the samples treated with dishwashing liquid and Polident. rP samples surfaces, if treated with Geldis or toothpaste, presented visible but less profound grooves.
Conclusions: The two analyzed resins have shown a different behavior towards the different treatments: even immersion in water alone makes rP more porous than rA and therefore susceptible to microbial adhesion. The use of specific prosthetic cleaners is recommending by the most of operators in the sector, about a third of them council the toothpaste as the best one. This in vitro study demonstrated toothpaste is able to cause an increase in surface roughness in rA, while in rP this peculiar abrasion has the effect of reducing the grooves depth, that are visible on the control samples too. Both denture cleaners have proven themselves safe for rA, while only Geldis for rP. Patients should be warned of the potential risks associated with the use of unconventional cleaners and despite toothpaste has a moderate antiseptic action, the conventional ones, with specific antimicrobial functions, constitute the elective choice.

Knowledge and behavior on oral health of the parents/caregivers of subjects with disabilities

Bosia Tersilla[1], Bontà Giuliana[1], Cagetti Maria Grazia[1]

[1]Department of Biomedical, Surgical and Dental Sciences, University of Milan, Italy
WHO Collaboration Centre for Epidemiology and Community Dentistry, Milan

Aim: The management of oral health of patients with autism spectrum disorder and Down syndrome is associated to a reduced capacity to collaborate sufficiently to perform proper oral hygiene at home and in dental chair therapies. The aim of this study was to assess the knowledge on eating habits, oral hygiene and prevention of caregivers who deal with people with special needs, specifically with Down syndrome and with autism spectrum disorders, compared to the knowledge of caregivers of subjects without special needs. In addition, the paper had the goal of assessing whether the caregivers are monitoring children with special needs more carefully compared to caregivers of children without disabilities regarding eating habits, oral hygiene and prevention.
Methods: A sample of 138 children between 7 and 12 years, between males and females, has been evaluated. The sample was composed of 60 children with autism spectrum syndrome, 18 subjects with Down syndrome and 60 healthy subjects. A questionnaire was submitted to the caregivers in order to assess the oral hygiene knowledge of the parents of the children examined, a fundamental aspect of the maintenance of oral health of all subjects, especially for disabled subjects.
Results: Findings show that almost one half of the sample with disabilities are self-sufficient in tooth-brushing, while the other half needs the help of parent/caregivers during oral hygiene practices. Regarding healthy subjects, about 90% are self-sufficient. Electric toothbrush is used by the 62% of children with disabilities, but only the 33% of healthy children used this device. No statistically significant differences in sugared foods and beverages intake neither in fluoride use was recorded in the two groups. A quite higher prevalence of halitosis has been reported by parents/caregivers of children with disabilities compared to healthy subjects (48% versus 42%). A quite high caries prevalence was reported by parents/caregivers of both groups (33% in children with disabilities and 36% in healthy children). Despite these results, the majority of the parents of children from both groups showed to have good behaviors regarding the oral health topics proposed.
Conclusions: These results point out that although parents are often in possession of the knowledge necessary to prevent the most frequent dental conditions and are also aware of the problems of oral health that already afflict their children, they are not able to effectively prevent these diseases. It is therefore necessary that clinicians give more importance to oral health promotion during the regular checks that all children, especially if affected by disabilities, should undergo.
KEY WORDS:Oral health, knowledge and habits, Down syndrome, autism spectrum syndrome

New technologies in non-surgical periodontal therapy: synergy between laser and ozonated water

Butera A.[1], MateraC.[1], Gatti S.[1], Scribante A.[1], Rodriguez y Baena R.[1]

[1]Department of Diagnostic and Pediatric Surgical Clinical Sciences, University of Pavia

Aim: To evaluate the potential benefits of irrigation with ozonated water (Aquolab, Sweden & Martina) in addition to Laser-assisted non-surgical periodontal therapy with the home support of a toothpaste based on biomimetic hydroxyapatite and lactoferrin (Biorepair Plus Parodontgel, Coswell)
Methods: 30 adult patients with periodontitis not associated with systemic diseases were selected. The periodontal condition is defined as follows according

to the new classification of periodontal disease:
- Localized
- Severity and complexity: Grade II and III
- Progression: slow or moderate

The patients were men and women, smokers and non-smokers, without metabolic diseases, not in pharmacological therapy, without fixed orthodontic implants or appliances, which were randomly divided into 2 groups of 15 individuals each.

Groups A (Laser-assisted therapy) and B (Laser-assisted therapy with ozonized water irrigation) were treated at baseline (t0) as follows:

1. Index detection: plaque index (PI), probing pocket depth (PPD), bleeding on probing (BOP), bleeding score (BS), number of pathological sites
2. Debridement, scaling and root-planing
3. Home hygiene instructions, CHX 0.12% mouthwash for 7 days, then essential oils mouthwash
4. One Laser-therapy session a week for four weeks (1.2 W, 60 seconds per surface) with pockets irrigation with hydrogen peroxide and chlorhexidine

In Group B were added irrigations with an ozonated water generator (Aquolab, Sweden & Martina) before each session (water 1, ozone 3). In addition, patients in group B used daily toothpaste based on high concentration of biomimetic hydroxyapatite and lactoferrin (Biorepair Plus Parodontgel, Coswell) throughout the study.

After 1 month (t1) the patients were treat again according to the respective protocols without re-evaluating the PPD.

After 2 months (t2) all the periodontal indices were re-evaluated, including PPD.

Data analysis was conducted at the Experimental Test Laboratory of the UDA of Orthodontics and Infantile Dentistry of the Department of Clinical-Surgical, Diagnostic and Pediatric Sciences of the University of Pavia. The Kolmogorov and Smirnov, ANOVA and post-hoc Turkey tests were used, with significance for $P < 0.05$.

Results: Statistical analysis shows significant differences in both groups with significant reductions between t0 and t2 for all periodontal indices.

No significant differences were found between the two groups, in the various times tested, with regard to PI, PPD, BS and number of pathological sites.

However, the BOP analysis shows significant differences between the two groups between t0 and t2, with lower indices in the B group.

Conclusions: According to the results obtained, it can be stated that, after 2 months, this protocol of Laser-assisted non-surgical periodontal therapy has considerable benefits in terms of improvement of periodontal indices, with or without integration of ozonated water irrigation and a specific toothpaste.

However, ozonated water can further promote long-term healing by progressively improving BOP and preventing recurrence, providing further evidence supporting the properties of ozone on vascularization, oxygenation, and inflammatory response of periodontal tissues. The home support of a toothpaste specially studied for periodontal health has been fundamental thanks to the lactoferrin, which has bacteriostatic properties, and to the biomimetic hydroxyapatite, which occluding the dental tubules prevents bacterial penetration inside them, one of the possible causes of recurrence in the periodontal desease.

Evaluation of discomfort in pediatric patient: two methods for the session of hygiene compared. a randomized split-mouth study

Cabac Viorica[1], Bontà Giuliana[1], Pelagio Edward Todd[1], Cagetti Maria Grazia[1]

[1]Department of Biomedical, Surgical and Dental Sciences, University of Milan, Italy
WHO Collaboration Centre for Epidemiology and Community Dentistry, Milan

Aim: Painful episodes may affect patients' collaboration in the dental chair and reduce compliance with oral hygiene at home, especially in children. The aim of the study was to evaluate which device induces greater or less painful stimulation and discomfort in patients during the treatment of professional oral hygiene, comparing piezoelectric and magnetostrictive technology.

Methods: Forty-five subjects, aged 7-14 years, were treated using the piezoelectric scaler (Newtron P5 Acteon Satelec) and the magnetostrictive scaler (Cavitron® Select ™ SPS ™) in a split mouth design. The instrumentation starts on the first and third quadrant with a technology, and proceeds on the second and fourth quadrant with the other technology. The choice of the starting instrument is carried out in a randomized and hidden way to the patient. After treatment of each quadrant, the pain assessment was measured with the visual analogue scale (VAS) and FACES® Wong-Baker (WB-F). Furthermore, the noise level was evaluated with the VAS scale. Student's t-test was used to compare VAS scores and the significance level was set at $p < 0.05$.

Results: The levels of perception of the noise evaluated with the VAS scale were higher using the piezoelectric device compared to the magnetostrictive device, when the two medians were compared to the Student's t test which is statistically significant ($p < 0.05$). Mean levels of pain values were slightly different but no statistically significant difference in pain perception was found using the VAS scores ($p = 0.30$) and WB-F ($p = 0.19$).

In a post hoc analysis, differences in pain perception were recorded based on the personal oral hygiene level of each patient detected with the Simplified Oral Hygiene Index (OHI-S) regardless of the device used ($p < 0.05$). It can be observed that the painful stimuli perceived by subjects with an insufficient Oral Hygiene are slightly higher than those perceived by subjects with a Good Oral Hygiene, without distinction between the two technologies.
Conclusion: This study showed that the magnetostrictive device has a lower perception of vibration and noise than the piezoelectric device in a sample of children. No difference was found, however, in the comparison of the pain stimulus produced by the two instruments. Both instruments proved to be effective aids, able to obtain a valid clinical result, the protection of hard and soft tissues and a good comfort for the patient. It is up to the clinician to know how to find the most suitable instrument based on his skills, needs and patient.

The use of Pistacia lentiscus L. in oral healthcare: chemical profile and biological activity

Catarino P.M.[1], Usai M.[2], Szotakova B.[3], Eick S.[4], Marchetti M.[5], Baldoni E.[6], Spano G.[7], Bortone A.[7], Serra GL.[1], Mastandrea G.[1], Bandiera E.[1], Milia E.[6]

[1] Department of Biomedical Scienze, University of Sassari, Italy
[2] Department of Chemistry and Pharmacy, University of Sassari, Italy
[3] Charles University, Faculty of Pharmacy, Hradec Kralove, Czech Republic
[4] University of Bern, Department of Periodontology, School of Dental Medicine, Switzerland
[5] Institute of Science of Food Production UOS Sassari-CNR, Sassari, Italy
[6] Department of Clinical and Experimental Medicine, University of Sassari, Italy
[7] Dental Disease Unit, Azienda Ospedaliero-Universitaria, Sassari, Italy

Aim: The undesirable side effects of antibiotics and antiseptics in addition to increasing microbial resistance have created a demand for new molecules as an alternative. With this intention, plants have become a hot topic in research. This in vitro study aimed to determine the fingerprint of Pistacia lentiscus L. (PLL) essential oil together with its potential antimicrobial capacity against different oral microorganisms and to evaluate a potential citotoxicity to human oral cells.
Methods: PLL oil obtained from the leaves by hydro-distillation was chemically characterized by using GC/MS equipped with a fused silica capillary column (AT-5). As antimicrobial assays we used an agar diffusion test and Microbroth Dilution Technique (MIC) targeting against planktonic cells of Gram-positive (Streptococcus mutans, Lactobacillus acidophilus, Enterococcus faecalis), Gram-negative (Porphyromonas gingivalis, Fusobacterium nucleatum) and the yeast Candida albicans. Cell viability using periodontal ligament fibroblasts (PLF) and gingival fibroblasts (GF) was determined using WST-1 assay using PLL in a concentration range of 1 - 100 µg/ml for 72 hours.
Results: Gas chromatography / Mass spectrometry demonstrated a very high representation of α-pinene and terpinen-4-ol (33%), which in addition to limonene (3,89%), α-myrcene (0,87%), α-caryophyllene (1.39%) and α-caryofhyllene (0.07%) allow us to classify the EO as pharmacological active compound. The disc diffusion assay and MICs demonstrated the antimicrobial potential of the terpenoids against planktonic cells of Gram-positive (Streptococcus mutans, Lactobacillus acidophilus, Enterococcus faecalis), Gram-negative (Porphyromonas gingivalis, Fusobacterium nucleatum) and the yeast Candida albicans with MICs ranging between 0.31 - 2.5 µg/mL. Cell viability in human periodontal ligament fibroblasts and gingival fibroblasts using WST-1 assay and PLL in a concentration range of 1 - 100 µg/ml for 72 hours, showed no cytotoxicity up to the maximum concentration.
Conclusions: these data mean PLL could be a new antimicrobial agent in oral health without side effect to human oral cells. Keywords Oral health care product, natural agents, oral diseases, resistance, periodontal bacteria, Candida albicans.

Correlation between "dmft" and lactation in the pediatric patient

Cendron M.[1], Zuccon A.[1], Signoriello A G.[1], Litta G.[1], Menin M.[1], Ludovichetti F S.[1]

[1]Department of Neurosciences, Dental Clinic, School of Dentistry, University of Padova, Italy

Aim: Few studies in literature have assessed the effect of breastfeeding, the infant formula and the consumption of sweetened drinks in children's caries. In this study, it was assessed if both the duration of breastfeeding and the type of breastfeeding play a role in influencing deciduous dentition caries onset.
The purpose of this study is to collect data by monitoring the dmft index (decayed, missing, filled teeth) of children up to 6 years old to demonstrate, based on the pre-existing literature and the first-person survey, how eating habits can influence the risk of developing caries already in the first years of a child's life. In particular, the goal of this work is to

verify if there is correlation between time, type of breastfeeding and dmft index.
Methods: Data collection took place between March and August 2018 between "San Giacomo Civil Hospital" in Castelfranco Veneto (Padova, Italy) and "Borgo Cavalli Dental Clinic" in Treviso, Italy. In this study were included children with deciduous dentition with different nationality and different gender.
Each parent of the selected subject completed a questionnaire containing question about pathological history, eating habits and oral hygiene habits of the examined subject. From an initial sample of 163 subjects, all those who did not fall within the inclusion criteria (one or more risk factor for dental caries or presence of sealants) were excluded.
The 120 suitable cases for the analysis were analyzed with the linear multiple regression method in an Excel 2007 sheet.
Results: 80 children were breastfed, 40 were fed with infant formula. For 68 children time of lactation was less than 12 months and for 52 was more than 1 year. The average dmft was 1.2 for the children breastfed up to the year of age, 5.9 for those nursed over the year, 3.5 for those fed with infant formula up to the year of age, and 9.1 for those nursed over the year
Conclusions: Despite the limited sample size of this study, it can be assumed that adopting correct eating habits starting from the first days of life, in particular breastfeeding for less than 1 year, may be considered as a protective factor in the Early Childhood Caries onset.

Activity learning in dental education

Corridore D.[1], Capocci M., Francesca R., Marta M., Ndokaj N., Debora P., Guerra F., Ottolenghi L.

Sapienza University of Rome Department of Oral and Maxillofacial Sciences Dental School, Sapienza University of Rome, italy

Aims and Objectives: The Activity Learning approach requires changing the traditional pattern of using time in organising classroom activities. As activating the students is one of the key features, students will have to take more responsibility for their learning process, and teachers will act more as facilitator of students' learning and as a guide. In this way in-class activities aim at motivating students for critical thinking, engage them in active learning by applying and analyzing, and thereby foster deeper learning.
Methods: Activating students plays a central role in-classroom approach. According to Prince 'Active learning is generally defined as any instructional method that engages students in the learning process. In short, active learning requires students to do meaningful learning activities and think about what they are doing. Active learning refers to students actively engaging in the learning process, students being mentally active, thinking and working with the subject material, in contrast to being passive receivers of information as in traditional lectures. An example of AL in-classroom is: Live Lecture,Assigned reading, Multimedia content. Another fundamental objective for the good performance of the in-class programming is the definition of the working groups and their nuemrosity, different it will be to organize an activity for a garnde or for a small group or even an individual activity. Both self evaluation - reflecting on your own practice as a teacher - and evaluation of student satisfaction with your AL approach can provide important insight and information about what worked according to your plan and what didn't. Another important area demanding evaluation is of course the use of class time.
Results and Conclusion: It is equally important that each activity is meaningful, and ensures student development and advancement through the unit. Activities should build on previous activities and avoid being repetitive, they should enable students to engage with and develop their skills, knowledge and understandings in different ways. Meaningful activities engage students in active, constructive, intentional, authentic, and cooperative ways.
The teacher's fundamental task is to get students to engage in learning activities that are likely to result in achieving [the intended learning] outcomes. It is helpful to remember that what the student does is actually more important that what the teacher does.

Oral health in pregnancy. inter-professional collaboration and training

D. Coridore, P. Debora, M. Capocci, M. Campoli, F. Guerra, L. Ottolenghi

Sapienza University of Rome, Department of Oral and Maxillofacial Sciences, Italy

Aims and Objectives: The oral and systemic complications associated with pregnancy are numerous and can significantly compromise the quality of life of the pregnant woman and the fetus.
Oral health awareness associated with interprofessional collaboration allows the management of adverse outcomes of pregnancy and an improvement in the quality of life of the patient and the unborn child. The purpose of the project is to explore the knowledge of students enrolled in the Obstetrics degree program regarding oral health during pregnancy and to investigate whether the curriculum include subjects related to oral health. Interprofessional collaboration today, has set specific goals related to the protection

and safeguard of oral health quality of life, the rational management of resources and the implementation of prevention strategies.
Methods: A questionnaire was administered to the students of the degree course in Obstetrics of the universities of Tor Vergata, Sapienza and Cattolica. Through the online platform Survio an anonymous questionnaire was implemented with 16 multiple choice questions and scale likert. The questions were related to general personal information, general oral health and oral health during radiotherapy.
Results: Overall, awareness of the relationship between oral health and general health was found to be good, whereas awareness of side effects in pregnancy on oral heath was low. However the whole sample considered that an interprofessional collaboration could increase the quality of the patient's treatment plan and believe that a deepening in this regard is useful in everyday clinical practice, considering the fact that only 14,8% of the sample in question had studied oral health topics.
Conclusions: The results obtained suggest that awareness of oral health in university students can be improved by incorporating basic information on oral health into their training program, conducting interdisciplinary seminars or introducing a lecture program into the curriculum, in order to promote interprofessional collaboration and optimization of the therapeutic plan.

Oral health during radiotherapy: interprofessional collaboration and training

D. Corridore, M. Capocci, R. Francesca, M. Marta, N. Ndokaj, P. Debora, F. Guerra, L. Ottolenghi

Sapienza University of Rome, Department of Oral and Maxillofacial Sciences, Italy

Aims and Objectives: The Activity Learning approach requires changing the traditional pattern of using time in organising classroom activities. As activating the students is one of the key features, students will have to take more responsibility for their learning process, and teachers will act more as facilitator of students' learning and as a guide. In this way in-class activities aim at motivating students for critical thinking, engage them in active learning by applying and analyzing, and thereby foster deeper learning.
Methods: Activating students plays a central role in-classroom approach. According to Prince 'Active learning is generally defined as any instructional method that engages students in the learning process. In short, active learning requires students to do meaningful learning activities and think about what they are doing. Active learning refers to students actively engaging in the learning process, students being mentally active, thinking and working with the subject material, in contrast to being passive receivers of information as in traditional lectures. An example of AL in-classroom is: Live Lecture,Assigned reading, Multimedia content. Another fundamental objective for the good performance of the in-class programming is the definition of the working groups and their nuemrosity, different it will be to organize an activity for a garnde or for a small group or even an individual activity. Both self evaluation - reflecting on your own practice as a teacher - and evaluation of student satisfaction with your AL approach can provide important insight and information about what worked according to your plan and what didn't. Another important area demanding evaluation is of course the use of class time.
Results and Conclusion: It is equally important that each activity is meaningful, and ensures student development and advancement through the unit. Activities should build on previous activities and avoid being repetitive, they should enable students to engage with and develop their skills, knowledge and understandings in different ways. Meaningful activities engage students in active, constructive, intentional, authentic, and cooperative ways. The teacher's fundamental task is to get students to engage in learning activities that are likely to result in achieving [the intended learning] outcomes. It is helpful to remember that what the student does is actually more important that what the teacher does.

Assessment of pit and fissure sealants with and without ozone pre-treatment

Diust L., Chermetz M., Frattini C., Cadenaro M.

Aim: Ozone gas has been claimed to be an important antimicrobial agent effective against gram-negative and gram-positive bacteria, viruses, and fungi. The purpose of this in vivo study was to assess, at two different time points, the marginal integrity of pit and fissure sealants when applied with or without an ozone (O3) pre-treatment.
Methods: Healthy contralateral first or second molars in randomly selected compliant paediatric patients aged from 6 to 16-year old were randomly assigned into two main groups. Only teeth with sound enamel that did not need fissure enameloplasty were included in the study. All teeth were properly isolated with rubber dam. In the control group (G1) the fissure sealant (Clinpro™ Sealant, 3M™ ESPE™) was applied on the occlusal surface with no pre-treatment; in the test group (G2) the occlusal surface was pre-treated with ozone gas (O3) (Ozone DTA, Sweden & Martina SpA) before fissure sealant application. Follow ups

were scheduled after 5 (T1) and 10 months (T2) in order to evaluate the effectiveness of the treatment. USPHS parameters were used to evaluate the failure of the fissure sealants at each follow up. Chi-square test was used for the analysis of data ($p<0.05$).
Results: 20 teeth per group were compared. Premature detachment and marginal discoloration were the main causes of failure of the treatment at T1; at T2, instead, results showed that microleakage was the main reason of failure. At T2 the final success rate of the treatment was 72% in G1, while in G2 the final success rate was 94%. The statistical analysis of data showed a differentiation trend with 20% of positive events in the test group and 5% of positive events in the control group, even if not significant ($p=0.077$).
Conclusion: The retention of a pit and fissure sealant applied on ozone (O3) pre-treated surfaces was effective over time compared to non-pre-treated teeth occlusal surfaces. The failure rates were 15% in the test group against 35% in the control group. Even though the statistical analysis did not show a significant difference, there was a differentiation trend between the two groups that might suggest a positive effect of ozone treatment against adverse events. The sample of the study was not large enough to detect statistically significant differences; for this reason it would be appropriate to continue the study, enlarging the sample in order to obtain a more reliable statistical analysis and extending the follow up period to evaluate the efficacy of the treatment over time.

Oral hygiene protocols for ventilator-associated pneumonia (vap) prevention: a narrative review

Fella G.[1], Ferrara E.[2], Callegaro E.[3], Di Giorgio R.[1], Nardi G. M.[1]

[1]Department of Odontostomatological and Maxillo-Facial Sciences, Sapienza University, Rome, Italy
[2]U.O.C. of Odontostomatology, Hospital S.S. Annunziata, Chieti, Italy
[3]U.O.C. of Anesthesia and Reanimation, Santa Scolastica's Hospital, Cassino, Italy

Aim: Ventilator-associated pneumonia (VAP) is defined as a pneumonia occurring >48 hours after endotracheal intubation as delineated in the 2005 guidelines of the American Thoracic Society and the Infectious Diseases Society of America. It's associated with high mortality and morbidity. Indeed, a recent meta-analysis derived from VAP studies estimated the attributable mortality at 39% for high income countries and at 10% for low and middle income countries. VAP may be caused by a wide spectrum of bacterial pathogens. Common oral pathogens include the Streptococcus Mutans, Actinomyces Viscosus, Staphylococcus Aureus, Streptoccocus Pneumoniae, Pseudomonas Aeruginosa, whose products can cause the disease whit their consequent aspiration. That increases the length of stay in the ward, the duration of mechanical ventilation, and especially the mortality. One of strategies to prevent the disease is to intervene implementing preventive protocols that limit the appearance of VAP. This narrative review had the purpose to investigate the use of chlorhexidine at 2%, rather than lower rates, in patients suffering from ventilator-associated pneumonia, in order to standardize the protocol used, to improve the conditions of patient's health and discharge the stay in the hospital ward.
Methods: The research involved keyword searches of electronic databases, including PUBMED, MEDLINE and Google Scholar up to 2018. Search terms included "ventilation-associated pneumonia", "oral care protocol", "chlorhexidine". Of all articles, 9 were used for the preparation of the research, being relevant to the topic under discussion. The studies used methods collected with Apache Iv Module, Beck Evaluation Scale, Orophartngeal Buffer Culture and CONSORT Protocol 2010.
Results: Results showed a significant reduction in VAP, in the percentage of 51% with the use of chlorhexidine and the 2%, associated with toothbrushing and mechanical suction, whit a reduction of the ventilation time of 85%, without however reporting a significant decrease in mortality due to VAP, which is quantifiable nowadays in 24% of patients.
Conclusion: The use of chlorhexidine leads to a reduction, even timely, of the incidence of VAP in hospitalized patients, where the hospital provides more specific protocols. The mechanical action of the toothbrush is therefore decisive for the success of the treatment. There are still few studies on higher concentrations of chlorhexidine, which could potentially lead to complications. In all the studies it was found that the use of chlorhexidine is effective for the prevention and incidence of VAP, but fails to decrease the mortality and duration of hospital stay. The implementation of only way to prevent the disease is to intervene on the oral cavity, implementing preventive protocols that limit the appearance of VAP.
American Thoracic Society (ATS) and Infectious Diseases Society of America (IDSA). Guidelines for the management of adults with hospital-acquired, ventilator-associated, and healthcare-associated pneumonia Am J Respir Crit Care Med 2005;171:388-416. Zand F, Zahed L, Mansouri P, Dehghanrad F, Bahrani M, Ghorbani M. The effects of oral rinse with 0.2% and 2% chlorhexidine on oropharyngeal colonization and ventilator associated pneumonia in adults' intensive care units, 2017; 40:318-322
Tuon FF, Gavrilko O, Almeida S, Sumi ER, Alberto T, Rocha JL , Rosa EA.Prospective, randomized controlled trial that evaluates the early modification of the oral

microbiota after admission to the intensive care unit and oral hygiene with chlorhexidine, 2017 ; 8: 159-163

Non-surgical periodontal treatment effect on type II diabetes mellitus: observational study

Ferrara E. [2], Cesarano F.[1], Grassi R.[3], Grassi R.[4], Nardi G.M.[1]

[1] U.O.C. of Odontostomatology, Hospital S.S. Annunziata, Chieti, Italy
[2] Department of Odontostomatological and Maxillo-Facial Sciences, Sapienza University, Rome, Italy
[3] Department of Biomedical Sciences, University of Sassari, Sassari, Italy
[4] Department of Medical Sciences, Neurosciences & Sense Organs, University "Aldo Moro", Bari, Italy

Aim: It is well known the biunivocal relationship between periodontal disease and diabetes and pathophisiological mechanism related to immune functioning linking periodontitis and diabetes. Meta-analyses indicate that non surgical periodontal treatment determines a reduction of 0.4% glycate haemoglobin (HbA1c) approximately. On this scientific background, the aim of our observational study was to assess the impact of periodontitis and non-surgical periodontal treatment on changes in HbA1c in type II Diabetic individuals.
Methods: This was a single-centre, prospective study. Twenty-six patients with type II Diabetes were enrolled. Periodontal examination, including Plaque Index (PI) and Gingival Index (GI) in all teeth except for third molars, was assessed at baseline, 3 and 6 months. Levels of HbA1c were collected pre and post non-surgical periodontal treatment, at baseline, 3 and 6 months. The simple correlation index does not detect a linear connection between Hba1c and PI and between Hba1c and GI in the different detection times. However, through the fixed effects regression model we find a significant relationship.
The fixed effects regression model with panel data reveals the relationship between Hba1c and PI. It was decided not to include the GI variable in the regression because it was significantly correlated with PI. The data were structured in a "panel", with a Time variable that identifies the time units (0-3 months - 6 months), and a variable ID that identifies the patient. With this data structure, a regression model is implemented that allows us to estimate the coefficient of the linear relationship between the two variables, considering the effects fixed over time, and taking exclusively the variations between patients. The fact that over time patients have been constantly undergoing therapy makes this hypothesis credible.
Results: Consistent with findings in literature, our study underlined the improvement of glycated hemoglobin percentage after non-surgical periodontal treatment. Results analysis showed that the relationship between HbA1c and PI is positive ($\beta = 0.00388$, $p = 0.013$). The Model does not have a high level of adaptation to the data (R-square = 0.115), margins for improvement are possible considering the possibility of inserting further explanatory variables useful to explain the variation of HbA1c.
Conclusion: It has been proven from many research sources that periodontitis is correlated to type II Diabetes and current literature evidence provides information for understanding the interplay between periodontal inflammation and diabetes. Although the sample size is small, our results support the evidence of this relationship, demonstrating that non-surgical periodontal treatment may contribute to the reduction of HbA1c levels.
Sanz, Mariano et al. Scientific evidence on the links between periodontal diseases and diabetes: Consensus report and guidelines of the joint workshop on periodontal diseases and diabetes by the International diabetes Federation and the European Federation of Periodontology. Diabetes Research and Clinical Practice. 2018;137:231-241
Preshaw PM, Alba AL, Herrera D, et al. Periodontitis and diabetes: a two-way relationship. Diabetologia. 2011;55(1):21-31.

The impact of periodontal inflammation on serum markers levels in patients undergoing hemodialysis

Ferrara E.[2], Cesarano F.[1], Grassi R.[3], Grassi R.[4] Nardi G.M.[1]

[1]Department of Odontostomatological and Maxillo-Facial Sciences, Sapienza University, Rome, Italy
[2]U.O.C. of Odontostomatology, Hospital S.S. Annunziata, Chieti, Italy
[3]Department of Biomedical Sciences, University of Sassari, Sassari, Italy
[4]Department of Medical Sciences, Neurosciences & Sense Organs, University "Aldo Moro", Bari, Italy

Aim: Periodontal inflammation is found to be linked to enhanced inflammatory activity determining a low-grade systemic inflammation status which affects a multitude of systemic disease. Recent investigations focused the potential role of periodontitis as a nontraditional risk-factor, contributing to worsening of inflammation and malnutrition status in patients undergoing hemodialysis (HD). HD patients have higher susceptibility to infectious complications. Serum markers levels as high-sensitivity C-reactive protein (CRP), blood urea nitrogen (BUN) and plasma creatinine, are commonly used in clinical practice as routine procedures for the evaluation of

renal function. Considering the role of periodontal disease in development of systemic inflammation and efficacy of serum factors as markers of renal function, we aimed to investigate the association between periodontitis and serum levels of CRP, BUN, creatinine in HD patients, and evaluate the impact of non-surgical periodontal treatment on these biomarkers reflecting inflammatory and nutritional status.
Methods: Thirty-three hemodialysis patients were evaluated. Medical data including C-reactive protein (CRP), creatinine and BUN were extracted. For the serum factors assessment blood samples were collected pre and post non-surgical periodontal treatment, at baseline, 3 and 6 months. Periodontal examination including measurements of the mean Pocket Dept (PD), Plaque Index (PI), Gingival Index (GI) and Clinical Attachment Loss (CAL) in all teeth except for third molars was assessed. Kendall's Tau and Spearman's rank correlation coefficient were used in statistical analyses. Friedman's test was used for the difference between medians in k-related samples.
Results: There were not observed significant relationships between periodontal inflammation and creatinine and BUN in hemodialysis patients. Our study only showed that periodontal inflammation was positively correlated with C-reactive protein levels (tau=0.197; p=0.188).
Conclusion: In our small study a correlation between periodontitis and serum markers levels in patients undergoing hemodialysis was observed only for C-reactive protein. Systemic inflammation is an indipendent predictor factor of allograft failure after renal transplantation. Thus, periodontal health maintenance may be also essential for HD patients waiting for a renal transplant since oral pathologies or infections could put at risk the success of the transplantation. However, even if recent investigations suggest that primary management of peripheral inflammatory condition such as periodontitis may be a prevention strategy to improve the risk of comorbidities in hemodialysis patients, further studies are necessary to investigate this correlation.

Which consequences may have the intake of alcoholic drinks or soft drinks on oral ph?

Guazzo R.[1], Lingström P.[2], Stellini E.[1], Sbricoli L.[1], Gervasi M.[1], Tomasi C.[3], Bressan E.[1]

[1] Department of Neurosciences, University of Padova, Italy
[2] Department of Cariology, The Sahlgrenska Academy at Göteborg University, Sweden
[3] Department of Periodontology, The Sahlgrenska Academy at Göteborg University, Sweden

Aim: The aim of this study is to analyze the pH and titratable acidity of some beveragesin vitro and to investigate in vivo the saliva's pH variation after the intake of some alcoholic beverages and soft drinks.
Methods: For the in vitro study the following beverages were chosen: beer, Bacardi Breezer, Champagne, Chardonnay, Coca Cola, orange juice, Prosecco and Valpolicella red wine. The initial pH of these beverages was tested just opened, one hour after opening, cold (4°C) and at room temperature (25°C). These beverages were subject to pH measurements performed using AMANI650, a pH sensor with a 0.65 mm diameter, a tip's length of 20 mm, and a pH meter with a mV display and a BNC connector. In addition, the acidity of these beverages was titrated by adding gradually 0.1 mL of NaOH 0.05 M to 1.0 mL of each beverage until a pH>7 was reached.
For the in vivo study, the oral pH was measured on teeth surface in 20 healthy volunteers. The volunteers held in the mouth 10 mL of beverage for 1 minute. The analyzed teeth surfaces were: the right central incisor both vestibular and palatal and the upper-right molar on the occlusal surface. Different time intervals were chosen to record pH data: baseline, 1, 2, 3, 5, 7, 10, 15, 20, 30 minutes after the intake of water, Coca Cola, orange juice, Prosecco, Champagne and beer. The used pH sensor was the same for the in vitro study.
Results: The in vitro study resulted in Coca Cola being the most acid beverage among this analyzed at room temperature with a pH of 2.56. The less acid beverage was the beer at room temperature with a pH of 4.43. Beverage temperature slightly affect its pH. About the acidity titration, beer is the beverage which requires the least amount of sodium hydroxide (49,33 mg), while Champagne needs the biggest amount of it to reach pH>7 (197,33 mg).
The in vivo study showed that all drinks, except water, cause a lowering of oral pH after rinsing with 10 mL of beverage for 1 minute. Champagne caused the highest lowering of oral pH than other beverages while Coca Cola the lowest. After 30 minutes independently from the beverage, the pH values are like the initial ones.
Conclusion: There is no correlation between the initial pH of the beverages and the variation in the oral pH. Moreover, even holding in mouth 10 mL of beverage for 1 minute, there is no pH value damaging the tooth enamel because the pH does not reach its critical values (< 5,5). It can be concluded that with the assumption method analyzed in this study, neither alcoholic beverages nor soft drinks are able to damage tooth enamel. The saliva's buffer capacity is effective to neutralize the acid assumption.

Microbiological evaluation of periodontal pockets with two different diagnostic methods

Ketjona Lamaj, Ami Lamaj ,Chiara Occhipinti,

Batia Salvatore, Kolesnikova Nadia , Zelica Rocca , Ferrario Susanna, Beretta Paola ,Ceratti Chiara

Dipartimento di scienze biomediche, chirurgiche e odontoiatriche, Fondazione IRCCS Ca' Granda - Ospedale Maggiore Policlinico. Università degli Studi di Milano, Italy

Aim: The aim of the study is to evaluate in both qualitative and quantitative ways the presence of different bacterial strains before and after a Full Mouth Disinfection.
Methods: For the study, was chosen 20 patients with different 6 mm deep periodontal pockets, who were treated with a scaling 15 days before the microbiological test. Then, two samples of sub-gingival sulcus fluid were collected from the periodontal pocket, using a paper cone, and then analyzed, in three different timings: T0 right before the Full Mouth Disinfection, T1 30 minutes after the therapy, and T2 two weeks later.
The buffer was then analyzed emplying two different diagnostic systems: PerioPOC and Biomolecular Diagnostic. PerioPOC is a rapid chair-side test which realizes a qualitative detection of five bacterial species associated to Periodontitis, which are: Treponema denticola (Td), Prevotella intermedia (Pi), Tannerella forsythia (Tf), Aggregatibacter actinomycetemcomitans (Aa) and Porphyromonas gingivalis (Pg). The first step is to add to the buffer six drops of solution A, then hermetically close the phial, and manually shake for 30 seconds. Successively, the tube must be heated up for six minutes in a pre-heated to 95°C stove. The next step is to aspire the sample with a pipette, transfer it into the input channel of the chip, and leave it on for two mintues. Then, must be added one drop of solution B into the opening of the chip, and again leave it on for 2 minutes. Repeat the procedure for solution C and D, the last one, however, must be left on for four minutes. At the end of the process, can be read the results of the test in the chip, where are printed the abbreviation of each bacterial strain (Td, Tf, Pg, Pi, Aa), and three other controls, C1, C2 and TGL. The Biomolecular Diagnostic method consists of collecting the sample in a test tube, and sending it to the research laboratory, where is executed the Bacterial Periodontal Assessment (BPA), through a Real Time PCR methodology. This test provides a qualitative and quantitative result about bacterial, fungal and viral population present in the oral cavity, or in a specific periodontal pocket, which are responsible of the periodontal disease. After the T0, the patient was subjected to Full Mouth Disinfection, which includes interval rinse with 0.2% chlorhexidine, ultrasonic debridment, scaling and root planing, revision of oral hygiene manoeuvre and motivation. This was followed by the collection of new sample in T1 and T2. Once obtained the results of all the microbiological test, they can be compared to research a difference about the presence of bacterial strains in the different timings.
Results: The valuation of the results of the microbiological tests, express both qualitative and quantitative difference of bacterial species between the three different timings.
Conclusion: Methods about diagnostic procedures qualitative and quantitative presence of different bacteria could help clinics to customize clinic and drugs therapy in periodontal patients.

The s-iga and il-6 in children saliva. correlation to tooth decay severity and oral hygiene parameters

Nicita F., Sazonova E., Tamà C., Messina A.C., Sorace V., Bertino R.

Dept. Biomedical and Dental Sciences and Morphofunctional Imaging, Messina University

Aim: Normal physiological condition of the oral ecosystem is an expression of competitive balance between different oral microorganisms and immune mechanisms. To prevent tooth decay, therefore, it is necessary an effective function of salivary immune response. This action is related to the aspecific antimicrobial agents and the IgA, sIgA, IgM, IgG present in salivary composition. In particular, IgA secretory response is the first immune adaptive defence. IL-6 is a cytokine with pro and anti-inflammatory properties produced by T cells and macrophages, and its high salivary levels are correlated with dental caries. The aim of this study is to evaluate the S-IgA and IL-6 in saliva of children with primary and permanent dentition and its correlation to oral hygiene indices and tooth decay severity.
Methods: Twenty patients from 4 to 16 years old were divided into two groups according to DMFT/dmft criteria: caries free (A group) and caries active (B group). PUFA/pufa index was associated to DMFT/dmft score to quantify severity and extension of tooth decay. Moreover, B group was investigated according to WHO System, Mount and Hume, Benagiano and Ekstrand indices. Oral hygiene level was estimated by using Plaque and Gengival Indices, PHP Index and tooth brushing frequency in both groups. Stimulated whole saliva was collected and the levels of salivary IgA and IL-6 were determined by ELISA's method separately.
Results: Mean salivary IgA rate between two groups (A 11.7±8.5 mg/dl vs B 17.72±15.74 mg/dl) was not significant, while IL-6 rate (A 2.23±0.98 pg/ml vs B 32.5±12.54 pg/ml) was statistically different ($P<0.001$).

Based on severity of caries process, B group was divided in mildly active caries (MAC) (S-IgA=17.26±13.76mg/dl; IL-6=31.08±3.45pg/ml) and highly active caries (HAC) (S-IgA=18.4±20.65mg/dl; IL-6=34.62±21.01pg/ml). No significant difference in these two subgroups was found according to S-IgA and IL-6 concentrations. Regarding the tooth brushing frequency with parameters once a day (OD)/more than once a day (MOD), the comparison of S-IgA and IL-6 concentrations between A and B groups showed a statistically significant difference for IL-6 (A Group – S-IgA: OD 2.8 mg/dl, MOD 12.7±8.4 mg/dl and IL-6 OD 2.13 pg/ml, MOD 2.23±1.03 pg/ml. B Group – S-IgA: OD 20.2±16.4 mg/dl, MOD 14±16.23 mg/dl and IL-6: OD 30.02±7.05 pg/ml, MOD 36.22 ±18.91 pg/ml). The tooth brushing frequency showed no statistically significant difference in S-IgA and IL-6 levels considering MAC and HAC (MAC subgroup – S-IgA: OD 14.7±11.09 mg/dl, MOD 22.5±22.3 mg/dl and IL-6: OD 32.2±3.88 pg/ml, MOD 28.93±0.79 pg/ml. HAC subgroup – S-IgA: OD 31.3±24.7 mg/dl, MOD 5.52±2.41 mg/dl and IL-6: OD 25.8±12.2 pg/ml, MOD 43.5±29.34 pg/ml). Furthermore, patients with range values of 0.1<PI<1, GI<0.1, PHP=0 and MOD showed a statistically significant correlation with IL-6 levels among caries-free and caries-active groups, while no positive correlation was found for S-IgA.

Conclusion: This study showed that IL-6 rate was statistically higher in saliva of children with caries when compared to caries-free while for the S-IgA not significant differences between both groups were recorded. Also, the IL-6 salivary levels appear related to the oral hygiene quality expressed by the plaque and PHP indices. Inflammatory parameter such as IL-6 can be an important indicator in evaluation of dental caries.

The role of dental hygienists in the treatment and prevention of oral diseases in cerebral palsy pediatric patients

Ludovichetti F. S., Mazzoleni S., Porumb C. T., Cangemi G., Zuccon A., Stellini E.

Department of Neurosciences, Dental Clinic, School of Dentistry, University of Padova, Italy

Aim: Cerebral Palsy (CP) is a persistent, but not progressive, disorder of posture and movement due to changes in infant brain function, before the central nervous system development completion. People with cerebral palsy have a higher risk of developing oral and dental complications that may adversely affect their quality of life and well-being. The aim of this study is to find in the literature evidence of manifestation of oral diseases, to analyze the appearance of various pathological manifestations in the oral cavity and to report any preventive measure that facilitates oral hygiene in pediatric patients with cerebral palsy.

Methods: A literature review was carried out using the Pubmed database. The following "search equation" was used for the research: ((((cerebral palsy) AND dental) AND hygiene) AND oral) AND health). 52 articles were found. Two reviewers (F.S.L and C.T.P.) independently selected the articles suitable for the study, each disagreement was discussed and, in case of necessity, the intervention of a third reviewer (S.M.) was requested. 11 articles were excluded reading the titles. After reading the abstracts, 15 articles were then excluded. Finally, after reading the "full-text" of the remaining studies, 13 articles were selected and considered. Different study variables were analyzed by the Authors: prevalence of caries (DMFT); prevalence of dental erosions and traumas (OHI-S); prevalence of periodontal diseases (CPI); prevalence of drooling (MGI); Poor oral Hygiene.

Results: All the considered studies examined the prevalence of dental caries in patients with PC. The studies showed a general poor oral hygiene, which leads to periodontal disease. Other frequent pathologies in this kind of patients are malocclusion, bruxism, dental traumas, drooling and enamel formation abnormalities. No unanimous opinion about the prevalence of oral diseases and their direct correlation with cerebral palsy has still been reached by the literature.

Conclusion: Oral hygiene is essential to prevent and to reduce the occurrence of certain diseases and thus improve the quality of life of people with CP. Subjects with CP are a category of people at higher risk of oral diseases, so it is vital for dental professionals to control these subjects, both in the short and long term, so that they can intercept and attend promptly in case of any disease.

Bacteriotherapy: evaluation of the literature on the use of probiotics in preventing dental caries

Potente I., Mazzoleni S., Ludovichetti F. S., Cangemi G., Di Fiore A., Stellini E.

[1]Department of Neurosciences, Dental Clinic, School of Dentistry, University of Padova, Italy

Aim: The first studies conducted on the probiotic approach aimed at modifying the intestinal flora and in the last years, in the same way, an attempt was made to alter the microbial flora of the oral cavity, reducing or preventing oral diseases such as caries and periodontal diseases. In recent years in the field of pediatric dentistry there has been a considerable push towards the early identification of lesions and of the subjects at greatest risk, in order to prevent and decrease the progression of the pathological process. Bacteriotherapy is a potential

alternative to be used as a means to fight infections, obtaining, with the administration of certain non-pathogenic microorganisms, a shift of balance towards the presence of less aggressive species. Therefore the aim of this study is to describe the state of current scientific knowledge on the administration of probiotic strains in relation to carious lesions and in the control of related risk factors. Furthermore, we aim to provide indications for clinical use, with a focus on the pros and cons of the strains currently studied and available in Italy for caries prevention.
Methods: Various articles published in international scientific journals have been consulted, obtained thanks to research carried out through the PubMed database. The studies included in this research are clinical trials that have met certain inclusion criteria and that evaluate the in vivo role of probiotic administration on caries lesion development and on the control of caries risk factors.
Results: Through the scientific database, 95 studies were identified and evaluated and 25 of these met the inclusion criteria. Only 5 out of 25 do not recognize any kind of modification attributable to the intake of probiotics, but most of the works has highlighted one or more positive effects related to their administration. In 83% of the selected works, there is a statistically significant decrease in S. mutans, which does not occur in the case of lactobacilli, while in 70% of cases there were reported positive correlation effects between the intake of the probiotic and the reduction in caries risk and/or in carious lesions. Preliminary and still little investigated evaluations are instead found in the evaluation of plaque, saliva and in the persistence of the probiotic strain or related benefits.
Conclusion: The effect of probiotics as an aid in caries prophylaxis seems encouraging and in general, it is probable that for this use regular daily consumption is required for long periods. Probiotics have shown the ability to reduce the number of S. mutans present in saliva and/or plaque independently of the product or strain used, and there are also positive effects in relation to caries risk and caries lesions. Further investigations are necessary to optimize the dosage and therapeutic cycles protocol, analyze the persistence of the various strains in the oral cavity and obtain more information on the interactions of the various probiotic species and the resident oral microbiota.

Oral hygiene program improves the symptoms of oral lichen planus gingival lesion. A short-term study

Romeo T.[1], Mirone A.[1], Guida A.[1], Accarino A.[2], Izzo D.[2], Bucci P.[3]

[1]Undergraduated student, School of Oral hygiene, Department of Neurosciences, Reproductive and odontostomatological Sciences, University of Naples Federico II, Naples, Italy
[2]DDS postgraduate student of Oral Surgery School, Department of Neurosciences, Reproductive and odontostomatological Sciences, Univerity of Naples Federico II, Naples, Italy
[3]MD, DDS, Professor of Oral Medicine, Department of Neurosciences, Reproductive and Odontostomatological Sciences, University of Naples Federico II, Naples, Italy

Aim: Oral lichen planus is a mucocutaneous disease that involves the oral mucosa, the gingival tissue and in some cases the lesions can be very painful. Regarding the etiology of lichen planus, it seems that in light of recent studies, the genetic predisposition related to peculiar environmental factors strongly affects the manifestation of lichen planus gingival lesion. Lichen Planus can appear in the mouth in several different patterns but when symptoms arise, they are commonly associated with the atrofic and ulcerative subtypes of oral lichen planus. Therefore make an adequate treatment is crucial to get an improving of the clinical condition of the lesions. The aim of this study is to evaluate the effectiveness of a proper oral hygiene program to improve the painful symptoms of oral lichen planus gingival lesion.
Methods: Eleven patients with oral lichen planus gingival lesion were selected. The patients were evaluated regarding the clinical characteristic of the lesion by Escudier et al. index and we have considered four scores: site score, activity score, pain score and total score. Pain was evaluated by the visual analog scale (VAS). At baseline we have submitted the patients to a questionnaire: Oral Health Impact Profile (OHIP-14) used in a modified version, then we evaluated the periodontal indices too, in particular we examined clinical parameters such as bleeding on probing (BOP), the probing depth (PD) and the clinical attach level (CAL). We have also analyzed the visible plaque index (VPI) and gingival bleeding index (GBI) in four sites per tooth. At the baseline we submitted all the patients to a session of supragingival scaling and they received oral hygiene instructions. After the initial treatment, patients were followed up for four weeks, after that they were submitted to another professional plaque removal and we re-evaluated periodontal indices, pain and the clinical characteristic of the lesions; so the data obtained at the baseline and at the conclusion of the treatment after four weeks were analyzed by ANOVA.
Results: Periodontal treatment gave a statistically significant reduction ($P<0,05$) in periodontal indices and an improvement in the clinical characteristics and painful symptoms of the gingival lesions. Considering the OHIP-14 questionnaire the data demonstrated that the dimension that presented the most prevalence was the physical pain (40%). As regard VPI and GBI the data obtained demonstrated the 20,61% of improvement for VPI and the 13,74% of improvement for GBI, in fact

the VPI at the baseline was 4,41 ± 2,21 and in the final periods was 1,38 ± 1,26; while the GBI at the baseline was 3,54 ± 2,46 and in the final periods was 1,94 ± 1,44. As regard clinical and pain scores we obtained 10,5% of improvement for site score, 13,5% of improvement for activity score, 18% of improvement for pain score and 22,5% of improvement for total score.
Conclusions: In the end of this study we have demonstrated that plaque control and a correct oral hygiene program were effective to improve the painful symptoms and the clinical characteristics of oral lichen planus gingival lesions.

Prevention and care of "white spot" lesion during childhood: a literature review

Ludovichetti F. S., Todescato B., Piovan S., Cangemi G., Di Fiore A., Gobbato E.

Department of Neurosciences, Dental Clinic, School of Dentistry, University of Padova, Italy

Aim: Dental Caries affect about 98% of the world's population and they are often preceded by "precarious" phenomena. The most common form of "precarious" pathology is the white spot lesion, which can be defined as a deep demineralization with an intact and well-mineralized surface layer of enamel. The aim of this study is to analyze the literature regarding treatments available for the white spot lesions.
Methods: This study a literature review was performed using the Pubmed database (http://www.ncbi.nlm.nih.gov/pubmed). The following search equation was used: ((white spot *)) AND (("Tooth Demineralization / drug therapy" [Mesh] OR "Tooth Demineralization / surgery" [Mesh] OR "Tooth Demineralization / therapy" [Mesh] OR "Tooth Demineralization" [Mesh] OR "Tooth Remineralization / methods" [Mesh] OR "Fluorides / pharmacology" [Mesh])). The exclusion criteria were: studies carried out in vivo on animals; articles with absent abstracts, articles not available from the full text not available. After entering the "search equation" in the Pubmed database, 552 articles were found. 2 reviewers (F.S.L and B.T.) independently selected the articles suitable for the study, each disagreement was discussed and, in case of necessity, the intervention of a third reviewer (S.M.) was requested. 24 scientific articles were considered.
Results: The remineralization process of the white spot lesions already begins using a fluoridated toothpaste. Home treatments with Tooth Mousse or Tooth Mousse Plus, fluoride varnish, fluoridated mouthwashes and Miswakes can have positive effects after long-term usage, but this depends on the severity of the lesion treated. The treatment with probiotics, on the other hand, has little effect on remineralization but it may reduce the percentage of Mutans Streptococci in the oral cavity. Modern treatments with bio-active materials help in the formation of new hydroxyapatite. Icon (infiltrating resins) disguises the lesion by filling the demineralized layer.
Conclusion: The daily use of a normal fluoride-containing toothpaste is essential in the presence of white spots subjected or not to treatment, except in keeping the progression of the precarious lesion under control. The use of probiotics did not produce satisfactory results, but Miswak, over a period of 6 weeks, obtained very satisfactory results in terms of lesion progression and aesthetic level. The home application of tooth mousse is more effective than the treatment in a professional environment with the same product. As concerns aesthetic, results are significantly higher with minimally invasive dentistry interventions (ICON).

Medication related osteonecrosis of the jaws (mronj): management of clinical risk through prevention and awareness of the prescriber

Capocci M.[1], Toto I.[1], Coreno A.[1], Del Vecchio S.[1], Pippi R.,[1] Fadda M.T.[1], Guzzo A.S.[2], Romeo U.[1], Ottolenghi L.[1]

[1]Department of Oral and Maxillofacial Sciences, "Sapienza" University of Rome
[2]Health and Risk Management Unit – University Hospital Umberto I Rome

Aim: The aim of this study is the evaluation of the clinical risk of development of MRONJ and the possibility of reducing it through adequate primary prevention, starting from the awareness of the prescriber.
Methods: Through the digital archive review of CROMA pathway (Coordination of Research on Osteonecrosis of the Jaws) at Sapienza University of Rome, a retrospective analysis was carried out on patients who were yet to start or had already begun taking drugs associated with causing osteonecrosis of the jaws, during the observation period. A medical history was collected and a physical examination performed for each patient. Data collected was grouped into age, sex, systemic diseases, active principles of the administered drugs and duration of therapies related to the risk of osteonecrosis, previous or in progress, together with any diseases in the oral cavity, local and systemic risk factors and therapeutic needs. Depending on these elements a 3, 6, 12-months follow-up was established for each patient.
Results: From 2007 to 2018, 1338 patients, 1067 females and 271 males, were observed and treated when

necessary. 979 of them were affected by metabolic bone diseases, while the other 359 by metastatic cancer. Only 28% of patients had been observed before starting drug therapies associated with MRONJ. The remaining 72% of patients were undergoing drug therapy at the time of the first examination or had already undergone it, with therapy duration varying from a few months to tens of years. 7% of patients had undergone several drug therapies associated with MRONJ: a dental examination was required for two of them before starting Denosumab and Zoledronic acid, respectively. The first patient had already been receiving Clodronic Acid and the second one had already been receiving Sunitinib. For 74% of patients, therapeutic needs were identified such as oral hygiene, conservative, prosthetic, periodontal and surgical treatments. Only 26% of patients had adequate hygiene and oral health. 380 patients came to the examination before starting drug therapy associated with MRONJ and 253 of them had therapeutic needs. 145 patients had to perform surgical treatments before starting the indicated therapy. In 5% of the cases MRONJ were found. 67 cases of osteonecrosis of the jaws were identified and specifically: 12 patients with osteonecrosis at stage 0, 21 patients at stage 1, 25 patients at stage 2 and 9 patients at stage 3. For the 98.51% of these 67 patients, no dental visit had been required before initiation of therapy. One case of osteonecrosis at stage 0 was identified during the first examination before starting therapy with Zoledronic acid: the patient, with a metastatic renal cell carcinoma, performed radiotherapy and chemotherapy.

Conclusions: During treatment with bisphosphonates, anti-resorptive and anti-angiogenic drugs, there is a real risk of developing osteonecrosis of the jaws. This can be considerably reduced following appropriate therapeutic protocols, in order to maintain and where necessary, restore a high level of oral health, especially in a preventive way. It is, therefore, necessary to extend the existing network, intensifying the relationship between the dentist and the prescriber. A fundamental principle becomes, increasing the degree of awareness of the clinical risk of MRONJ.

Ozonated oil in dentistry: level of evidence

Tricarico G.[1-2], Cavarra F. [2], Travagli V.[3], Rocchetti V.[1-2]

[1]Università Piemonte Orientale- Scuola di Medicina Dipartimento di Scienza della Salute
[2]ASL"VC" Ospedale sant'Andrea Vercelli Ambulatorio di Odontostomatologia
[3]Dip. di Biotecnologie, Chimica e Farmacia – Dip.to Eccellenza 2018-2022 – Università degli Studi di Siena,

Aim: The aim of this paper is to review the available published research and to assess that the use of ozonated oils in dentistry has achieved a level of evidence to allow a strong recommendation of this product in oral and dental pathologies. References on the clinical use of ozonated oils appear in scientific literature since decades ago. The efficacy of ozonated oils in dentistry is enough supported by prospective cohort studies, randomized controlled trials, systematic review of either level II or nonhomogeneous level I studies. The outcomes, for us, represent a level II of evidence, enough to propose more opportunity for clinical studies in dental applications and a strong recommendation for clinical applications in dental and oral pathologies.

Methods: This paper reviews the general and main clinical applications of ozonated oils in dentistry that have appeared in the scientific literature by using PubMed, SCOPUS, Cochrane, Medline, ISCO3, Lilacs-Scielo researching papers published in the last 15 years using the following keywords: ozone, ozonated oil, dentistry, oral pathology, oral surgery.

Results: We found 40 papers in literature, on clinical studies, into the 300 published in this period, divided in the different chapters as indicated below. Clinical group classification and frequency distribution of articles on ozonated oil in dentistry: Surgery: 13 publications, Antibacterial activity: 10 Publications, Periodontitis: 6 publications, Oral lesions: 5 publications, Endodontic: 3 publications, Basic research: 3 publications. All these studies were analysed on a basis of a G/S, Good significant, G/NS, Good/Non-Significant; NS, Non-Significant.

The ozonated oil is topically used for the treatment of infections, ulcers and burns, abscesses, dental and apical fistulae, gingivitis, dry socket. In all these studies there is a ratio of 100% of G/S Good Significant results; G/NS and NS were 0%

Conclusion: The major positive result noted in ozonated oils studies is strongly suggestive of their usefulness in dental applications. Ozonated oil showed to be very useful in many oral pathologies and in the oral surgery becoming more and more a valid pharmaceutical substance for the treatment of oral and dental diseases; we propose to recognize a level II of evidence to the use of ozonated oil.

Evaluation of the oral microbiota in surgical extraction of symptomless impacted third molar: oral hygiene instructions associated with chlorhexidine with and without antibiotics

Bernier A., Creminelli L., Grossi G. B., Aref E., Cressoni P., Mitescu C., Benvenuto V., Loi G., Harowon I., Occhipinti C.

University of Milan, Italy Department of Biomedical, Surgical and Dental Sciences Ortognatodontics President Prof. G. Farronato

Dental Hygiene President Prof.ssa C. Dellavia
Fondazione Irccs Ca' Granda – Ospedale Maggiore Policlinico
UOC Maxillo-facial and Odontostomatology Unit – Director Prof. A. B. Giannì

Aim: of the study is to prove the fundamental importance of a good education on home oral hygiene procedures in the pre- and post-operative phase, promote tissue healing and avoid infections due to bacterial plaque proliferation. Therefore we want to prove the indispensable value of the dental hygienist presence, to juxtapose with the dentist, in dental extraction procedures. Finally, we want to analyze the oral microbiota in the patients that did and did not take antibiotics.
Methods: Randomly selecting 32 healthy individuals for the extraction of the impacted symptomless mandibular third molar. The day of extraction (T0) a plaque index was evaluated, using the Silness & Löe method. Moreover, a sample of plaque was taken and also a sample of oral microbiota through a 1 minute rinse with 5 mL of physiological water. The samples taken were subjected to microbiological analysis. To half of the selected patients we provide an accurate oral hygiene lesson using models and brushes in order to show the correct movements to be implemented. After 7 days, on the day of the removal of stitches (T1), the same samplings and indices considered in T0 were taken and analyzed in microbiology laboratory. We gave to each individual two anonymous questionnaires: the first one in T0 to acquire the basic informations of the patient and for the evaluation of pre-existing oral hygiene skills prior the start of the study. Instead the second questionnaire has been delivered in T1: it verified the quality and frequency of oral hygiene care during the last week, the use or not of Chlorhexidine 0,2% (CHX) mouthwash and the intake or not of antibiotics.
Results: The data collected shows that the plaque index percentage in the patients having received detailed oral hygiene instructions significantly goes down from T0 to T1 (from 41.33% to 23.33 %), unlike the untrained patients in which it increased (from 33,85% to 41,42%). We also noticed an important variation of the oral microbiota from T0 to T1 between patients who took antibiotics and those who did not.
Conclusions: An efficient oral hygiene and the use every 12 hours of CHX gives hope for a faster and better healing of the treated gingival tissue and in a lower and less aggressive presence of bacterial plaque compared to patients who don't follow these measures. Providing a good education to oral health instructions has being proved essential for oral cavity health. A mechanical therapy associated with the use of an antiseptic is sufficient to avoid an infection. That being said, we can certainty state that the professional figure of the dental hygienist is indispensable for the post-surgical phase of patients subjected to third molar extraction. From the analysis of the oral microbiota we have finally obtained surprising and scientifically interesting results, which have aroused such curiosity and interest to the point of wanting to continue the study to investigate the causes and the potential consequences of the variation of bacterial flora of the oral cavity.

Oro-dental manifestations of the celiac disease

Marziali N. , Iovane C. , Fama A. , Cressoni P. , Benvenuto V. , Cicero A. , Bernier A. , Aref E. , Occhipinti C.

University of Study of Milan, Italy. Department of Biomedical, Surgical and Dental Sciences
School of Specialization in Orthodontics (Dir: Prof. G Farronato)
Dental Hygiene Degree Course (President: Prof.ssa C. Dellavia)
Fondation Cà Granda IRCCS – Polyclinic Major Hospital
U.O.C Maxillofacial surgery and odontostomatology (Dir: Prof. AB Giannì)

Aim: The purpose of the present study is to identify any dental or oral mucosa manifestations in patients with diagnosis of celiac disease. The study aims to define if patients with celiac disease may have significative repercussions in oral cavity in order to find a posible connection between the gastrointestinal disease and stomathognatic system.
Methods: The sample is constituted by 16 celiac adult patients (average age ranging from 20 to 60 years), of which 4 males and 12 females. People with other pathologies, smokers and people who have undergone professional oral health care for more than three months have been excluded.
All the following analysis were performed:
- the valutation of the lesions of oral mucosa as recurrent aphthous ulceration minor and major;
- salivary pH;
- quantitative analysis of the basal salivary flow compared to the standard values described by Leo M. and Arjian Vissin (0.25 mL/min ≤ V basal salivary flux ≤ 0.35 mL/min);
- ROSA TEST for the individuation of any gingival and periodontal inflammation;
- demineralization sites, White Spot Lesions (WSLs);
- cariogenic receptivity index (DMFT/dmft)
- periodontal screening and recording (PSR);
- quantitative examination of bleeding (FMBS) and semiquantitative (IS);
- quantitative examination of plaque (FMPS) and semiquantitative (IP) in order to exclude poor oral hygiene as the cause of inflammation.

Results: The result of the present study shows a high level of gingival and periodontal inflammation corresponding to the NO3- mean value of 187

µMol/L, although the etiological factor of the bacteria plaque was not present in significant quantities.
It was found on average:
- a salivary pH of 6,4
- a salivary flow lower than the physiological values
- a significant presence of WSLs
- an high index of DMFT
- the presence of recurrent aphthous ulceration in the 50% of the population before the diet and only 25% during the gluten-free diet.

Conclusions: The oral examination could make a significant contribution to the individuation of celiac disease. The oro-dental signs found in the present study may be an indication of celiac disease.

Assessment of plaque bacteria in patients with juvenile idiopathic arthritis

Cressoni P., Batia G.[1], Colangelo B., Occhipinti C., Brounsouzoghly W., Repellini A., De Filippis A., Cigni L., Bellina A., Garagiola U.

[1]University of Milan, Italy. Faculty of Dental Medicine, Department of Orthodontics Foundation of IRCCS CA' GRANDA – The Major Hospital of Policlinico, Complex Operative Unit of Maxillofacial Surgery & stomatology

Aim: Make an evaluation about the changes of bacterial plaque in patients with Juvenile Idiopathic Arthritis from the first meeting and after every single session of Oral Hygiene during the whole period of orthodontic treatment. Since the early nineties, in the Major Hospital of Policlinico in Milan – Faculty of Dentistry, Department of Orthodontics is now active the Oral Hygiene Service for patients who suffer from Juvenile Idiopathic Arthritis. During the session of oral hygiene instructions, a sample of the oral plaque is removed to be examined in the laboratory under the microscopy to get a qualitative and quantitative assessment of plaque bacteria.
Methods: 250 patients with Juvenile Idiopathic Arthritis were enrolled in the study, all patients are in an orthodontic treatment phase.
A sample of oral plaque is collected using a special O shaped tiny handle from the lingual surface of the first right lower molar.
Before the beginning oral Hygiene session, samples of oral plaque are collected at every meeting with the patients. These samples can be conserved in a test tube filled with physiologic solution (0.5 ml) and then sent to laboratory to be analyzed.
In laboratory, after a good shaking of the test tube, a drop which of physiological solution contains oral plaque bacteria can be isolated. This drop must be positioned on a microscopy slide and colored using Gram Staining method to get a quantitative assessment.
The remaining part of the collected sample inside the test tube must be dilute with 9.5 ml of physiological solution. After adding a vital coloring (methylene blue) a drop must be isolated and positioned in the Hemocytometer grid to get a quantitative assessment.
Just like an average the patients enrolled in this study are subjected to 3 oral plaque sample examination.
Results: After 3 oral plaque sample examinations, it has been noticed that the number of Cocci and Bacilli found on the dental surface is sharply reduced quantitatively and qualitatively.
Conclusion: A right and constant oral hygiene, it is a fundamental component of an orthodontic treatment mostly in patients who suffer from particular pathologies which could limit the dexterity requested to get a good oral hygiene. It is been confirmed by the statistic results obtained in this study, the importance of the Oral Hygiene Instruction sessions for patients with Juvenile Idiopathic Arthritis Before and during the orthodontic therapy. the constant check of oral hygiene on a short distance of time has the aim to reduce the percentage of pathogenic bacteria and consequently reduce the incidence of a negative repercussion on the oral health of patients during the orthodontic therapy.

Importance of oral health in pre and post organ transplant patients

Occhipinti C. , Harowon I., Izadi S. , Mitescu C. , Ioi G. , Garavelli L. , Aref E. , Benvenuto V. , Taoufik S. , Cressoni P.

University of Milan, Italy. Department of Biomedical, Surgical and Dental Sciences Ortognatodontics President Prof. G. Farronato
Dental Hygiene President Prof.ssa C. Dellavia
Fondazione Irccs Ca' Granda – Ospedale Maggiore Policlinico
UOC Maxillo-facial and Odontostomatology Unit – Director Prof. A. B. Giannì

Aim: This study will be conducted with the aim of promoting oral health and the whole organism in patients who are following the therapeutic process that will lead them to receive an organ transplant.
In addition, possible changes following the intake of immunosuppressive drugs will be evaluated in the post-operative phase in both collaborative and non-collaborative patients. It is important to point out that the intake of immunosuppressive drugs entails a greater susceptibility to infectious phenomena that can originating from the oral cavity, with the risk of serious consequences at systemic level.
Methods: Patients included in the study will be enlisted awaiting autologous organ transplantation. Each subject, before the beginning of the study, will undergo a dental examination and schedule

any treatment aimed at restoring oral health. Moreover, two weeks before the start of the study, to standardize the sample, patients will be subjected to a professional oral hygiene session, to topical fluorine application and will be prescribed to use a chlorhexidine-based mouthwash of 0.12% (every 12 hours, for 10 days). Three months before receiving the transplant (T0) and for a follow-up of 3 months after the surgery (T1), each patient will be subjected to oral health examination through screening which involves the evaluation of the following indices: Periodontal screening Record (PSR); Index of quantitative bleeding of O'Leary (FMBS) and semi-qualitative Mombelli (ES), considering 6 surface per tooth; Quantitative Plaque Index of O'Leary (FMPS) and semi-qualitative silness and Löe (IP), considering 6 surface per tooth; cavity receptivity index (DMFT/DMFT). In addition, the salivate basal volume (split technique performed in a seated position for 5 minutes) will be evaluated and the obtained values will be compared with the standard values described by Sreeby and Vissin. It will be evaluated the salivary ph (with litmus test) and investigate the level of antioxidants present at the salivary level (treatment of salivary specimen in spectrophotometric analysis). Finally, intra-and extraoreal soft tissues will be inspected. In T0 All patients will be educated and motivated to perform oral hygiene operations at home to be repeated three times a day. Moreover, in the post-operative phase, until the end of the insulation, sterile devices (toothbrushes, dental floss and brushes) will be supplied for oral hygiene manoeuvres to be carried out only with 0.05% chlorhexidine (without water and without toothpaste). In T0 and T1 a questionnaire (anonymous, multiple-response, self-compilation) will be given to evaluate the patient's collaboration and interest in the oral health and systemic health. The answers with the questionnaire, will allow us to divide the population studied in two different groups: patients motivated/cooperated (group A); unmotivated/uncooperative patients (group B).

Results: The comparison of parameters considered in t0 and T1, in the two different groups, will allow us to understand if the focus on oral hygiene is not only for the health of the mouth but, above all, the systemic health of transplanted patients.

Conclusions: The promotion of oral health in the pre - and post - transplantation phase of organ is of fundamental importance, in order to prevent and intercept any oral complications that could jeopardise the outcome of surgery by jeopardising the patient's life.

The role of hormonal changes in women's oral health: from puberty to menopause

Occhipinti C. , Mannini F. , Izadi S. , Harowon I. , Bonura S., Fraone I. , Benvenuto V. , Taoufik S. , Cicero A. , Cressoni P.

University of Milan, Italy. Department of Biomedical, Surgical and Dental Sciences Ortognatodontics President Prof. G. Farronato
Dental Hygiene President Prof.ssa C. Dellavia
Fondazione Irccs Ca' Granda – Ospedale Maggiore Policlinico
UOC Maxillo-facial and Odontostomatology Unit – Director Prof. A. B. Giannì

Aim: Scientific literature shows that female sex hormones (estrogen and progesterone) are responsible for periodontal inflammation, host response and increased susceptibility to infections. This work aims to study the repercussions at the oral level, due to the hormonal changes characteristic of women's life phases: puberty, pregnancy and menopause. Specifically, we will try to understand if this correlation is direct or due to mood changes. Furthermore, we want to promote oral health taking into account the oral problems encountered in the various female phases.

Methods: A female multi-ethnic population is selected, free from pathologies and drug intake, divided according to the phase of hormonal life (puberty, pregnancy and menopause) into 3 different groups: puberty (group A), pregnancy (group B) and menopause (C). Every hormonal phase the woman goes through leads us to consider two different moments. Therefore, puberty will be divided into A1, pre menarche (appearance of the first signs of changes in the female body) and in A2, post menarche (beginning of puberty and entry into the fertile age); pregnancy in B1, first trimester (sixth week of intrauterine life) and in B2, third trimester (thirty-second week); menopause in C1, pre-menopausal phase (appearance of the first signs of female change) and in C2, post menopausal phase (final disappearance of menstruation and end of ovarian activity). Each patient will undergo an oral health assessment through a screening exam that involves the evaluation of different indexes: Periodontal Screening Record (PSR); quantitative bleeding index of O'Leary (FMBS) and semi-qualitative Mombelli (IS), considering 6 surfaces per tooth; quantitative plaque index of O'Leary (FMPS) and semi-qualitative index of Silness and Löe (IP), considering 6 surface per tooth; carioreceptivity index (DMFT / dmft). The presence of enamel demineralizations (WSLs) and the presence of dentinal hypersensitivity to the cold air test will be evaluated, for 5 seconds. Furthermore, the basal salivary volume will be collected (spitting technique performed in a sitting position for 5 minutes) and the values obtained will be compared with the standard values described by Sreeby and Vissin. The salivary pH will be evaluated (with litmus paper) and the level of anti-oxidants present at the salivary level will be investigated (salivary sample processing at

spectrophotometric analysis). Finally, the intra and extraoral soft tissues will be inspected. An anonymous, multiple-choice questionnaire will be administered, in which we will evaluate oral hygiene habits and eating habits of certain foods with different cariogenic power that could alter oral health.
Results: The comparison of the results obtained in the different phases of female life will allow us to correlate oral health with hormonal changes.
Conclusions: "Protecting women's health means protecting the health of an entire community ... Women must become protagonists of their own health by setting up life, from the earliest years, with prevention habits and healthy lifestyles." (Beatrice Lorenzin Minister of Health).

Oro-dental changes of pregnancy associated with fetal growth

Occhipinti C. , Bonura S. , Izadi S. , Manini F. , Aref E. , Benvenuto V. , Bernier A. , Taoufik S. , Cicero A. , Cressoni P.

University of Milan, Italy. Department of Biomedical, Surgical and Dental Sciences Ortognatodontics President Prof. G. Farronato
Dental Hygiene President Prof.ssa C. Dellavia
Fondazione Irccs Ca' Granda – Ospedale Maggiore Policlinico
UOC Maxillo-facial and Odontostomatology Unit – Director Prof. A. B. Giannì

Aim: Pregnancy is characterized by complex physiological changes that can affect the mother's oral health and that of the fetus. Despite the recommendations for the oral health promotion (2014 update of the Ministry of Health) aimed at health workers (gynecologists, pediatricians, dentists, dental hygienists), one child out of eight is still born prematurely or weighing less than normal by women with bad oral hygiene and gum/periodontal infections. The purpose of this work is to study the gold dental changes linked to hormonal changes in pregnancy and associated with fetal growth. Furthermore, we want to understand in which gestational period we are most exposed to the risk of contracting infections.
Methods: A population of multi-ethnic women, aged between 18 and 25 years, are randomly selected, who are free from pathologies and medications. The population will be divided into two different groups, women educated in their own oral hygiene and in the newborn with good nutrition (group A) and women not educated in their own oral hygiene and in the infant with a poor diet. The first observation period coincides with the sixth week of pregnancy (T0), while the other moments of the study will be fixed every 4 weeks from the first visit to continue until the third month of breastfeeding. Each patient will undergo an oral health assessment through a screening exam that involves the evaluation of different indexes: Periodontal Screening Record (PSR); quantitative bleeding index of O'Leary (FMBS) and semi-qualitative Mombelli (IS), considering 6 surfaces per tooth; quantitative plaque index of O'Leary (FMPS) and semi-qualitative index of Silness and Löe (IP); carioreceptivity index (DMFT / dmft). The presence of enamel demineralizations (WSLs) and the presence of dentinal hypersensitivity to the cold air test will be evaluated, for 5 seconds. Furthermore, the basal salivary volume (spit technique performed in a sitting position for 5 minutes) will be collected and the values obtained will be compared with the standard values described by Leo M. Sreeby and Arjian Vissin. The salivary pH will be evaluated (with litmus paper) and the level of anti-oxidants present at the salivary level will be investigated (salivary sample processing at spectrophotometric analysis). Finally, the intra and extraoral soft tissues will be inspected. An anonymous, multiple-choice questionnaire will be administered, in which we will evaluate oral hygiene habits and eating habits of certain foods with different cariogenic power that could alter oral health.
Results: The comparison of the results obtained from the study of groups A and B will allow us to deepen the knowledge that correlate maternal oral health with fetal growth. Moreover, from the results obtained from the evaluation questionnaires it will be possible to hypothesize which of the mothers will give importance to the care of the oral cavity of their newborn reducing the risk of carious disease in pediatric age.
Conclusion: It is important to establish a synergistic collaboration between gynecologist and dental hygienist to prevent gold dental diseases that occur in pregnant women, often the cause of systemic diseases with significant repercussions for the fetus. In addition, oral health information activities for future mothers could reduce the incidence of early-onset early childhood caries (ECC) and improve their children's oral health.

Prosthesis

Prosthetic rehabilitation with use of palatal augmentation prosthesis in patients affected by functional limitations of the tongue

Carlo Stefano[1], Michele Fabretti[2], Matteo Armida[2], Sara Jamshir[3], Francesca De Angelis[4], Edoardo Brauner[4]

Università degli Studi di Roma La Sapienza, Dipartimento di Scienze Odontostomatologiche e Maxillo-Facciali, Roma, Italy
[1]Professor
[2]Graduate student
[3]Research Assistant
[4]Researcher

Aim: In this study six patients with oral carcinoma were subsequently subjected to surgery. Following surgical operation, patients highlight functional and psychosocial problems such as dysphagia, dysarthria and difficulties in everyday life. In this work we analyzed six oncological patients undergone hemiglossectomy or/and hemimandibulectomy and presenting the above-mentioned limitations of lingual functionality. To improve their clinical conditions, patients underwent prosthetic rehabilitation through the use of the Palatal Augmentation Prosthesis (PAP).
Methods: After selecting the patients, we evaluated them to fill out two questionnaires on Quality Of Life (OHIP-14 and Vas Method), on the same day we tested pharyngeal swallowing pressure, performed phonetic tests and we took the impressions. After one week we started rehabilitating with PAP (Palatal Augmentation Prosthesis) and after two months of its use we repeated the same tests previously performed. PAP is an intraoral prosthesis, characterized by the increase of the component of the palate, used for the treatment of dysphagia and dysarthria, thanks to the restored contact between the tongue and the palate. The purpose of this kind of prosthesis is to allow a swallowing easier in patients with dysphagia, as well as an improvement of the speech.
Results: We evaluated pharyngeal pressure during swallowing, in two stages: one week before starting rehabilitation with PAP (Time 0) and two months after its use (Time 1), asking patients to swallows twenty times. We evaluated the QOL of our patients with two questionnaires, one week before PAP's insertion (Time 0) and two months later (Time 1). With regard to dysarthria rehabilitation, we evaluated patients using phonemic test with the same timing as the other tests performed. Regarding pharyngeal swallowing pressure, it is remarkable that the mean pressure with PAP was found to be significantly greater compared to that without PAP; this device allows a correct bolus transit, thanks to the renewed contact between tongue and palate- For what concerns the QOL, the analysis of the questionnaires results in a clear improvement in the comfort, chewing, aesthetics and functionality of the patients; results indicate an increase in overall satisfaction and self-esteem, a re-established serenity of mind and a remarkable improvement in relationship life. With regard to dysarthria, the comparison between phonemic tests at Time 0 and Time 1 shows an excellent improvement: the number of omitted, distorted or replaced words is reduced considerably as the number of correct words increases.
Conclusion: The use of PAP restored a correct connection between palate and tongue; this led to greater pharyngeal pressure during the swallowing phase and therefore to a better transit of food.In conclusion, we can state that PAP represents an effective therapeutic remedy in cases of absent or reduced lingual mobility, due to both emiglosectomy and demolition interventions which result in a lingual mobility deficit.

Objective assessment of masticatory performance a color based image segmentation method

Aquilanti Luca[1], Scalise Lorenzo[2], Napolitano Rachele[2], Coccia Erminia[1], Verdenelli Lorenzo[2], Carloni Luca[1], Rappelli Giorgio[1]

[1] Department of Clinical Specialistic and Dental Sciences, Polytechnic University of Marche, Ancona, Italy
[2] Department of Industrial Engineering and Mathematical Sciences, Polytechnic University of Marche, Ancona, Italy

Aim: Impaired masticatory performance (MP) might have an influence on Quality of Life, social interaction and general health.
Several methods were proposed in order to evaluate MP. Even if fragmenting test are considered to be the gold standard for the assessment of MP, they could be inconvenient and cost-intensive. Liedberg and Öwall proposed, for the very first time, the two-color mixing test, using two-different-colored chewing-gums. The two-color mixing test was optimized by Schimmel and implemented by a dedicate software (ViewGum®) which aim was to digitally analyze the scanned images of the specimens. This software introduces errors because of the manually segmentation of the samples in the images and the difficulty to distinguish hue variation between gum and background, especially in well-mixed specimens.
The aim of this work is to compare Univpm software, an automatic color-based image segmentation software, with ViewGum®.
Methods: 100 subjects were enrolled in the study. After informed consent for clinical treatment, patients were subject to a general dental examination at Dental Clinic of the Polytechnic University of Marche. Medical and clinical data were collected. All patients performed the two-color mixing test. Five samples were prepared for each patient, all consisting of the union of two equal parts of red and blue chewing-gum. Each sample was chewed for 5, 10, 20, 30 and 50 chewing cycles. Boluses were collected, inserted between two sheets of transparent plastic and brought to a standard thickness of 1 mm. A photo was taken from both sides of each bolus, so that the images could be processed by computer, analyzing the measure of the area of pixels of different colors using the Univpm software and ViewGum®.
Results: Out of a total of 100 subjects enrolled in the study, 50 were aged over 65 and 50 under 30. The images of the samples were digitally analysed.It was observed that MP increased with the increase of the number of masticatory cycles. There was a difference of 0.602 between the MP mean at 5 masticatory cycles and 50, according to Univpm software. According to ViewGum®, a difference of only 0.226 was detected between the MP mean at 5 and 50 masticatory cycles. Moreover, under-30-year-old subjects showed a better MP than over-65-year-old ones (0.556 vs 0.442, MP mean at 20 masticatory cycles).
Conclusion: The Univpm software is capable to quantify the degree of color mixing, while providing a better sensibility compared to ViewGum®software. This approach can provide an automatic classification of the interest color areas perfectly separated from the background of the scene. Therefore, Univpm software is more effective than ViewGum® and could be used to evaluate MP in adult and elderly patients.

Replacement of teflon on ball attachment without container for teflon a new technique

Saverio Ceraulo[1], Bruno Salerno[2], Luparelli Giovanna[3], Ignazio Ceraulo[4]

[1] Prof. a.c, di Tecnologie Protesiche e di Laboratorio, Dipartimento di Medicina e Chirurgia CLOPD Università Milano-Bicocca;
[2]Odontoiatra, libero professionista;
[3]O.S.S. RSA,
[4]Anestesista, Direttore Sanitario RSA.

Aim: In recent decades the number of elderly people has increased considerably, the dentist has more elderly patients requiring long-term oral rehabilitation. The overdenture on two implants with ball-attachement is an excellent solution for all those patients who cannot cope with more complex rehabilitations. In nursing homes It is often, in elderly guests who are not very cooperative, to have to replace the Teflon in prosthesis dated where the space for the insertion of the new container is reduced for wear of the resin.
Aim: The overdenture on two plants with ball-attachment retentions provides for the insertion of two plants, the presence of ball attacks and the Teflon lodged with the respective steel containers for the prosthesis. When the vertical dimension is very low or the thickness of the resin is reduced, often the metallic container can not be inserted because it occupies space inside the prosthesis therefore it is necessary to create a thickening in the very fastidious resin For the patient. To avoid these thickments, the Teflon is inserted directly into the denture resin eliminating the container. This procedure presents the risk that the resin used to fix the Teflon can go into the undercut of the retentive pellet causing considerable inconvenience. The objective of the following work is: to bring to zero/cancel the risk that the resin can end up in the undercut of the retentive ball-attachment; Reduce the finishing times.
Methods: The new technique includes the use of cold acrylic resin, teflon, a silicone tube, a laboratory motor for finishing, cutters and polishing rubbers. Once you have prepared the housing for the Teflon on the

mobile prosthesis and assessed the necessary height, insert the small silicone tube cut at the right height in the ball-attachment. Then the Teflon is inserted. The silicone tube adheres above the Teflon to the gingiva, protecting the whole of the retentive attack. Mixed the acrylic resin is inserted in the right quantity filling the 50% the previously prepared cavity and expects the polymerization. After curing, the mobile prosthesis can be removed very easily as the acrylic resin will be present only around the Teflon and will have filled all the walls of the cavity previously prepared leaving them smooth. The resin hardly goes any further.
Results: The use of this technique greatly helps the dentist as it reduces to zero cancels the risk that the resin can end up in the undercut of the ball-attachment, also reduces the working time and finishing.
Conclusion: This technique allows to stabilize the prosthesis in elderly patients not very cooperative even when the space is reduced for the insertion of the metallic container for Teflon. The dentist finds the use of this procedure very convenient both in the time of insertion of the Teflon and for the safety during the processing.

Marginal fit of CAD/CAM lithium disilicate occlusal veneers with two preparation designs: a scanning electron microscope quantitative evaluation

D. Angerame[1], M. De Biasi[1], G. Geretti[1], F. Zarone[2], R. Sorrentino[2]

[1]Clinical Department of Medical Science, Surgery and Health, University of Trieste, Trieste, Italy
[2]Department of Neurosciences, Reproductive and Odontostomatological Sciences, University Federico II, Naples,Italy

Aim: The use of all-ceramic conservative occlusal veneers is becoming more popular in the clinical setting thanks to the recent improvement of the mechanical and esthetical properties of the restorative materials. Furthermore, the option of CAD/CAM fabrication may constitute a further advantage for both clinicians and patients. Since little is known about the influence of the occlusal veneer preparation design on the marginal fit of the final restoration, the present study compared the marginal fit of two preparation designs.
Methods: Sixteen maxillary molars were selected from a pool of freshly extracted teeth and received 1-mm cusp reduction by using silicon indexes as reference. The teeth were randomly divided into two groups identified by the preparation design: conservative full-coverage occlusal veneer with a 90° rounded shoulder margin (n=8) and marginal chamfer (n=8). At the end of the preparation process, the exposed dentine surfaces were immediately sealed with a self-etch adhesive system. Lithium disilicate restorations (IPS e.max CAD) were produced with the Cerec 3 CAD/CAM system. The intaglio surface of the occlusal veneers was conditioned with hydrofluoric acid and silane, while the tooth surface underwent silicatization, enamel etching, and adhesive system application. The occlusal veneers were luted with Variolink II cement. The specimens were embedded into acrylic resin simulating the periodontal ligament with a layer of vinyl polysiloxane; then, they were subjected to thermomechanical aging with a chewing machine (1,250,000 cycles, 1 Hz, 5-55°C). A quantitative marginal fit evaluation was performed observing at the scanning electron microscope resin replicas of the specimens obtained before and after the thermomechanical aging simulation. For each replica, a single trained blinded operator measured the marginal gap along 120 equidistant points of the adhesive interface. Collected data were tested for the assumptions for using parametric tests. The marginal fit measured at different experimental time points was compared within the same group with a paired-sample t-test, while the two groups were compared at the same time point with an independent-sample t-test ($p<0.05$).
Results: At baseline, the occlusal veneer with a 90° rounded shoulder margin group showed a mean marginal gap equal to 103.83 ± 54.97 µm, while the conservative preparation design with a marginal chamfer 120.43 ± 58.92 µm. The difference between the two preparation designs in terms of marginal fit was not significant at any experimental time point. Thermomechanical aging caused a slight not significant reduction of the marginal gap in both groups.
Conclusion: The present study on extracted molars demonstrated that a new minimally invasive preparation for CAD/CAM lithium disilicate occlusal veneers with marginal chamfer is capable of marginal fit comparable to that of a standard conservative preparation.

Full digital workflow for an implant retained overdenture by digital smile project to guided surgery and prosthetic rehabilitation

G. Giannatempo[1], L. Ortensi[2], T. Vitali[2], M. Mascitti[3], A. Barlattani[3], M. Dioguardi[1], F. Mastrangelo[1], L. Lavorgna[1]

[1]Department of Clinical and Experimental Medicine, University of Foggia, Foggia, Italy
[2]Private Dental practitioner, Italy
[3]Department of Clinical Specialistic and Dental Sciences, Marche Polytechnic University, Ancona, Italy

Aim: The development of digital technologies in dentistry

has changed the therapeutic approach in edentulous patients both in preliminary stages of clinical case studies and when supporting the surgical and manufacture phases. The goals of the digital workflow are to reduce the number of patient appointments and to improve the predictability of treatment outcome.
Methods: A 67-years old female patient came to the dental office complaining of reduced chewing ability and loss of retention of her upper removable complete denture; she furthermore asked to improve the appearance of her smile and face. First of all a digital impression of the edentulous upper arch (3shape, Trios, Denmark), of the pre-existing denture and of the opposite arch were made. At this point two photos were taken of patient's face according to a coded technique for DSS software. Digital pre-rendering consisted of creating a digital teeth arrangement with virtual artificial teeth contained in the software library. The files from DSS were superimposed onto scanned images to convert the virtual 2D teeth arrangement into a 3D teeth arrengement (Exocad software, Exocade GmbH) and converted into a prototype by a 3D printer (SLA 3D, Form 2, Formlabs Inc) . The prototype was tried in the mouth checking esthetics and function and then is used a radiological stentwith for CBCT exam. The Dicomdata and STL files relative to anatomical and prosthetic parts are imported in a specific implant planning software (Realguide 5.0, 3DIEMME, Italy). A stereolithographic surgical template allowed to place 4 prosthetic-driven implants (Thommen Medical AG) with a dedicated bur kit. After the healing period of implants, the overdenture were made according to DSS project in terms of volume, esthetic and functional parameters already tested with previous prototype.
Results: The clinical case described was almost entirely resolved with an innovative digital workflow, both from a clinical and technical viewpoint. However, it is expected that technical development will rapidly lead to more and more digitalized therapies with an increase of the end quality of therapy and less conditioned by the skills of the individual operator.
Conclusion: DSS not only allowed the patient to see her future appearance, but it also enables production of a prototype for the functional check of the digital project carried out.

Prosthetic rehabilitations using ot equator clinical evidences

Francesca Gorassini, Luca Fiorillo, Giulia Amoroso, Roberta Mastroieni, Cristina Scoglio, Floriana Lauritano, Cesare D'Amico, Gabriele Cervino, Marco Cicciù

University of Messina, Italy

Aim: This abstract discusses the use of the OT Equator, the smallest attack for overdenture. The average dimensions of the total vertical connection (male + female and container) are, in fact, only 2.1 mm. The maximum width is ø 4.4 mm. The low-profile design and the wide range of retentive options make it the ideal solution for all clinical scenarios, but particularly indicated especially in cases where intervention space is limited. Different hights of the OT Equator abutment are made; the minimum one depends on the platform of the implant. Each retentive cap presents different sealing levels, which lead to the possibility of a change of the degree of retention in the different production realizations. OT EQUATOR attachments are made of a titanium nitride (TiN) coating (which gives the product the highest resistance to wear), a small metal container and nylon inserts, replaceable easily and in a few seconds for any kind of retention level. The aim of the research is to verify the best quality of life of edentulous patients rehabilitated with removable prostheses implanted using OT Equator.
Methods: Comparison of the published research documents that deal with the present subject, available in specialized magazines and/or websites, which also provide an observation of the characteristics of the products offered on the patent and spin-off market (in quantitative and qualitative verification on the materials used as well as their functional association). If possible, comparative evaluation of those results that could be pursued differently.
Results: OT Equator is currently the most advanced and versatile titanium implant attachment. Born as an evolution of the sphere O.T. Cap, it wants to keep the advantages of it reducing at the same time its dimensions as much as possible. The flexibility of this multi-use system ranges from single-ended overdentures, to the multiple types of bars, to fixed rehabilitations. A technique for immediate loading has also been developed, which allows the patient to apply a temporary bridge fixed to the implants, yet during the same session after surgery. The technique with OT Equator appears better and more efficient than other attack systems; from the examination of the data obtained it seems to be confirmed that the OT equator systems are able to maintain retention in a clinically acceptable way even after several years of use.
Conclusions: Despite the findings on the results, given that the bibliography and specific literature on the subject appear to be quantitatively limited, more detailed in vitro studies reproducing the most varied clinical situations hypothesized are, in fact, needed, as well as randomized clinical trials, which could also be useful in order to comparing the perceived satisfaction felt from the patient towards the use of different systems of attack (being this a relevant datum in this type of interventions).

Comparison between two interocclusal recording techniques intraoral wax record versus arcusdigma

M. Iervolino, F. Sorrentino, R. Sorrentino, F. Zarone

University of Naples "Federico II"
Department of Neuroscience, Reproductive Sciences and Dentistry
Dental Prosthesis Area (Director Prof. Fernando Zarone)

Aim: In recent years, in dentistry, as in other disciplines, digital applications have taken an increasingly important role in clinical practice. Any new technology should be compared with conventional methods to be able to evaluate and validate the use. The aim of this experimental study is to compare an innovative and computerized intermaxillary recording using the Arcusdigma (Kavo Kerr) with a traditional technique (the wax technique), wich is used as a reference. The comparison between the two techniques focuses on the analysis of differences: clinical-operative, sagittal condylar inclination (SCI) values, the Bennett angle (BA) values. They are the parameters that most determine substantial corrections of the occlusal surfaces during the planning and realization of the restoration. The null hypothesis is that there are no differences between the two techniques.
Methods: A total of 20 volunteers, 10 males and 10 females, aged between 22 and 30 years, participated in the study. Each volunteer was subjected to both intermaxillary recording techniques: the direct intraoral technique using wax (Aluwax); the extraoral, graphics technique, using the Arcusdigma (Kavo Kerr), a non-invasive computerized device based on the use of ultrasound. The Protar evo 7 articulator (Kavo Kerr), an individual value articulator, was used to obtain the interocclusal record data (sagittal condylar inclination and Bennett angle) with the wax technique. These data were then compared with those that arcusdigma processes directly at the end of interocclusal recordings in a graphical and numerical format, which can be saved, printed or sent by e-mail to the laboratory.
Results: The sagittal condylar inclination and the Bennett angle were analyzed: both descriptive statistics and the ANOVA one way test suggested that there was no significant difference between two techniques (SCI: p=0,920; BA: p=0,462). The clinical-operative differences were analyzed according to the time of execution, repeatability, preservation and data management: the ARCUSdigma was more advantageous.
Conclusion: The null hypothesis can be confirmed totally, because:
1. there are no statistically significant differences in the comparison of the Bennett angle values and the sagittal condylar inclination values obtained by the two techniques;
2. from a clinical-operative point of view, the technique using Arcusdigma is quicker, offers more diagnostic options, allows easier data management and fast communication with the laboratory, compared to intraoral technique based on the use of Aluwax wax.

Comparison of the fit accuracy at the implant abutment interface in original abutment and copy compatible abutment connected to original implant

Mariani Giorgio[1], Galullo Matteo[2], Mainardi Beatrice[1], Pirani Filippo[2], Russo Aldo[3], Gastaldi Giorgio[4]

[1]Student, Dental School, Vita-Salute University and IRCCS San Raffaele , Milan , Italy
[2]Oral Surgery Specialization School, Vita-Salute University and IRCCS , Milan , Italy
[3]Consultant, Vita -Salute University and IRCCS , Milan , Italy
[4]Associate Professor, Vita-Salute University and IRCCS , Milan , Italy

Aim: Nowadays there exist different abutments from different companies that are compatible with a certain manufacturer's implant. Until now no scientific evidence exists on whether the fit of the copy compatible abutments is comparable to that of the original abutments when connected to the original implants. Avoiding microgaps formation at the implant- abutment interface is important because they lead to biological and biomechanical complications. The aim of this study was to compare the fit accuracy of the implant-abutment interface in an original abutment and a copy compatible abutment connected to original implants.
Methods: One sample of an original abutment and one sample of a copy compatible abutment with an internal hexagon connection were connected to the original implants. Both the complexes A (implant-abutment original) and B (implant-abutment compatible) were sectioned in the middle and thereafter analyzed using a scanning electron microscope (SEM) to assess the fitting between the abutment and the implant. One of the two sections for each complex was analyzed in four different areas, considering two points for each area in order to achieve a comparative research study as comprehensive as possible. Since it was not possible to appreciate the gap at the IAI (implant-abutment interface) level with a magnification of 2000x, the magnification power was increased to 5000x. The final measurement of the gap was expressed in micron (µm).
Results: The marginal microgap at the implant-abutment interface in the compatible abutment complex was significantly greater than the microgap measured at the implant-abutment interface in the

original abutment complex. A mean gap difference at IAI level between section A and section B of about 20 µm was detected.
Conclusion: From the preliminary results obtained the use of compatible abutments would seem inadvisable in order to avoid biological and biomechanical complications. In addition there is already a evidence of how a greater gap at the IAI level leads to different mechanical consequences, which negatively affect the long-term prognosis of the positioned implant.
Nevertheless, according to the results of the study under consideration, it is necessary to deepen the subject matter, carrying out further research that examine a broader sample.

Three dimensional parametric analysis of a statically determinate system to rotate the occlusal plane for correction of skeletal Class III malocclusion

S. Marino; L. Fiorillo; R. Mastroieni; F. Gorassini; G. Amoroso; C. M. R. Scoglio; C. D'Amico; R. Lo Giudice; G. Cervino; M. Cicciù

Aim: Skeletal Class III malocclusion can be corrected by the rotation of the occlusal plane thanks to an early diagnosis of incorrect cranio-facial growth. This work is based on studies of Professor Sadao Sato. Parametric analysis is an engineering tool that allows us to recreate tridimensional models of devices, used for biomedical scope, using computer software. Our works is based on a three-dimensional scanning of a decomposable skull using engineering equipment that allows the reproduction of the 3D model on the computer through specific software.
Methods: We started with the factorization of the skull to have greatest precision and to facilitate the job of engenering department that have supported us during the reserch. After that, we went on with the tridimensional scanning of the different part of the model.The skull has been divided in: Parietal bones, Frontal bone and Ethmoyd, Occipital and Temporal bones, Sphenoid and Plowshare, Nasal-maxillary complex and Zigomatich bones and Mandibula. We needed from 25 to 50 scansion each. After the process of scanning we had to cleen the images with a CAD tecnique and, after that, we reassembleed the images with specific softwares. The scanner used for the tridimensional scanning is a ATOS COMPACT SCAN 2M with camera position 300. To recreate the skull we reassembleed the images with a software called SolidWorks. After the three-dimenional scanning we proceed with the simulation of realistic movements of the mandibula and we start to rotate the occlusal plane to correct the malocclusion. Three-dimensional Parametric Analysis is still in progress because we have to consider many factor about the cranio-facial growth. We used the first results of our study with a 17 years old female patient. Thanks to the ortopantomography, latero-lateral radiography and atero-posterior radiography we have seen that the patient had a facial asymmetry with a malocclusion (3°class malocclusion on the right side and 2° class malocclusion on the left side), a brachifacial profile and the mandibula had an antero rotation and a right overdevelopment with a left deviation on the middle line. The patient refused the ortognathic surgery treatment, so we decided upon a conservative treatment using the partial results of our tridimensional analysis, to use Sato's method. Sato's method is based on the correction of occlusal plane to correct the malocclusion . To correct the 3° class malocclusion we had to lift the occlusal plane on the left side and, at the same time, we had to lower the occlusal plane on the right side to correct 2° class malocclusion. To proceed with this treatment is necessary eliminate all the interferece between the dental arch, only the premolars have to contact.
Conclusion: Althoug three-dimensional parametric analysis is still in progress we are optimistic about the work. The patiente is still being in treatment but the final results are encouraging.

Digitalization ih prosthesis innovative methodology on a clinical case

Palumbo V. L.[1], Dedola A.[1], Giuliani M[1], Mauceri R.[2], Canepa F2, Giannatempo G.1

[1]. Department of Clinical and Experimental Medicine, University of Foggia, Foggia, Italy.
[2]. Department of Surgical, Oncological and Oral Sciences, University of Palermo, Palermo, Italy

Aim: treatment of a 50-year-old patient ex heavy smoker that showed a severe reabsorption of the maxillary bones due to chronic periodontitis. Arrived at the dentist's observation for aesthetic reasons (lost a lateral incisor), the patient was immediately taken into care. The patient never went to the dentist for the last 40 years and until a few days before the start of the treatment he had all his natural teeth in position, albeit severely mobile in the frontal area. Given the patient's age, the treatment was planned to bring to it the least possible physical and psychological discomfort, except for the days immediately following implant surgeries, he always went to work and continued normal social activities.
Methods: The treatment plan consisted of periodontal causal therapy and immediate implementation of two removable prostheses to avoid discomfort to the patient in the prime of his social life. After defining

with reasonable certainty which dental elements could be saved, implant surgeries were planned and with it the digital design of the final prosthesis has begun. After placing the implants and taking the impressions of the maxillary arches, the work proceeded with the prosthesis that passed through a circular provisional milled in resin and ended with the manufacture of a metal structure milled in CrCo sinter alloy. This sinterable material (such as zirconia) allowed the milling of the structure directly in the dental technician laboratory, being the same consistency of a wax, then proceeding with the sintering that gave it the chemical-physical characteristics typical of the traditional CrCo alloy. The metal structure was then ceramicized in a traditional method obtaining a very natural characterization. Since the patient is characterized by a limited uncovering of the teeth between the lips, it was decided not to place a pink gingiva, thus allowing a smaller encumbrance of the prosthesis that resulted in a lower weight and an easier access to the periimplant areas useful for carrying out daily hygiene.

Results: after one year of treatment, the patient received the definitive prostheses that have restored original function and aesthetics and most important can be easily cleaned giving a good predictability of success of the entire therapeutic plan.

Conclusion: Wisely planning extractions and surgical therapy, the digital workflow can help you achieve an optimal and predictable result.

Rehabilitation of a maxillo facial defect with implanta-supported prosthetic device a therapeutic alternative in composite defects of the face as a result of surgical exeresis for oncological pathology

Palumbo L., Capparè P., Vinci R , Gastaldi G.

Departement of dentistry, IRCCS San Raffaele Hospital, Milan Italy

Aim: As regards composite defects that include multiple facial subunits, the aesthetic superiority and the simplification of the surgical phases of the rehabilitations with implant-supported obturator prostheses make the maxillofacial prosthetic reconstruction techniques more predictable than plastic surgery. Where the defect extends to the oral cavity or the orbit, and therefore where a surgical reconstruction is not easy, the use of prostheses with anchoring to osseointegrated implants may offer the most appropriate treatment option. The aim of the present work is to present a complex clinical case related to the post-oncological implant-prosthetic rehabilitation of the nasal and maxillary district in a patient previously subjected to surgical exeresis for oncological pathology.

Methods: The patient came to our attention (at the Department of Dentistry and Dental Prosthetics of the University Vita e Salute San Raffaele) sent for a pre-surgery evaluation by the ORL department of our Hospital. A mass is shown at the level of the nasal columella; we note the complete edentulism of the maxilla. The diagnosis is an infiltrating epidermoid carcinoma of the tip of the nose that involved the nasal cavities, the columella, the pre-maxilla and the labial filter. The first phase of the treatment involved the surgery of rhinectomy and partial maxillectomy performed at the ORL department. During surgery, an immediate surgical obturator is inserted to allow the closure of the oro-nasal communication. Over time the healing of the surgical margins is followed by adapting the obturator to the variation of the shape defect that occurs in the post-operation. To create a first temporary prosthesis, an impression is made of alginate and gypsum of the nasal defect for the construction of a traditional epithesis hooked to a spectacle frame. During the healing phase, the possibility of inserting implants in the upper arch was evaluated, to increase the retention of the obturator prosthesis and to evaluate the possibility of combining it with the nasal epithesis to improve the performance of both prosthetic devices. The procedure is carried out under local anesthesia with the insertion of 4 implant fixtures in the upper premolar area, two on each side. After 4 months the implants were discovered and it is assessed that there is no mobility, bone loss or clinical signs of infection. Once the definitive implant-supported obturator has been installed with the application of attachments on the implants. The definitive epithesis on the nasal extension of the obturator prosthesis is also constructed, designed to enclose two ball attachments in its structure that allow the connection of the epitheses to intraoral obturator prosthesis. This system favors the easy removal of the prosthesis and a better sanitation of the cavity by the patient.

Results: After one year from the prosthetic rehabilitation, the epithesis is well tolerated and the implants are perfectly osseointegrated. From the oncological point of view, there is no recurrence of the pathology. Rehabilitation is useful, not only to give the patient a better appearance, but also to promote social integration by ensuring greater self-confidence.

Conclusion: The implant-prosthetic rehabilitation of post-oncological defects can be considered an effective and suitable method for the rehabilitation of patients with extensive surgical resections for head and neck cancers. The use of osseointegrated implants has allowed excellent prosthesis stability and retention, making it more acceptable and comfortable for the patient.

Evaluation of satisfaction in prosthetic patients

M. Pietrantonio, R. Sanzullo, P. Ausiello, E. Epifania

Department of Neurosciences, Reproductive and Odontostomatological Sciences, University of Naples Federico II, Naples, Italy

Aim: Numerous patients are rehabilitated by a conventional removable prosthesis. It is undeniable that a part of patients with removable prostheses, are disappointed by the rehabilitation therapy. Therefore, the purpose of this study is to evaluate the subjective patient satisfaction, ascertaining whether and how such data affect the perception that patients have of their quality of life and the acceptance of removable complete denture.
Methods: The variable object of this study is Patient's satisfaction. Patient's satisfaction: The only tools available in the literature developed to measure the quality of life of patients in relation to their oral health, are reduced to more or less comprehensive and complex questionnaires that authors provided to patients, such as Oral Health Impact Profile (OHIP) and Geriatric Oral Health Assessment Index (GOHAI). These questionnaires, however, refer to the assessment of the quality of life of patients in relation to oral health in the global sense, not specifically structured to assess the problems and satisfaction that patients report with regard to complete denture. Based on the existing questionnaires and above all on the criteria defined by Kressin et al., which are fundamental for the creation of a valid and meaningful tool, a new questionnaire has been drawn up, consisting of eight variables such as : ability to chew hard foods; the ability to chew soft foods; the perception of retention; the stability of the prosthesis during chewing or phonetics; the patient's ability to insert or remove the denture; ability to speak; aesthetic satisfaction and general satisfaction. At these 8 canons, patients could attribute a personal and subjective assessment that ranged from 1 to 5 (where 1 is "for nothing satisfied" and 5 for "totally satisfied"). 113 patients have been included in the research and they have filled out the questionnaire anonymously. Preliminarily, an analysis of the mean and frequency of the anamnestic data was presented, as number and percentage. The univariate variance test (ANOVA) was used to testify an association between the scores of the satisfaction scale and the detected anamnestic data.
Results: The evaluation of the overall satisfaction score has underlined an average of 26.43 and a median satisfaction score of 3.30. This indicates that the patient's level of satisfaction was on average between "quite" and "very". A repeated analysis of the univariate variance (ANOVA) between the various anamnestic factors considered in the study and the overall satisfaction score showed that sex, age, degree of education, and time spent from the prosthesis delivery did not change the level of satisfaction and are therefore not suitable parameters to predict the outcome of prosthetic treatment.
Conclusion: Based to the collected data and the results obtained it can be concluded that:
- Age, gender, degree of education, and time of denture wearing do not change acceptance and final satisfaction. The anamnestic data taken into account are therefore do not constitute a predicting factor of the outcome of the treatment.
- The patient's level of satisfaction was on average between "quite" and "very".

Biological width re-establishment around dental implants is influenced by abutment height irrespective of vertical mucosal thickness a cluster randomized controlled trial

Antonio Rapani[1], Claudio Stacchi[1], Sergio Spinato[2], Teresa Lombardi[3], Fabio Bernardello[4], Marcello Messina[5], Sergio Dovigo[6], Federico Berton[1], Davide Zaffe[7], Roberto Di Lenarda[1].

1Department of Medical, Surgical and Health Sciences, University of Trieste, Italy.
2Surgical, Medical and Dental Department of Morphological Sciences Related to Transplant, Oncology and Regenerative Medicine, University of Modena and Reggio Emilia, Italy.
3Private Practice, Cassano allo Ionio (CS), Italy.
4Private Practice, Terranegra di Legnago (VR), Italy.
5Private Practice, Trieste, Italy.
6Private Practice, Noventa Vicentina (VI), Italy.
7Department of Biomedical, Metabolic and Neural Sciences, University of Modena and Reggio Emilia, Italy.

Aim: Early peri-implant bone remodeling is a complex phenomenon, influenced by several variables. Among them, the re-establishment of biological width, occurring when the implant is exposed to the oral environment after abutment connection, has been widely investigated. Numerous studies showed that both the vertical thickness of peri-implant mucosa and the height of the prosthetic abutment have a key role in influencing early marginal bone loss (MBL), but no clinical trials are present in literature evaluating their simultaneous action during biological width re-establishment. The aim of this study was to evaluate the influence of the abutment height on early MBL (up to 12 months of prosthetic loading), in implants surrounded by thick or thin mucosa.
Methods: Partially edentulous non-smoker patients requiring single implant-supported screwed restoration in the posterior mandible were enrolled in this trial. Local inclusion criteria were: I) presence

of keratinized mucosa with a minimum bucco-lingual width of 3 mm; II) bone crest with a minimum of 6 mm width and 9 mm height above the mandibular canal, with no concomitant or previous bone augmentation procedures; III) presence of the opposing dentition. Platform-switched implants with internal connection (Shape1, i-RES, Lugano, Switzerland) were placed in equicrestal position (peak insertion torque <60Ncm) in two groups of patients with different vertical mucosal thickness: thin (≤2.0 mm) and thick mucosa (>2.0 mm). Abutments with a height of 1 mm (short, subgroup-A) or 3 mm (long, subgroup-B) were randomly assigned for single crown screwed restoration. MBL was evaluated on radiographs taken at implant placement (T0), restoration delivery (T1) and after 6 months (T2) and 12 months (T3) of prosthetic loading.

Results: Seventy implants were inserted in the posterior mandible of seventy patients. After three months of submerged healing, implants were restored with screw-retained ceramic crowns. Implant survival rate was 97% after 12 months of prosthetic loading, with 66 implants in function; 2 drop out and 2 failures were recorded. Mean MBL, comparing T0 with T3, varied from 0.59 mm to 0.80 mm in subgroup-A and from 0.28 mm to 0.37 mm in subgroup-B. Differences between subgroups resulted statistically significant, irrespective of vertical peri-implant mucosal thickness. MBL pattern over time showed that the greatest amount of bone resorption occurred in the first 6 months after prosthetic loading, particularly around implants restored with short abutments (subgroup-A).

Conclusion: After 12 months of prosthetic loading, platform-switched implants with internal connection placed in equicrestal position and rehabilitated with short abutments (1 mm) exhibited a significantly greater MBL compared to identical implants rehabilitated with long abutments (3 mm), irrespective of the vertical thickness of peri-implant mucosa.

Elderly masticatory performance and nutritional status an observational study

Coccia Erminia[1], Vignini Arianna[2], Pugnaloni Sofia[2], Aquilanti Luca[1], Alia Sonila[2], Rosati Valentina[1], Mancini Margherita[2], Rappelli Giorgio[1]

[1]Department of Clinical Specialistic and Dental Sciences, Polytechnic University of Marche, Ancona, Italy;
[2]Department of Clinical Specialistic and Dental Sciences, Polytechnic University of Marche, Ancona, Italy.

Aim: According to WHO, there will be an increment in the percentage of elderly population, highlighting the need to pay more attention to the health of these subjects. Oral health is an important part of general health. It affects the quality of life and it is therefore important to try to preserve it as much as possible, preventing and possibly treating all the pathologies most frequently encountered by elderly subjects that could lead to edentulism. The latter is the main responsible of the reduction of masticatory performance (MP). Also nutritional status is an important health factor in elderly patients and its assessment is crucial. Oral disorders, associated with reduced MP, negatively affect nutritional status of elderly patients, who will tend to exclude some basic food from their diet.The limitations made to dietary habits of edentulous subjects do not allow them to have adequate nutrition,exposing them to a greater risk of protein-energy-malnutrition than their peers with a still adequate number of natural teeth.
The aim of this work was to verify the existence of a correlation between the reduction of MP in elderly subjects and their nutritional status.

Methods: Patients aged ≥ 65, who were undergoing medical outpatient treatment at the Dental Clinic of the Polytechnic University of Marche, were enrolled in this study. For all participants, individual sociodemographic data, general and oral health data were recorded. MP was carried out using the two-color mixing test. Five samples were prepared for each patient, all consisting of two equal parts of red and blue chewing-gum. Each sample was chewed for 5, 10, 20, 30 and 50 chewing cycles. Boluses were collected, inserted between two sheets of transparent plastic and brought to a standard thickness of 1 mm. A photo was taken from both sides of each bolus. Images were digitally processed. Areas of blue and red pixels were identified and separated from the pixel areas of the mixed portion, which were added together to obtain the total mixed quantity.The assessment of nutritional status was carried out through a food interview. Antromorphometric parameters were collected and bioimpedance analysis was performed in order to study lean mass, fat mass and body total water.

Results: 89 patients - 48 men and 41 women - were enrolled in this study. Most of these patients had more than 20 teeth (21.7 ± 5.9). Obese patients had a lower MP than patients who were overweight and normal weight. Both men and women, with an abdominal circumference above the threshold, had a mean MP lower than that of patients with an abdominal circumference within the normal range. The evaluation was repeated taking as reference value FFM (Free Fat Mass): subjects presenting a FFM below the normal range had a lower average MP. The relationship between MP and the daily protein intake was evaluated too. Patients with a value within or above the reference range had a higher average MP than those who took a quantity of daily proteins below the range.

Conclusion: An association between reduced MP and an incorrect diet was observed in this study. A reduced MP could be considered to be a risk factor for obesity and reduced FFM.

Digital vs conventional impressions on the totally edentulous maxilla in vitro analysis of the accuracy

Gennaro Ruggiero, Fernando Zarone , Roberto Sorrentino.

Department of Neurosciences, Reproductive and Odontostomatological Sciences, Division of Prosthodontics and Digital Dentistry, University "Federico II" of Naples, Italy

Aim: The aim of the present in vitro study was to compare the accuracy of scans performed by an intraoral scanner (TRIOS 3 Pod, 3Shape) to scans performed with a laboratory scanner (DScan 3, EGSolution) of impressions made with 3 different impression materials: polysulfide (Permlastic Regular body, Kerr), polyether (Impregum Penta medium-bodied, 3M ESPE) and polyvinylsiloxane (Vestige medium, Trayart) on a reference typodont of a totally edentulous maxilla. The null hypothesis was: there is no difference between the accuracy obtained by each scanning typology and the accuracy of the reference scan.
Methods: A typodont made-up of polyurethane resin (PRIMA-DIE, Gerhò) of a totally edentulous maxilla was fabricated and scanned using an industrial metrological machine (Atos Core 80, GOM), so obtaining a digital reference scan in .stl format. The areas needed for the construction of a complete maxillary denture were all included in the scans. The scanning strategy proceeded longitudinally along the ridge occlusal side of the full arch, starting from the left maxillary tuberosity, ending at the right one, then continuing on the buccal side and finally on the palatal side, scanned with a circular movement in a counterclockwise direction along the palatine vault and finally in posterior-anterior direction along the palatal median line. A device was created to take impressions with a repeatable, consistent process that could guide and position the typodont onto an individual impression-tray with the same standardized pressure and orientation in the space. A reference tray was fabricated in light-curing resin (ValSax) and a silicone (ADDISIL A+B-85, Bartolini Dental Group) was used to create a mold of this tray, inside which a self-curing resin (BI-CRYL COLD A+B, Bartolini Dental Group) was cast to duplicate the reference tray, in order to obtain 10 identical impression-trays. With this device, 10 impressions for each impression material were obtained; then, by the laboratory scanner, a scan of each impression was done. With a dedicated software (DentalCad, EGSolutions) digital models for each impression were obtained processing "in reverse" the physical impressions. Four groups of scans were done (n=10): scans obtained by the intraoral scanner were named: "Intraoral-Scanner"; the ones made with the laboratory scanner were respectively named: "Polysulfide", "Polyvinylsiloxane" and "Polyether". The scans in .stl format were imported into a dedicated software (Geomagic Control X) and the accuracy of each one was evaluated calculating trueness and precision in μm. Data were statistically analyzed by means of a dedicated software (SPSS 25, IBM).
Results: Trueness values (95% CI): Polysulfide=254.8 [120.7-388.9]; Polyvinylsiloxane=218.3 [124.3-312.3]; Polyether=298.9 [225.5-372.2]; Intraoral-Scanner=48.1 [42.4-53.7]. Kruskal-Wallis' test was performed and statistically significant differences ($p<.001$) were detected between the means of the groups: Intraoral-Scanner/Polyether, Intraoral-Scanner/Polysulfide, Intraoral-Scanner/Polyvinylsiloxane. Precision values (95% CI): Polysulfide=281,0 [119.2-442.8]; Polyvinylsiloxane=210.2 [112.4-307.9]; Polyether=288.8 [232.4-345.2]; Intraoral-Scanner=46.0 [39.7-52.3]. Kruskal-Wallis' test was performed and statistically significant differences ($p<.001$) were detected between the means of: Intraoral-Scanner/Polyether, Intraoral-Scanner/Polysulfide, Intraoral-Scanner/Polyvinylsiloxane. Accordingly to the results, the null hypothesis was rejected.
Conclusion: Within the limitations of this in vitro study, the scans performed with the intraoral scanner were more accurate than the ones performed with the laboratory scanner on the impressions made in polysulfide, polyvinylsiloxane and polyether. The most accurate impression material was polyvinylsiloxane, followed by polysulfide; polyether was the least performing.

Aesthetic and functional mock-up: differences between analogical and digital techniques

F. Cattoni, V. Sanci, R. Broggi, S. Tecco, G.Gastaldi

Dental School, University Vita-Salute San Raffaele, I.R.C.C.S. San Raffaele Hospital, Milan (Italy)

Aim: Today the concept of a beautiful smile is largely changed. In fact, the role of occlusion became fundamental in dental rehabilitations. Mock-up are used to pre-visualize the final rehabilitations and it can be used to test occlusal pattern before the treatment. Mock-up are useful for patients to understand what results we will obtiain in oral rehabilitation before the treatment.The aim of the

study was to compare digital analogical techniques to project the mock-up.
Maethods: Study participants included 22 adult patients (5 male and 17 female), aged 20 to 55 years old, presented to the Department of Dentistry and Dental Prosthetics of the University Vita-Salute San Raffaele with Occlusal Vertical Dimension (DVO) loss, without periodontal or systematic disease. All the patiens were treated by the same dentist (F.C.) Mandibolar position for determine maxillo-mandibolar relation and mock-up realization was stablished for all the patiens by the same dentist too (R.B.). Digital or analogical techniques were chosen in a random way by the same dentist. Occlusal pattern was tested before the treatment (t0), with mock-up (t1), and after final treatment (t2) by comparing surface electromyography (sEMG) of masticatory muscles, to investigate differences between analogic or digital procedures. In this study was a 6 canal sEMG system was used. Due to the distribution of data and to the small numerosity of the sample, a non parametric test (Mann Whitney test) was used to investigate the differences between the study and the control group for T0 versus T1 (Delta1) and for T2 versus T1 (Delta2) chenges in sEMG activity.
Results: In general, the masticatory pattern improved from t0 to t1, on the two groups, and there was a decrease of asymmetry, although not significant. There weren't statistically significant differences between the two groups for the t1-t2 differences for the masticatory muscles' electrical activity and occlusal pattern, suggesting that analogical as well as digital procedures are precise.
Conclusions: The digital approach helps to reduce the working time for projecting the mock-up, as errors usually associated with the classical prosthodontic manual step. But the two methods are efficient to achieve a proper occlusal asymmetry. New technologies appear to human benefit and sometimes can change the common paradigm on clinical protocols and best techniques.

Clinical outcome of implant-prosthetic rehabilitation after mandibular reconstruction a case report

S. Sgroi, F. Zarone, R. Sorrentino, G. Dell'Aversana Orabona

Department of Neurosciences, Reproductive and Odontostomatological Science Federico II University of Naples
Dental prosthesis (Head Fernando Zarone)

Aim: The purpose of this study was to present a clinical case of implant rehabilitation in a post-oncologic reconstructed mandible, focusing on how different steps of the surgical and implant-prosthetic procedures can be combined to optimize the aesthetic and functional rehabilitative results.
Methods: A 44 years old female patient was referred from another center with a large ameloblastoma relapse in the left mandible. Resulting from trauma, infection or tumour, for extensive bone resections (over 6 cm) the free vascularized fibula flap is the treatment of choice, because of its length, long-lasting survival and low donor site morbidity. To ensure that the graft matches the height of the native jaw, it is possible to apply a combination of inlay and onlay grafts, a technique of vertical osteodistraction or a double bar technique, to improve bone volume for dental implants placement aimed at a final dental rehabilitation. In comparison to other procedures, the double bar fibula vascularized free flap technique seems to be not excessively traumatic for the bone, which is therefore more resistant to the peri-implant re-absorption processes during functional loading. A Cone Beam Computerized Tomography acquisition allowed for a 3D reconstruction of the mandibular arch. After digital planning of the intervention and CAD/CAM fabrication of surgical osteotomic guides, surgical access was performed by horizontal cervicotomy to expose the bone and define the portion of the mandible to be dissected. In a single surgical step the lesion was removed and the flap was elevated and set, with a termino-terminal anastomosis between the vascular pedicle and the vessels of the receiving site and with a cutaneous pan to restore the soft tissue. The double bar fibula free vascularized flap in the symphyseal portion allowed to reach a sufficient height for the subsequent implant-prosthetic rehabilitation. Finally, occlusal space and soft tissue healing without complications made implant placement possible. Surgical placement of the fixtures was performed after about 2 years. At the end, prosthetic rehabilitation by means of a screw retained, titanium CAD/CAM bar prosthesis supported by MUA (multi-unit abutment), with PMMA artificial teeth was performed.
Results: Literature is mainly focused on 3D imaging that might help in the planning of these complex reconstructions and on the use of integrated CAD/CAM systems to increase the graft consolidation and the predictability of morpho-functional results of the rehabilitations. Regarding the reported clinical case, clinical and radiographic examinations at the 1-year follow-up showed no problems related to implant stability, together with the presence of soft tissue hyperplasia, sometimes described in literature as a peri-implant complication.
Conclusion: In order to get good esthetics and function, an interdisciplinary collaboration between the prosthodontist and the maxillo-facial surgeon is paramount. The results obtained in the reported clinical case are consistent with the current knowledge supported by the literature.

The use of frameworks made of carbon fiber-reinforced composite in implant prosthodontics

G. Tassi, F. De Angelis, A. Visca, M. Senatore, E. Marinaro, L. Piccoli, S. Di Carlo

Dipartimento di Scienze Odontostomatologiche e Maxillo Facciali Sapienza Università di Roma, Italy

Aim: Carbon fiber is adopted in different fields, including dentistry. The aim of this study is to evaluate the scientific literature about the use of frameworks made of carbon fiber-reinforced composite (CFRC) in implant prosthodontics, considering the excellent properties of this material.
Methods: It was considered the scientific literature at 2019, which includes the main properties of the CFRC in implant prosthesis, their effects in the oral cavity and a comparison with the other prosthetic materials used nowadays. The keywords "carbon fiber framework" and "dental implant" on PubMed have been used. Seven studies were found. Only articles of the past 5 years have been chosen, resulting 4 studies. One of them was excluded because not choerent to our aim. In conclusion, three studies have been chosen. These articles investigated the biocompatibility and the mechanical characteristics of dental implant frameworks made of carbon fiber composite. Destructive and non-destructive mechanical tests were performed in order to evaluate: porosity, static and dynamic elastic modulus. A compression test was performed to compare complete implant- supported fixed dentures, provided with a metal or carbon fiber framework. The articles compared also carbon fiber frameworks with metal frameworks used to rigidly splint implants in full-arch immediate loading rehabilitation. In a clinical study all patients were treated with resin screw-retained full-arch prostheses endowed with carbon fiber frameworks. Differences in the absolute change of bone resorption over time between the two implant sides were assessed. The outcomes were statistically compared with those of patients rehabilitated following the same protocol but using metal frameworks. A statistically significant difference in the absolute change of bone resorption around the implants was found between the two groups, with greater mean peri-implant bone resorption in the second group compared to the first one. It was also analysed the occlusal load transmitted to the implant by prostheses made by carbon fibre composite framework; load is transmitted around the implant directly to the bone without any intermediate shock absorbing element. The analysis of the shock absorption properties (low modulus of elasticity) of CFRC, makes this material able to absorb the masticatory load while protecting the bone from risk of overloading.
Results: Carbon fiber intact and fragmented samples showed optimal biocompatibility. Manufacture technique strongly influenced the mechanical characteristics of CFRC. Masticatory forces are better dissipated in the bone around implants in patients rehabilitated with CFRC crowns, resulting in less bone absorption and a significantly decrease of peri-implant inflammation.
Conclusion: The optimal biocompatibility and mechanical characteristics together with the less bone absorption increase the implant survival rate and made the carbon fiber frameworks a viable alternative to the metal ones.

FMRI study on the perception of the face after treatment with complex dental aesthetic rehabilitation self perception vs others' face perception

F. Cattoni, G. Tetè, R. Uccioli, Tettamanti M., G. Gastaldi, D. Perani

Aim: In this fMRI study, we investigated the activation of cerebral pathways involved in the elaboration of visual self-retracting photos (SELF) and the same pictures of others (OTHER), each of which depicted subjects at different stages of prosthetic dental rehabilitation: pre-treatment phase (PRE), virtual planning phase using "3D Lynx" smile design software (VIR) and post-rehabilitation phase (POST).
Methods: Eighteen volunteers, aged between 22 and 67 years old, underwent a fMRI acquisitions, during which the subjects were shown the aforementioned photos (SELF-PRE, SELF-VIR, SELF-POST, OTHER-PRE, OTHER-VIR, and OTHER-POST) in pseudo-randomized order. The participants were instructed to perform a task that consisted of pressing a button every time a green-bordered photo appeared (catch trials, 15% of all stimuli, discarded from the analysis). A two-stage mixed-effects group data analysis was conducted, with statistical contrasts targeting, respectively, the main effect of Identity (SELF vs OTHER), the main effect of prosthetic rehabilitation Phase (PRE vs VIR vs POS), and interaction effects between these two factors. All the reported effects survived a declared peak-level $P < 0.05$, using a small volume Family Wise Error (FWE) type correction for multiple comparisons.
Results: The results showed a bilateral involvement of the dorso-lateral fronto-parietal areas for the main effect of Identity, and a Phase by Identity interaction regarding the PRE and POST stages in the right hemispheric supplementary motor area (SMA). This interaction was accounted for by a selectively greater activation in observing self-retracting photos (SELF) after the prosthetic rehabilitation (POST) versus the other experimental conditions.

Conclusion: The results of this fMRI study concerning the visual apperception of self-retracting face pictures versus pictures of others' faces confirm the observations of a number of previous studies in the literature showing a greater involvement of different activations of well-known brain circuits which display selective self and other face-recognition responses. Most importantly, the present study provides some trend wise evidence that, among all self-retracting faces in the different stages of the prosthetic rehabilitation, those portraying the subject in her/his actual physiognomy (i.e. the POST stage) have a somewhat special status in eliciting selectively greater brain activation in the supplementary motor area (SMA). These data provide important insights for future studies, by suggesting a possible neuro-cognitive measure of how the perception of oneself can vary as a consequence of aesthetic prosthetic rehabilitation.

Custom-angled abutments on tilted implants in the maxilla a clinical report and review of the literature

F. Di Francesco, G. De Marco, A. Sommella, A. Lanza

Multidisciplinary Department of Medical-Surgical and Dental Specialties, Campania University Luigi Vanvitelli, Naples, Italy

Aim: The aim of this work is to describe a case of severe disparallelism between two implants supporting a cement-retained bridge, placed in the maxilla, employing two custom-angled abutmentswith three years follow-up.
Methods: A 65-year-old female patient, non-smoker, with stabilized chronic periodontitis andin good general health conditions presented a second degree mobility of cement-retained implant crown in first left molar position (26), and gingival inflammation in second left premolar position (25) where a fractured abutment was found. The implants had been placed, three years before our first visit, were: 3.5 x 11 mm for 25 and 4.0 x 9 mm for 26 positions (Astra Tech OsseoSpeed TX Dentsply- Internal-Hexagon). Clinical and radiographic exams showed a fracture of the abutment in the 25 implant-crown and a fracture of the screw-abutment in the 26 implant-crown. According to a diagnostic and therapeutic algorithm, the damaged prosthetic components have been removed. Then, a preliminary radiographic examination and a careful clinical examination excluded signs and symptoms of mucositis and peri-implantitis. Therefore, a new prosthetic rehabilitation has been planned. New healing abutments were applied for two weeks in order to reduce the gingival inflammation and to condition the transmucosal route again. The application of the pick-ups showed an important disparallelism, highlighted also by the examination of models. AtlantisTM3D software was performed in order to realize a virtual design of the individualized abutments and crowns. The divergence between the fixtures in the mesio-distal projection was measured, obtaining an angle of divergence of 39 degrees. The software for Atlantis abutments set the finishing lines of abutments in relation to the free gingival margin, the patient's periodontal biotype and the ideal level for easy and safe removal of excess cement. In this case, chamfer was the preferred finishing line and different heights were chosen, in particular 1.5 mm subgingival in buccal and palatal views, 1.0 mm in mesial and distal views. Thus, the abutments and the structures are checked clinically and radiographically. Two splinted metal-ceramic crowns were made, and finally they were cemented with provisional cement.
Results: Clinical and radiographic evidence showed a good integration of prosthesis to implants at three years follow-up. These results were obtained thanks to the use of custom-angled abutments. These abutments are able to correct angulation when implants are placed in tilted positions preserving the stiffness of the abutments, their retentive and stabilizing capacity, guaranteeing easy access to the screw-abutments and all levels of implant shoulders in iuxtagengival zone, which simplifies routine oral hygiene.
Conclusion: The use of custom-angled abutments may improve the prosthodontic management and biomecanics, in cases where tilted implants can occur. From our experience, custom-angled abutment is a optimal prosthodontic solution for cement-retained bridges in order to achieve the prosthetic parallelism between tilted implants and a high-performance ceramic material, ensuring accurate cement removal, excellent cleanability of the prosthesis and greater predictability of aesthetic and function.