

Aligners

DOI 10.23805 /JO.2020.12.03.6

Treatment of Class II, subdivision with orthodontic aligners

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Aim: A 16-year old female patient presented to our observation with class II subdivision malocclusion, with molar and canine class II only on the right side. In malocclusions like this, it is very important to perform a correct diagnosis, and discriminate the malocclusion of dental origin from malocclusion of skeletal origin. The aim of this paper is to show the sequence of treatment, the attachments and the class II elastic protocol used to treat with reproducibility and success this kind of malocclusion with orthodontic aligners.

Methods: Dental impressions, photos, and orthopantomogram and lateral cephalometric x-rays were examined, and it was diagnosed a II class malocclusion of dental origin, with molar and canine of the right side in II class malocclusion. Both dental arches were contracted with deepening of Wilson curve and mild crowding was present on the upper and lower arch. Curve of Spee was quite deep, associated with augmented overbite. Upper dental midline was deviated to the left side. Silicone impressions were taken and shipped to program the dental movements to correct the malocclusion. It was asked to follow these instructions: Expand and align dental arches with derotation of the molars and distalize the teeth with a "modified V pattern", that means that the first movements were performed just on the upper molars,

and then sequentially on the other teeth only on one side, in this case the right side. In particular, it was first moved the upper 7, and after 5 aligners, it was moved also the upper 6. The upper 4 was moved to I class only when the occlusion of upper 7 was corrected to class I. With this sequence of movements it was possible to take advantage of the anchorage of the other teeth to have the best predictability of movement. It was also necessary to apply conventional 3 mm long vertical attachments on the upper right molars, and optimized attachments on the upper right premolars. It was also necessary to prescribe precision cuts on upper canines and lower molars and to add for these teeth conventional 3 mm attachments. It was also programmed interproximal reduction of lower incisors and their retroclination to contrast the tendency of the lower incisor to procline in class II mechanics.

Results: The treatment was conducted with 40 aligners changed every 7 days. The patient was instructed to wear class II elastics ¼ 4,5 oz full time for both sides for all the treatment. After the first phase, class I on the right side and it was conducted just one refinement of 14 aligners to better expand and rotate teeth. After 1 year and 2 months the treatment was concluded with resolution of the malocclusion. It was asked to the patient to wear vacuum-formed retainers during the night for retention.

Conclusions: Class II malocclusion subdivision of dental origin can be treated successfully with aligners respecting the right protocols and with the collaboration of the patient.

Open bite orthodontic treatment with aligners in an adult patient: a case report

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Aim: Open bite malocclusion is one of the highly challenging orthodontic problems. The prevalence of anterior open bite ranges from 1.5% to 11% and varies between ethnic groups according to chronologic and dental ages. Open bite is less common in adult population than in young population. It is caused by different factors, like muscular malfunctions and abnormal habits or skeletal or dental developmental anomalies. If open bite malocclusion is due to dental anomalies, it can be treated with only orthodontic treatment. In this case report the aim is to describe the protocol of treatment with aligners of an open bite malocclusion of dental origin.

Method: A 20 years old male patient was presented to our attention asking for an improvement of functional and aesthetic occlusion. The patient was not suffering of any general health problem. Orthodontic problems were also: narrow upper arch with diastemas between upper incisors, and narrow lower arch with moderate crowding, and severe rotation of upper incisors. Skeletal analysis showed little prorotation of the mandible. The patient was in dental and skeletal Class I. Teeth 18 and 28 were present in the arch. It was proposed a treatment with orthodontic aligners, because it is known that aligners can be more successful in open bites than multibrackets therapy because they have a "bite block effect", that means that intrusion of posterior teeth is more predictable because the patient has the tendency of biting with more strength while wearing aligners. In this case, it was useful because the patient did not require an extrusion of upper incisors, but an intrusion of the posterior teeth, to correct the open bite. The sequence of movements was the following: move upper third, second and first molars while blocking premolars. After intrusion of molars, upper premolars were intruded. The rotation of upper incisors started from the first aligner and was performed during all the treatment. In the lower arch, the first molar and second premolar were intruded first, and after their intrusion, second molars and first premolars were intruded. Both arches were expanded, and that was necessary to solve inferior crowding. Spaces between incisors were closed with reduction of overjet. No attachment was necessary on upper incisors.

Results: After 25 aligners with the first phase and 23 aligners with the second phase, in about one year the case was completed with the closure of the spaces of the upper incisors, the resolution of the inferior crowding, and the correction of the anterior open bite.

Conclusions: Aligners can be predictable in open bite orthodontic therapy with the help of the right sequences of movements.

Predictability of orthodontic movement using invisible aligners

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Aim: The purpose of this study was to assess the predictability of orthodontic movements using invisible aligners. The use of this type of device in the adult population is increasingly required, due to its low aesthetic impact and its reduced risk of plaque accumulation on teeth.

Methods: Nine patients (average age 27 years) undergoing treatment with invisible aligners at the Dental Clinic of the University of Foggia have been enrolled for the evaluation of this study. All patients have been treated with Dooris Invisible Aligners, made of modified PET-G (Glycol Modified Polyethylene Terephthalate). For each patient included in the research, we requested the STL format models at the initial state of therapy (Pre), the final STL format models of the first orthodontic phase processed by the software (Virtual) and, after the first phase of treatment, the STL format models with the results actually achieved by the patient (Real). The orthodontic movements obtained and, therefore the treatment error delta were evaluated by comparing the differences between the STL models of the virtual treatment and the models with the dental movements actually obtained. Through the Software Geomagic 10, the "superimpositions" of dental arches at the beginning of treatment with both virtual and real arches after the therapy have been created, with the best fitting mechanism. The measurements were made taking the interincisive papilla as a reference point, using the Software Fusion 360.

Results: The results of linear and rotational movements can be observed mainly in the frontal sector, in fact the diathoric teeth require more time and more aligners to get results. A statistical analysis of error delta's difference between the initial linear and angular measurements and those achieved according to the virtual set up and the real set up was carried out. The difference between the linear displacements of the dental elements between pre-virtual and pre-real from a clinical point of view is minimal; the error delta, i.e. the difference between the delta rejection of the average values of linear movements is 0.227 mm. Taking a minimum error



delta of 0.5 mm as reference, linear movements below this threshold are 71%. For rotary movements, the error delta calculated as the difference between the average values of the rejection delta is about 3°. Taking an error delta of 5° as the threshold value, rotary movements below this threshold value are 82% of the total, the remaining 18% exceeds the threshold value of the delta error.

Conclusion: The results obtained are consistent with the scientific literature. Linear movements (that concerned vestibularization, palatization/lingualization and expansion) are absolutely predictable, especially buccolingual tip movements. The vestibularization movements are more predictable with the help of attachment and IPR method. Rotational movements are less predictable than linear movements, according to literary results, but, in this study, the percentage that is above the threshold value of the error delta is attributable to only one patient, which translates into not being relevant, the reasons could certainly be the poor compliance or the different response of the periodontal tissues.

The influence of composite attachments on clear aligner treatment: a systematic review

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Aim: The purpose of this systematic literature review is to identify and select the available scientific studies about the use of attachments in orthodontic treatment with clear aligners and to determine what is the best number, shape, position and size for each dental movement.

Methods: Eight databases were examined up to May 2019 to identify all the articles potentially relevant to the research. The review also included gray literature. The process of selecting studies, extracting data and assessing risk of bias was autonomously carried out by two different authors. Then they proceeded to the analysis of the outcomes by evaluating the aligner retentive capacity and six types of movement (anterior B-L tipping/torque; extrusion; intrusion; M-D tipping/bodily tooth movement; rotation; posterior B-L tipping or arch expansion).

Results: At the end of the selection procedure a total of twenty-one studies were identified. More specifically, ten finite element analysis, six experimental tests

and five clinical studies were included. Most of them were identified as having a low risk of bias, whilst the others were labeled with a medium risk. Aligner retentive capacity could be improved by the addition of attachments but the outcome may be affected by several factors. Most of the articles highlighted the efficacy of attachments in different orthodontic movements, such as M-D movement, anterior B-L tipping and torque. On the other hand, it is difficult to draw clear conclusions about extrusion and intrusion because of the few sources in scientific literature and contradictory results were found about rotation. Finally, no articles analyzed posterior B-L tipping or arch expansion. The most frequently assessed shapes were optimized, rectangular, ellipsoid and rectangular beveled. As far as concerning the number, some studies also considered the addition of two attachments (placed on both sides of the tooth) or the use of attachments on a greater number of teeth. Moreover, some articles analyzed changes in attachment placement, while attachment size was rarely evaluated. However, not all the selected studies compared different attachment configurations and not all the configurations were systematically analyzed.

Conclusion: Attachments appear to have a positive influence on clear aligner treatment, although the available data are sometimes insufficient. More specifically, there is a lack of evidence about the effects of attachments on extrusion, intrusion and posterior B-L tipping or arch expansion. Moreover, the results about rotation seem to be contradictory. Further studies could therefore be useful to analyze the effects of attachments on these movements and to define the most effective attachment configuration.

Treatment of an extraction case with clear aligner therapy

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Aim: Dental crowding can be responsible for the inclusion of dental elements. Dental extractions could represent the best therapeutic choice in some crowded cases. The closure of extractive spaces carried out by clear aligners has long been considered a challenge for the orthodontist and it is still a debated topic. The aim of this case report is to show how a complex case may be treated with aligners, in order to highlight the potential of this kind of treatment.

Methods: A 12 years old female patient came to our

attention. The orthodontic check-up (dental arch impressions, intra- and extra-oral photographs and radiographic examination), followed by cephalometric analysis, made it possible to draw up a problem list for this clinical case. The diagnosis was: class II malocclusion, hyperdivergent facial type, dental crowding, midline deviation and inclusion of element 23. After careful consideration, the chosen treatment plan included the extraction of four premolars (14,24,34,44) in order to get the space for the impacted canine, to solve the crowding, to manage the midline and to achieve the class I relationship without affecting the profile. Invisalign clear aligner therapy was chosen in order to achieve the treatment goals. More specifically, the Invisalign protocol G6 allowed us to manage posterior dental anchorage, vertical control and root parallelism. The initial phase of treatment consisted of 40 aligners and it was followed by two refinements. Aligners were changed every 7 days: the first phase lasted 9 months, the second one 8.5 months and the third one 6 months, for a total of 23.5 months of treatment. Finally, active therapy was followed by the use of upper and lower Vivera retainers.

Results: At the end of the treatment, the achieved therapeutic goals were: resolution of dental crowding and midline deviation, upper arch expansion, eruption of element 23, closure of extractive spaces, correction of class II relationship, leveling of the curve of Spee and root parallelism.

Conclusion: This clinical case shows how clear aligner therapy could be effective even in some complex cases. It is worth noting that several limits of clear aligner treatment can be overcome only with the use of auxiliary elements, such as attachments or power ridges. Moreover, a thorough knowledge of biomechanics and patient compliance are essential for a successful therapy, as aligners are removable devices. Considering the advantages of this kind of treatment (aesthetics, comfort, hygiene) and the increasing demand from patients, it is easy to understand the importance of being able to treat even complex cases with aligners. Further clinical studies could therefore be useful to highlight potential and limitations of clear aligner treatment and to constantly improve it.

Biomechanical effects of different attachment designs for the extrusion of maxillary incisors with clear aligners: a Finite Element Analysis

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Aim: The aim of the present study was to evaluate the biomechanical effects of some different auxiliary-aligner combinations and the relative attachments during the correction of the open bite malocclusion. The tested attachments were designed specifically for the extrusion of the maxillary incisors during the clear aligner therapy (CAT). For the correct evaluation of the biomechanical outcomes, an innovative finite element analysis (FEA) was implemented in order to simulate the force vectors for each orthodontic movement.

Methods: A Computer Aided Design (CAD) model including a complete upper dental arch of an orthodontic open bite configuration was modeled for the finite element analysis. It was designed by combining the cone beam computer tomography (CBCT) volumes and the surface-structured light scans of the occlusal pattern of the patient. The clear aligner morphology was also virtualized and numerically discretized and four different therapeutic configurations were compared: (1) standard aligner, (2) 150 degrees beveled buccal attachments, (3) rectangular palatal attachments and (4) rectangular buccal attachments. The reconstructed digital models were analyzed with a finite element solver and the resulting force-moments (MF) delivered by the aligner to the target teeth and their displacement were calculated. The direction of the vectors was also graphically represented for each tooth and the intensity of the applied forces was evaluated. Moreover, the pressure distribution pattern along the aligners surface was analyzed for each tested configuration.

Results: Models with attachments showed a greater orthodontic efficacy than models without attachments. The maximum tooth displacement along the z-axis was obtained with the rectangular palatal attachment, while the highest undesired moments (Mx and My) were found in the standard aligner configuration. The finite element analysis showed that the maximum pressure against the periodontal ligament was expressed in the cervical portion of the mesial aspect of the central incisors and was about 76,5 g/cm². The more favorable pressure distribution pattern on the aligner surface was correlated with the use of the rectangular attachments even in correspondence of the posterior teeth.

Conclusion: The present finite element study demonstrated that the rectangular palatal and buccal attachments could be able to improve the extrusion of the maxillary incisors during the correction of the



open bite with the use of clear aligners. Moreover, the use of rectangular and vertical attachments on posterior teeth may be suggested during this kind of therapy.

Case report: treatment of mild to moderate malocclusion with Donatello aligner system

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Aim: We present a new fully printed aligner system for correction of mild to moderate malocclusion, directly built with 3D printing without need to print model set.

Materials and methods: Aligner systems are present in orthodontic therapy since 1999. Several aligners are available in the orthodontic market and allow treatment of several malocclusions. Production of aligners is based on 3D software management system, starting from impressions that can be taken with traditional method, developed and scanned with lab scanner or directly acquired by intra oral scanner. A software generates a series of impressions reporting minimal movements of the elements that have to be moved, a 3D printer creates a set of models and aligners are built spreading a vinile disk on the surface of the models. Aligners are cut from the models, refined and ready for use. Donatello Aligner System is a methodic for alignment that doesn't need model set printing, and is fully created with a 3D printer using a transparent material. Here we present a case report showing orthodontic movements, in a case of mild malocclusion and re alignment. Orthodontic movement is managed by 3D software and movements are generated. A number of ten aligners is necessary for the pursuit of orthodontic therapy. A direct 3D printer using a transparent material directly prints a set of aligners.

Results: Donatello alignment system eliminates the need to print a set of models in order to build aligners. Time and printing material can be saved, and can be directly made by the clinician, without need of lab or third part operators.

Conclusions: Donatello Aligner System is a new, affordable and easy system for treatment of mild to moderate malocclusion.

Comparative effectiveness of orthodontic treatment with Invisalign or braces in first premolars extractive cases using the american board of orthodontics objective grading system

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Aim: The purpose of this prospective case-control study is to compare and validate the orthodontic clinical outcomes of premolars extraction treatment protocol with Invisalign® and straight-wire fixed appliances.

Material and methods: Twenty-four patients with a mean age of 18 ± 4.0 years for the Braces group and 19 ± 3.0 years for the Invisalign group, were included in this research. The Objective Grading System score prescribed by the American Board of Orthodontics was used to assess the treatment outcomes. Additionally, skeletal, dental and facial pattern measurements were calculated according to the American Board Orthodontics' cephalometric analysis, using pre- and post-treatment lateral cephalograms to compare the two groups.

Results: The results indicated that Invisalign appliances produced similar treatment effects as straight-wire appliances in four premolars extractive cases. The statistical analysis showed that marginal ridges, occlusal contacts, occlusal relationships, overjet, interproximal contacts and root angulation were not meaningfully different ($P > 0.05$) between the groups at the baseline. The mean final Objective Grading System scores were not statistically significant different between the Invisalign group and the Braces one, and a passing treatment value (< 30) was observed for all patients. Cephalometric measurements and changes after orthodontic-extractive therapy demonstrated to be analogous within Braces and removable Aligners group ($P > 0.05$).

Conclusion: This study demonstrated the efficacy of both the Invisalign and fixed appliances modality in treating complex cases requiring the extraction of four first premolars as assessed by the Objective Grading System score prescribed by the American Board of Orthodontics.

Management of anterior cross - bite in growing subject treated with invisalign first: a case report

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Aim: The purpose of this study was to analyse early

orthodontic therapy and to intercept certain types of malocclusion and directing treatment to remove the responsible factors. Therefore, it is possible to restore normal skeletal development and the right dental eruption, exploiting natural forces of growth. Anterior cross bite is a condition in which the mandibular anterior teeth overlap the maxillary anterior ones. The condition is often due to the lingual position of the maxillary anterior teeth relative to the mandibular anterior part teeth. It is a serious aesthetic and functional anomaly. Early correction is recommended: avoid future III class malocclusion, facial impairment and mobility and fractures of the front teeth. Interceptive treatment using Invisalign First protocol with sequential expansion permitted to eliminate the interferences, to manage better oral hygiene, and to obtain a normal occlusion.

Material and methods: The case of an eight-year-old girl with an pseudo class III, mixed dentition, anterior cross bite, deviation midline teeth, misalignment of the lower incisors with a flat profile and the protrusion of the mandible. The cephalometric analysis confirmed the alteration of 1 Go – Gn 101° and overjet – 1. The time of treatment is 6 months with 29 aligners changed every 5 days. The application of these aligners will be active during daylight and overnight hours, instructing the patient to use the device gradually for 23 hours during the day. The Clincheck plan forecasted 2 mm of advancement every eight stages, and after 20 aligners is head to head. Meanwhile 28 aligners have resolved the anterior cross bite. Thanks to 1° refinement with 22 aligners is corrected the midline teeth in 5 months. Attending final dentition to complete the case, now in retention with a 2° refinement.

Results: In this case, early intervention made it possible to avoid the development of a class III malocclusion. This has contributed a significant improvement in the facial profile of the girl after 13 months of treatment and an important correction of the proclination of the upper incisors. We also obtain the expansion of the dental arch, the recovery of space for 12 and 22 and the improvement of the overjet and overbite. In the same way, using the device and solving the anterior cross bite, a forward movement of the jaw is obtained, which prevents the advancement and excessive development of the jaw aids displacement in the posterior direction. All these effects can be achieved with these devices in 6-12 months, in some cases they avoid the use of other mobile or fixed devices simplifies and minimizes any other treatment.

Conclusion: The perception of facial profile improvement motivated the patient and helped to reinforce treatment compliance. It is essential to intervene during the deciduous dentition, possible future skeletal problems are resolved which, if treated in early period, restore the correct function. If preceded by a correct diagnosis of occlusal and functional

alterations, early preventive treatment with Invisalign First devices result in avoiding dysfunctional, 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.

Somatosensory changes following standardised orthodontic tooth movement

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Aim: To analyse, by means of a standardised battery of intraoral quantitative sensory testing (QST), the effects of experimental orthodontic tooth movement on the intraoral somatosensory functions.

Materials and methods: The study sample consisted of 19 adult patients, 5 men and 14 women (mean age \pm SD: 26.8 \pm 9.8 years). Each individual was provided a set of experimental clear aligners, to provide a standardised model of orthodontic tooth movement: Aligner 1 (AL1) did not determine any dental movement; Aligner 2 (AL2) was manufactured to deliver a standardized buccal tooth movement (0.5 mm) on a the 2.1. The participants were blinded to the existence of the sham aligner. The standardised battery of intraoral and extraoral QST included thermal and mechanical detection threshold tests. The thermal thresholds were detected on the buccal side of the attached gingiva of the 2.1 (planned for the orthodontic tooth movement), 1.1 (contralateral tooth on the same arch) and 4.1 (correspondent tooth on the opponent arch). Also, one extra-oral control site (right hand palmar thenar eminence) was used for control. The mechanical thresholds were measured on the same gingival and extra-oral sites of the thermal stimulation. Furthermore, the mechanical test were also performed directly on the tooth, and the force was applied perpendicularly to the crown and vertically along axis of the teeth. All the QST measurements were performed before the delivery of AL1 (T0), before the delivery of AL2 (T1) and 24 hours after delivery of AL2 (T2), when the maximum level of pain was expected. Comparison of mean values was computed using a one-way Analysis of Variance (ANOVA) for each measured variable. Statistically significant difference was set at $p < 0.05$.

Results: Hyposensitivity to cold stimuli (i.e. increased cold pain threshold) and hypersensitivity to heat stimuli (i.e. reduction of the threshold of sensitivity to heat) of the moving teeth was observed at T2. Also,



significant decrease in the pain pressure threshold at the contralateral maxillary tooth was found. No significant differences were observed for all the other variables in the remaining intra-oral and extra-oral testing sites.

Conclusions: Quantitative assessment of the intraoral somatosensory function is a valuable contribution to a better understanding and description of the basic neurobiological mechanisms related to orthodontic pain. Signs of sensitization of the trigeminal nociceptive system after minor tooth displacement and orthodontic pain have been observed as immediate effects. Future studies are needed to verify the long-term changes following an orthodontic treatment.

F22 hybrid: a new clinical approach

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Aim: The rotation movement is very difficult to be obtained with aligner, especially for canines and premolars teeth. When this movement is greater than 15 degrees, auxiliaries are needed to make the rotation more predictable. The aim of this study is to evaluate the effectiveness of the hybrid approach and subsequently compare it with the predictability of the rotation movement using only the clear aligners.

Material and methods: In order to find a more effective approach to resolve severe rotation, the postgraduate School of Orthodontics of the University of Ferrara has developed a new system, called "F22-hybrid". This technique is based on the combination of F22 aligner (Sweden & Martina, Due Carrare, Italy) and fixed lingual appliance. In particular this system consists of buttons suitable for bonding on the lingual surface of the teeth. The correct position on lingual surface are precisely established on the digital set-up. These buttons have a slot of 0.018 which can accommodate arcs of NiTi or steel up to 0.018, that will help aligners to develop the programmed movement. A sample of 4 patients for a total of 13 teeth were analyzed, where these teeth presented as a criterion of inclusion a rotation to be performed at least 13 degrees. Pre-treatment, post-treatment and ideal set-up virtual scans were performed and the measurements were taken using the VAM software (Vectra, Canfield Scientific, Fairfield, NJ, USA). Then the measurements were collected and compared with an Excel spreadsheet, in order to calculate the accuracy of the movement.

Results: The general accuracy of the rotation movement with F22 hybrid was 91,4%. This figure is significantly higher than that obtained with studies on F22 aligner (68,1%) and on Invisalign Aligner (43,2%). Specifically

the average movement accuracy of the 4 upper incisors analyzed is 90.7%, of the 5 lower incisors is 91.6%, of the 3 lower canines is 90.3% and of the only lower premolar is 96.4%. All these results are significantly better than the respective values of the treatment with only clear aligners. Especially as regards the lower canines, in which the rotation movement is less predictable than all the other dental types.

Conclusions: Combining clear aligner therapy and fixed lingual appliance is an esthetic means of treating malocclusions including important rotation movements, with high predictability. This result may determine the possibility of expanding the range of patients treatable with the clear aligners, one of the main objectives of modern orthodontics, which is confronting itself with ever higher aesthetic needs of patients.

Periodontal health in patients with fixed orthodontic appliances and removable aligners. Review of the literature

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Aim: Orthodontic devices represent therapeutic devices that can promote the accumulation of bacterial plaque which is the main etiological factor of periodontal inflammation. In patients with periodontitis, orthodontic devices could adversely affect and accelerate the destruction of the periodontium. Therefore, the clinician must carefully consider whether to subject the patient with periodontal problems to orthodontic treatment or not. The purpose of this literature review is to evaluate the microbiological changes caused by fixed and removable orthodontic appliances in order to identify plaque control techniques in patients with the aforementioned orthodontic devices.

Methods: The present work has been carried out by performing a search on the electronic database PUBMED. Keywords such as "plaque index", "periodontal disease", "gingival recession" have been used, in various combinations, associated with the terms "fixed devices" and "removable aligners".

Results: Patients with fixed orthodontic appliances present a greater risk for periodontal health than patients with removable aligners. This is due to the presence of attacks that act as an obstacle to hygiene maneuvers. By promoting plaque accumulation and superficial bacterial colonization, a periodontal inflammatory condition is established, initially

reversible, but which can worsen if not managed properly with severe clinical effects. On the contrary, the removable aligners allow to perform the oral hygiene maneuvers more easily and therefore ease the access to all the dental surfaces. Consequently, in patients with aligners the plaque index, gingival inflammation, bleeding and probing depth are less than in patients with fixed orthodontic appliances.

Conclusion: Removable aligner treatment ensures better periodontal health. In addition, their clinical use brings various advantages such as greater aesthetics, no impediment to the use of a toothbrush and dental floss and no need for food restriction. Therefore, the removable aligner can be considered the first choice therapy in patients with non-active periodontal disease who need orthodontic therapy.

Effect of different attachment shape on rescanning accuracy in orthodontic patients treated with clear aligners: an in vitro study

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Aim: In clear aligner therapy (CAT) attachments could be defined as predetermined composite geometries applied on teeth, which represent the necessary operative pressure points helping the expression of mechanical forces created by aligners. Composite attachments shape is supposed to be of crucial importance, together with aligner' fitting accuracy, in order to apply the desired force system to each tooth during clear aligner therapy. The aim of this pilot in vitro study was to investigate the effect on attachments impression accuracy of keeping them in place during rescanning for treatment mid-course correction or refinement.

Material and methods: Different types of attachments were applied to an ideally aligned upper arch virtual model (Master model, MM) and twenty copies, ten without and ten with attachments, were printed in epoxy resin using a 3D printer. Ten attachment templates were produced thermoforming a thin thermoplastic foil over the ten resin models with attachments and they were consequently used to bond composite attachments on the ten clean models, obtaining ten starting models (SM) that were scanned using an intraoral scanner (IOS), 3D printed and rescanned again (Rescanned models, RM). STL files of MM, SM, and RM models were imported into the Geomagic Qualify™ software, and a best-fit matching superimposition was used to obtain colorimetric maps. If data were normally

distributed, repeated measures ANOVA was used in order to detect the presence of statistically significant intra-attachment differences. When ANOVA test was significant ($p < 0.05$), post-hoc Tukey test was applied. The non-parametric Friedman test was conducted if data were not normally distributed, applying post-hoc Wilcoxon test in case of statistically significant differences detection. Analyzing inter-attachments differences, ANOVA was used in order to detect the presence of statistically significant differences if data were normally distributed. When ANOVA test was significant ($p < 0.05$), unpaired t test was applied to identify where the differences occurred between groups. Kruskal-Wallis analysis was conducted if data were not normally distributed, applying post-hoc Mann-Whitney test in case of statistically significant differences detection.

Results: Sixteen ($n = 16$) different shapes of attachments were considered. The C shape attachment was excluded from the measurements for continuous bonding failure of the composite, obtaining a final sample of 15 different shapes of attachments. Measurements obtained were not normally distributed, therefore non-parametric statistic tests were used. The results of this study showed that differences between MM and SM were higher than differences among SM and RM. The mean differences between MM and RM resulted higher for all the attachments than all the other sessions. The T shape attachment was the least accurate of all other shapes for both scanned and re-scanned models. Furthermore, the beveled rectangular attachments resulted the most precise shapes.

Conclusions: loss of precision after attachments rescanning varies according to their original shape, and it is higher in sharp-edged geometry. If a high precision of this type of attachments is requested, these should be removed before rescanning during the mid-course correction or the refining phases of CAT.

Agensis of the upper lateral incisors: open or close the space? Invisalign case report

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Aim: In this paper we will evaluate the management of agensis in adult subjects and the consequent therapeutic choice. The absence of one or more elements of the deciduous or permanent series is considered one of the number anomalies most frequently found; it

involves the aesthetic, functional and psychological aspect of the patient. A correct multidisciplinary approach is required: orthodontic, periodontal and prosthetic starting from the diagnosis that ends in aesthetics. By evaluating various factors such as the type of malocclusion, the shape of the teeth and the arch, the gingival parables and biotype, the amount of space, the age of the subject, for a multidisciplinary and personalized treatment for the individual patient. In order to plan the most suitable therapeutic option, it is necessary to outline a protocol that responds to the prosthetic and profilometric needs of the face.

Materials and methods: The subject we considered had undergone 22 years previously an orthodontic treatment which led to the opening of the spaces for implant rehabilitation. Unfortunately, osseointegration did not occur and they went to fenestration, therefore removed due to bone deficiency. The patient comes to our clinic for an orthodontic assessment and orthodontic planning with aligners. After a careful setup, it is decided to treat the patient by guaranteeing an aesthetic result. We proceed with the avulsion of two lower premolars and the closure of the upper spaces. Elements 1.3 and 2.3 are mesialized to cover the agenetic teeth and restore canine guidance with the first upper premolars. After the request for new OPT and LL, intraoral scanners are used to take the impressions, in order to obtain a better setup with Invisalign. After using 44 upper and 34 lower aligners with weekly changes, slight lower and upper spaces remain and need to center the midline. Then we decide to refine the case with a refinement of 43 other upper and lower masks. The case of the facets on the elements 13 and 23 ends to make them similar to the upper lateral ones and use Vivera only at night. After 20 months the case was concluded with normal cephalometric values and an excellent root parallelism.

Conclusion: Thanks to the aligner therapy, a good orthodontic result was obtained, thanks also to the use of composite veneers, the case report ended with an excellent smile line and gingival parables. We can therefore affirm the Invisalign treatment is an excellent substitute for traditional fixed orthodontic therapy, especially in adults even in the case of extraction or closure of spaces, especially in those patients who require a great aesthetic impact of the therapy and where we do not find excellent compliance in home hygiene with very thin periodontal biotypes.

Cleaning of clear aligners

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Aim: Plaque is the main etiological factor of

periodontal inflammation. If the inflammatory state continues, it causes irreversible damage to the periodontium. Periodontal damage is more severe when orthodontic treatment occurs in presence of an inflammatory state. Therefore, the need for correct oral hygiene and the cleaning of orthodontic devices to reduce the bacterial load is evident. This prospective randomized study evaluates the quantitative changes in the bacterial load on the surface of removable orthodontic appliances (Invisalign and Ef braces) after their insertion in different sanitizing solutions.

Material and methods: The present study involved 20 patients deemed suitable for treatment with Invisalign or Ef braces. At T0, each patient underwent a professional oral hygiene session, and was subsequently motivated and instructed to learn the correct home oral hygiene maneuvers. The 20 patients were then divided into two groups: G1 was treated with Invisalign, while G2 was treated with Ef braces. G2 patients were instructed to wear Ef braces for 4 hours during the day and overnight. G1 patients were instructed to wear Invisalign 20-22 hours a day. Both groups were therefore provided with indications for cleaning the appliances with the various sanitizing solutions studied. 3 different cleaning methods ("phases") were tested. Phase 1 involved washing the device with running water. Phase 2 involved washing the device with 0.12% chlorhexidine spray (curadent prototype) and rinsing with water. Phase 3 involved immersion in a solution of water and sodium carbonate and sulphate crystals (Cleaning crystals Invisalign), without rinsing. At the end of each of the 3 phases, samples were taken with sterile stubs for microbiological examination. All 20 patients experienced the 3 stages. G1 performed each of the 3 phases for a week; G2 performed each of the 3 phases for 2 weeks, so that the total hours of use of the appliance before the withdrawal were equal between the two groups. The microbiological samples were analyzed on solid culture media in LB agar. Bacterial colony growth was assessed after 24-48 hours of incubation at 37 °.

Results: the study showed that the use of running water alone does not lead to significant cleansing. With chlorhexidine 0.12% spray there is a reduction of the bacterial load compared to water alone of about 20%. With the solution of water and crystals of sodium carbonate and sulphate there is a 50% reduction compared to water alone. The reduction of the bacterial plaque is more evident in the Ef braces devices rather than Invisalign for both the cleaning methods applied.

Conclusions: the results obtained through the study conducted allow us to affirm that the cleaning of removable appliances with the solution of water and sodium carbonate crystals is the most effective. It is also essential that the clinician properly instructs the patient to properly clean the orthodontic devices.

Invisalign first treatment with mandibular advancement of a Class II malocclusion in a growing patient: a case report

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Aim: Orthodontic treatment with aligners is spreading more and more as a valid alternative to traditional multibrackets orthodontic treatment. Patient compliance and satisfaction are the main reasons that drive research to identify new protocols and new techniques to expand the potential of this type of therapy, increasing the number of malocclusions and patients who can benefit from this type of approach. The use of Invisalign First allows to perform a treatment specifically designed for young patients, combining the advantages of the functional and aesthetic correction of the malocclusion with the possibility of obtaining it with an invisible treatment, leading to aesthetic and social benefits that can be of great importance in quality of life of young patients and mandibular advancement method has proven effective in correcting Class II malocclusion in growing patients. This approach uses the Precision Wings built on the upper and lower aligners to bring the jaw to an advanced position while the front teeth are aligned. This method allows to reduce the use of the intermaxillary elastics at least in the early stages, thus reducing the patient compliance problem in using the elastics. The introduction of the aligners change protocol every 5 or every 7 days allows to reduce, always respecting the limits of biological adaptation to the dental movement, up to 50% of the duration of the treatment. The aim of this case report is to describe the management of a case of II dental and skeletal class in a 9-year-old patient with the mandibular advancement method associated with invisible treatment.

Material and methods: The patient treated in this case report was seen for the first time at the age of 8 years and 10 months. Clinical and radiographic examination revealed a dental and skeletal class II malocclusion (ANB: +5°) with an 8 mm overjet, hyperdivergent profile, lower and upper crowding, narrow upper arch form, deep Spee curve and deviation of the midline. The treatment was divided into two steps: a pre-advancement mandibular step, obtained with 25 aligners changed every 5 days, designed to dento-alveolar expand the upper arch, derotate the first upper molars, level the arches, normalize the Spee curve and align the anterior group. The second step

was the active phase of mandibular advancement, obtained with 40 aligners changed every 7 days. At the end of the treatment the last aligners were used as temporary retention pending a possible final phase of therapy in permanent dentition.

Results: The whole treatment lasted 13 months. The treatment goals were achieved, with the expansion of the upper arch, the recovery of space and alignment, the mandibular advancement, the correction of the deviation of the midline and the improvement of the overjet and overbite. The patient had an excellent compliance and she was very satisfied with the treatment and with the result.

Conclusions: Orthodontic treatment to solve a class II problem in young patients can be performed with Invisalign First with mandibular advancement devices, in a short time and with great satisfaction for the patient.

Thickness of orthodontic clear aligners at the anterior region

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Aim: Clear aligners (CA) are among the most chosen orthodontic therapies for patients who require an invisible treatment. Nowadays, thermoplastic materials are widely used for the fabrication of CA due to their excellent characteristics. These materials allow the fabrication of highly precise devices via a thermoforming process on accurate models of patients' malocclusions. Previous studies showed that the thermoforming process is reliable, but no information is present, if the thickness of the aligner varies according to the vertical height. The aim of the current study was to assess the thickness changes of the CA of the anterior region at different vertical heights.

Materials and methods: Forty CA were included in this study. The thickness of the unused CA was measured at different occlusal points on a 3D model with a dedicated software (Geomagic Qualify 2013; 3D Systems, Rock Hill, South Carolina, U.S.). The software was used to measure the whole thickness of the aligners, by one trained operator. Three points for each tooth from canine to canine were placed on the aligners, both on the left (L) and right side (R) of the maxillary arch. On each tooth were placed a GP (Gingival point), MP (Medial point), IP (Incisal point). All the aligners were studied as passive (no tooth



movement; no shape for attachments). A repeated measures ANOVA, with post hoc tests, was used to assess the differences in thickness among the three point for each tooth.

Results: The repeated measures ANOVA showed that for all the assessed teeth the gingival thickness was thinner than the incisal thickness. In particular for the right upper incisor (U1GR=0.48±0.07; U1IR=0.66±0.08, P<0.001) and the left upper incisor (U1GL=0.49±0.07; U1IL=0.64±0.07, P<0.001) there were the highest differences of more than 0.15 millimeters. The right lateral incisor (U2GR=0.52±0.08; U2IR=0.59±0.09, P=0.043 and the left lateral incisor (U2GL=0.52±0.08; U2IL=0.61±0.08, P<0.001) there were the smallest difference, of less than 0.1 millimeters. Finally, the right canine (U3GR=0.50±0.07; U3IR=0.61±0.09, P<0.001) and the left canine (U2GL=0.51±0.09; U2IL=0.61±0.08, P=0.001) also showed a statistically significant difference. Interestingly, the thickness in all the assessed area ranging from a minimum value of 0.50 mm to a maximum value of 0.66mm, resulted all reduced of more than the 10% respect to the original thickness of the thermoplastic foil used for the aligner manufacturing (0.75mm).

Conclusion: Considering the thickness changes, the CA examined showed different thicknesses on the anterior region according to the vertical heights.

Assessment of somatosensory changes by quantitative sensory testing after 6 months of clear aligners treatment

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Aim: to quantitatively assess the intra- and extra-oral somatosensory changes in patients treated with clear aligners in a 6-months follow-up.

Materials and methods: fourteen (14) healthy adult subjects (10 women and 4 men) free from orofacial pain complains and temporomandibular disorders were treated with a customized set of clear aligners (AIRNIVOL®, Navacchio, Pisa, Italy). To study the somatosensory function standardized quantitative sensory testing (QST) were used before the start of the orthodontic treatment (T0), after 1 month (T1) and after 6 months (T2). In particular, cold and warm detection thresholds (CDT; WDT), cold and heat pain thresholds (CPT; HPT) and pressure pain threshold (PPT) were measured. Both the thermal and mechanical thresholds were measured in the region of the attached gingiva adjacent to the right upper

and lower incisors (intra-oral sites), and at the thenar eminence of the right hand (extra-oral control site). The mechanical thresholds were also measured on the dental elements, and the force was applied directly to the crown and vertically to the long axis of the teeth. For each of the variables analyzed the comparison between the time-points was carried out by means of a one-way analysis of variance (ANOVA). Statistically significant difference was set at p<0.05.

Results: With regards to the thermal thresholds a slight reduction of the CDT between T1 and T2 (21.45 ° vs. 17.89 °; p <0.005) at the attached gingiva of right lower incisor was found, while were no statistically significant differences were observed at the thenar eminence and at the right upper incisor. A significant reduction of the PPT at the right upper incisor after 6months (T2) compared to both T0 and T1 (PPT T2: 155.5 kPa, PPT T1: 201.1 kPa PPT T0: 200.6 kPa ; p <0.005) was observed directly on the tooth crown. Moreover a significant reduction of PPT was found at the lower central incisor between T1 and T2 (280.5 kPa vs 209.2 kPa; p <0.005) placing the algometer vertically to the long axis of the teeth.

Conclusion: In a 6-month follow-up, orthodontic treatment with clear aligners does not determine significant changes of the extra-oral somatosensory function. Slight thermal and mechanical intra-oral changes were observed, maybe as a consequence of a structural alteration of the periodontal receptors stimulated by the orthodontic tooth movement.

Evaluation of intra- and inter-operator reliability of a new method for assessing success of aligner orthodontic therapy

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Aim: The use of aligners has spread widely in orthodontic practice because it represents an aesthetic and comfortable alternative to conventional fixed equipment. It is mainly used in the treatment of adult patients who are particularly careful and demanding about the aesthetic tolerability of the devices used. Despite frequent use, not much scientific evidence accompanies the aligners. Studies on the predictability of the orthodontic movement and the efficacy of the treatment are few and not very consistent. Even before studying the efficacy of treatment, it is necessary to find a method that is repeatable and effective to study the dental movements with the aligners. This study aims at verifying the intra- and inter-operator reliability of a novel method for assessing dental

movements after aligner orthodontic therapy.

Materials and methods: A sample of 6 digital dental models belonging to adult patients (2 Males and 4 Females; mean age 38 ± 9 years) who underwent orthodontic treatment with aligners were acquired pre-treatment (T0) and at device removal (T1). All dental models were processed by means of an extraoral laser scanner (Dental Wings). A 3D-3D superimposition procedure was performed by VAM[®] software to reach the minimum point-to-point distance between the two arches from each patient (T0 and T1). Values of RMS from the entire surface were automatically calculated. After that, those teeth which were expected to shift during treatment were manually isolated and RMS for only the moved teeth was also obtained. Reliability of the manual procedure was tested: the whole procedure was repeated by the same operator twice and by a second operator. Relative technical error of measurement (rTEM) and the Bland-Altman method were used to assess inter- and intra-observer error of the method.

Results: Intra- and inter-operator agreement on the entire model was maximum, with an rTEM of 0.0% and a Bland-Altman of 100%. Intra- and inter-operator agreement for the single shifted teeth was acceptable, with an rTEM of 5,5% and 5,2%, respectively for intra- and inter-observer error. Moreover, Bland-Altman system obtained a value of 84,5% and 87,1%, respectively for intra-operator and inter-operator reliability.

Conclusion: Since studies on the predictability of the orthodontic movement with aligners are not very consistent and most represented by case reports, it is still necessary to find a study method that is repeatable and effective in the analysis of the efficacy of therapy. The exposed novel procedure proved to be a reliable method for the assessment of dental movements after aligner orthodontic therapy.

Correction of anterior cross-bite with "Invisalign first" treatment

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Aim: Anterior cross-bite is a severe aesthetic and functional disorder which frequently occurs during the development of occlusion in children. An early intervention may be crucial to prevent the development of class III malocclusion, as well as anterior teeth mobility, fracture or dental wear and,

finally, gum disease. Literature provides us several solutions to treat this malocclusion, including both mobile and fixed appliances. This case report aims to show how the protocol "Invisalign First" may solve anterior cross-bite, allowing us to treat children at an early age in order to intercept the problem.

Materials and methods: We present a case of an 8-year-old girl with the following orthodontic problems: anterior cross-bite of elements 12 and 22, deep bite, midline deviation and narrow upper arch. Through the radiographic examination included in the orthodontic check-up, we also diagnosed skeletal class II malocclusion, hyperdivergent facial type and mandibular incisors lingual inclination. The treatment with Invisalign aligners involved upper arch expansion and correction of cross-bite, deep bite and midline deviation. The first phase consisted of the use of 39 aligners and it was followed by two phases of refinement. The last aligners were designed to maintain the obtained results, before carrying out a future phase of orthodontic Invisalign treatment. The patient changed aligners every 5 days; the first phase lasted 6 months, whilst the second one 8.5 months and, finally, the third one 6 months, for a total of 13 months of treatment.

Results: The obtained results were satisfactory. Invisalign clear aligners allowed us achieving upper arch expansion and gaining space. Moreover, we obtained the correction of cross-bite involving elements 12 and 22, anterior deep bite and midline deviation.

Conclusion: Invisalign treatment is increasingly widespread. Its advantages, such as aesthetics and comfort, make it the first choice for adults and teenagers. Nowadays, the introduction of "Invisalign First" allows treating a wide range of dental malocclusions in younger patients, such as dental crowding, diastema and narrow arches. Its ease of removal improves oral hygiene and the absence of metal elements ensures greater comfort for children, who often accept it more than other appliances. Further clinical studies about the "Invisalign First" protocol are therefore suggested in order to have more scientific evidence on this subject.

Invisalign mandibular advancement in a patient with Class II malocclusion

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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. Nowadays a lot of patients are treated by distalization of the upper arch, although McNamara has shown that 4 out of 5 patients have a mandibular retrusion component. The protrusion of the maxilla does not exceed the 20% of the total cases of Class II malocclusion, and the majority of these cases are significantly caused by mandibular retrusion. The so-called Fränkel manoeuvre, by which the mandible of Class II individuals is moved forward in dental Class I relationship, is important to discern the type of malocclusion and its sagittal discrepancy. Literature shows that the Class II malocclusion division 1 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 to prevent incisor trauma and its related long-term sequelae. Typically, these deformities are treated by using functional appliances not very accepted by patients who could compromise the treatment plan. Today patients, even the youngest ones, look for treatments able to improve their aesthetic and bite-jumping performed by Invisalign Mandibular Advancement seems to be well tolerated. Invisalign Mandibular Advancers have "precision wings" which, like all functional equipment, allow mandibular propulsion with forward sliding of the jaw and stimulation of condylar growth. 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 with aesthetical devices. **Materials and methods:** 9 years old male patient came in our department with a dento-skeletal Class II malocclusion, a short and retrusive mandible and a convex profile. X-ray evaluation and clinical observation confirmed the mandibular deficiency with mesodivergent growth pattern and increased OVJ (10 mm). Treatment plan consisted in three steps. The first step was performed by 22 aligners, changed every 5 days, in order to expand the dental arches. The second one was performed by 32 aligners with the "precision wings" for the mandibular advancement. These aligners were changed every 7 days for 7 months. Finally, the last step was performed by 25 aligners changed every 5 days. The last aligners are used as contention appliances while waiting for the eruption of the permanent teeth in order to proceed with the final phase of the treatment.

Results: The whole treatment lasted 14,5 months. Class I molar and canine relationship with a normal OVJ and OVB (overbite) were achieved.

Conclusion: The orthodontic treatment performed with Invisalign Mandibular Advancers in the pubertal growth peak can be effective in correcting Class II malocclusion division 1 also through a greater patient compliance compared to conventional functional devices.

Oral surgery

The evolution of surgical techniques in complex rehabilitations of the atrophic maxilla

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Aim: The purpose of this article is to analyze and compare the conventional dento-skeletal rehabilitation techniques of the atrophic maxilla with alternative ones. In order to rehabilitate reduced volume sites, treatment options are either non-invasive therapy that adapts to the clinical situation (short/ angulated/ zygomatic implants) or additional surgical therapy, that relies on augmentation procedures in order to increase bone volume (GBR, sinus floor elevation, onlay bone graft).

Methods: The available literature was screened for randomized clinical trials, prospective cohort and retrospective studies, published in the last 5 years up to May 2020, on the prognosis of implant rehabilitations of the atrophic upper jaw. Twenty-one studies were found, of which only eight met the inclusion criteria. The search keyword used was: "implant rehabilitation atrophic upper jaw".

Results: In these studies 302 patients took part, a total of 988 implants have been placed of which 485 implants had a traditional bone reconstruction associated with a standard implant length. The remaining 503 implants have been rehabilitated with alternative procedures such as zygomatic (141), short (339) and tilted (23) implants. The survival rate of long implants was in the range of 90 - 100%, while the survival rate of non-conventional implants was between 93,3 - 100%. Despite short implants showed fewer biological complications (14), much more were found in zygomatic and tilted implants,

which seems to be similar to the complications verified in long implants placed in augmented bone (48). No statistically significant differences were observed. Clinical data, on the other hand, reported that short implants are associated with less comorbidity.

Conclusions: Even if more complications were reported for zygomatic implants, they proved to be a reliable rehabilitation modality for severely atrophic maxillae. In the past, the use of short implants in clinical practice was reduced as they were associated with high failure rates, which was mainly due to their previous smooth surfaces. Their application has considerably increased due to their superficial treatment, and they can be considered a suitable, cheaper and faster alternative to longer implants placed in an augmented bone for rehabilitating edentulous atrophic jaws. Considering the results of the different studies we can assert that short implants, zygomatic implants and tilted implants are a valid alternative to conventional implants with bone graft for the complex rehabilitation of the atrophic maxilla.

Dental implant-prosthetic rehabilitation using a conical abutment connection in a type I diabetes mellitus patient

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Aim: Implant-prosthetic rehabilitation in diabetic patients has always been a matter of challenge because of the high prevalence of peri-implant



tissue remodeling that occurs in these subjects. The considerable amount of research performed in the field of implants led to the development of new types of connection, which allowed minimizing the bacterial invasion within the micro-gap present between the implant platform and the prosthetic component. The aim of this report was to verify whether using a conical abutment connection in diabetic patients could help in achieving any benefit in terms of peri-implant mucosal tissue and bone resorption.

Methods: A 28 years old female patient, suffering from type 1 Diabetes Mellitus, presented to our clinic because of severe pain at tooth 26 due to a severe carious process involving the furcation. Extraction of the profoundly compromised tooth was required. Subsequently, considering the paucity of the remaining bone as well as patients' general conditions, a two-step implant-prosthetic rehabilitation protocol of the edentulous area was proposed. After three months from the tooth extraction, an endoral radiography was performed and a CBCT (Cone Beam Computed Tomography) was prescribed for an adequate surgical planning. Second level radiological evaluation showed a vertical amount of residual bone of 0,8 mm, thus an implant of diameter 3.8 mm and length 11 mm was inserted using Summers' technique. Considering the complicated management of vertical bone and mucosal tissue loss in diabetic patients, an implant with a conical abutment connection was used. During surgery, the implant site was prepared up to a length of 8 mm, then a crestal sinus lift was performed according to Summers' technique. The implant (TTC, 3.8 x 11, Winsix, Ancona, Italy) was inserted with a 35 N torque, submerging the platform by 1 mm. The flap was sutured with a 4/0 absorbable stitches. After a recovery period of three months, the fixture was uncovered and a dental impression was immediately taken. A temporary prosthesis was initially used and then, after three months, replaced by a definitive one made with metal-ceramic. A control x-ray was performed at baseline, after six months and after one year.

Results: At each radiographic control, peri-implant tissues showed high stability with an almost absent reduction in parameters. Changes in bone level were assessed using a calibrated endoral x-ray, while the mucosal level was measured with a periodontal probe.

Conclusions: The conical abutment connection is a very effective method to prevent peri-implant bone and mucosal reabsorption, especially in patients with comorbid conditions such as type I Diabetes Mellitus, thanks to the ability to drastically reduce bacterial invasion between the implant platform and the prosthetic component.

Stabilized techniques and regenerative technologies for horizontal increments in atrophic bone crests

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Aim: Implant-supported prosthetic rehabilitations are constantly growing and often require complex surgical interventions, as it is necessary to obtain qualitative and quantitative standards of suitable bone support. The early loss of dental elements can result in a loss of bone volume in the area of interest. In the last decade, guided bone regeneration (GBR) has been very successful, given the ability to regenerate the alveolar bone. The principle on which GBR is based is that of using membranes whose function is to exclude from the graft certain tissues defined as rapid proliferation to promote the growth of tissues defined as slow proliferation such as bone tissue, in association with a bone graft scaffold.

The case report examined aims at restoring the correct bone volumes for implant-prosthetic rehabilitations through guided bone regeneration (GBR). In the case report, a resorbable type membrane was used in association with a mixed bone graft, of a heterologous and autologous type in order to provide structural support to the defect site and to promote the intrinsic regenerative potential of the host tissue. In a second step, two endosseous implants were inserted in the regenerated site, finalized with temporary crowns in resin and final in metal-ceramic.

Methods: In the case report examined, a prosthetic implant rehabilitation was decided by performing a cone-beam CT scan of the dental arches for this purpose. The three-dimensional images showed a serious horizontal bone defect and proceeded, therefore, by planning a guided bone regeneration of the site. After local anesthesia, a flap is set up for bone uncovering. Following passivation of the flap, the site, which will accept the graft at the same time as the membrane, is prepared by scraping with bone scraper. Then the membrane is positioned on the vestibular side, which is stabilized by using 2 titanium pins. Only after stabilization of the membrane is a bone mix prepared 70% with autologous bone and 30% with heterologous bone of porcine origin inserted. Once the membrane covering the graft is placed, it is stabilized with absorbable sutures. Finally, after the flap has been turned over, mattress sutures and

stitches to close the wound are applied. After 10 days, the sutures are removed. After 4 months, we proceed with the acquisition of new cone beam CT images aimed at verifying the bone volumes regenerated after surgery using the GBR technique and at the same time the position of the arch implants is examined and determined. Implant insertion is therefore scheduled.

Results: The treated case did not present post-operative complications such as suture dehiscence, membrane exposure or secondary infections. From the three-dimensional images (TC Cone Beam) performed before and after the regenerative intervention we can see a considerable volume of regenerated bone, about 4 mm, such as to allow appropriate programming for implant insertion in a prosthetically guided manner.

Conclusion: This case-report, thanks to an accurate diagnosis and a correct treatment planning, aims to overcome the problems of bone atrophy of the edentulous crest by using the GBR protocol, restoring the bone volumes suitable for the type of planned rehabilitation such to be able to insert the implants in the correct prosthetic position.

Correlation between the position of the lower third molar and the mandibular morphology: a three-dimensional analysis

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Aim: The aim of this study was to evaluate the correlation between the position of mandibular third molar and mandibular morphology, through the use of CT Cone Beam (CBCT) scans and 3D elaboration of the mandible.

Methods: The retrospective study was conducted at the Oral Surgery clinic, Department of Health Sciences, of the Magna Graecia University of Catanzaro. The study population was represented by all patients with 3.8 and / or 4.8, from the age of 18 to 32 years, who had performed a CBCT. CBCT scans were acquired in DICOM format, processed using the SimPlant O&O software and subjected to a morphometric analysis. For bone segmentation, the "bone" window was set to a minimum value of 250 HU and a maximum of 2310 HU. 3D reconstructions of the mandibular structures were carried out in order to perform a morphometric analysis. For each jaw, specific cephalometric points and related measurements were identified: gonial angle (Co-Go-Me), mandibular ramus high (Co-Go), mandibular ramus width (R1-R2), mandibular ramus divergency (Co-Go-R2), distance between the distal

surface of the second lower molar and the anterior border of mandibular ramus (M2-R). The results obtained were analyzed through a descriptive, bivariate and multivariate statistical analysis using the STATA software (STATA 11, Texas, USA). Alpha = 0.05 was set as the significant level.

Results: In the study, 29 women and 42 men were enrolled, with an average age of 26.3 ± 4.6 years. 124 lower third molars were analyzed, with an average GA value of $121.2 \pm 3.8^\circ$. This value allowed to distinguish two study groups: High-Gonial Angle group (H-GA), with an average value of $125^\circ \pm 2.5^\circ$ and Low-Gonial Angle group (L-GA), with an average value of $118.5^\circ \pm 1.9^\circ$. The bivariate analysis performed showed a statistically significant difference between the two groups: both the height and the width of mandibular ramus are significantly greater in the L-GA group ($p < 0.0001$). The analysis of the position of the third molar showed a statistical significance with age and sex, with the GA, with the M2-R, with the R1-R2 and, finally, with the Co-Go-R2.

Conclusion: The results obtained confirm a statistically significant correlation between the position of the lower third molar and the mandibular growth pattern. Specifically, the impaction of the lower third molar was related to a reduction of the gonial angle value.

Zinc-l-carnosine mouthwash after third molar surgery: a split-mouth study on oral surgical wounds healing

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Aim: The primary goal of wound management after dental extractions is to obtain wound closure in the shortest possible time with minimal pain and discomfort and without complications, thus achieving by modulating of the inflammation phase and initiation of proliferation phase in the wound healing process by heterogeneous substances. Zinc-L-Carnosine suppresses Nuclear Factor κ chain transcription in B cells, reduces the expression of Tumor Necrosis Factor α and stimulates the expression of Heat Shock Protein 72, possibly resolving inflammations and enhancing repair of injured mucosa. The aim of this split-mouth study is to evaluate the effects of zinc-L-Carnosine on the healing of oral mucosa after dental removal.

Methods: A split mouth observational study was performed on 20 patients (8 males, 12 females) needing extraction of lower wisdom teeth on both sides with open flap surgery, followed at the Complex Operative Unit of Odontostomatology of University of Bari



Aldo Moro. After the first extraction, patients were instructed to clean wound only with saline solution (NaCl 0,9%) 4-5 times per day. The extraction of the contralateral molar was performed after 1 month but during the post-operative period the patients received a zinc-L-carnosine mouthwash (Hepilor® Liquido, Azienda Farmaceutica Italiana) for wound cleaning to be used 4 times per day until the complete mucosa healing. The same post-operative therapy was prescribed to all patients (Amoxicilline 1gr tablets, 3 times per day, acetaminophen 1000mg tablets, 2 times per day). Surgical wound healing was assessed by periodic clinical follow-up at the 7th (during which the stitches were removed), 10th, 15th, 20th day after the surgery. Patients were invited to complete a questionnaire for evaluation of the post-operative pain (measured through a 10-cm Visual Analog Scale for Pain, ranging from "no pain" to "worst pain").

Results: The mean time for healing using Hepilor® Liquido mouthwash was 9.43 ± 2.37 days (mean \pm SD), and the reported mean pain was 5.71 ± 3.30 cm (mean \pm SD); in contrast, the mean time for healing without Hepilor® Liquido mouthwash was 12.86 ± 2.19 days (mean \pm SD) and mean pain was 6.43 ± 2.07 cm (mean \pm SD). The difference between the healing times of the two observations was significant ($P=.002$), instead of the reported pain ($P=.454$).

Conclusions: This study results suggest that Hepilor® Liquido mouthwash after lower wisdom extraction seems to accelerate the healing of surgical wounds, but it doesn't represent an adjunctive aid for the management of post-operative pain.

Conservative surgical removal of a maxillary intrasinus ameloblastoma: A 24-months follow-up

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Aim: The purpose of this study is to present a clinical case of ameloblastoma treated using a conservative surgical enucleation with a 24 months follow-up. Among odontogenic oral tumors of epithelial origin, ameloblastoma is the most common, it usually doesn't form metastasis and it is considered as a benign tumor with a locally invasive growth pattern and destruction of the jaws and surrounding tissues. This lesion is usually found randomly in routinely dental radiographic checks but the diagnosis is primarily

histological. Mostly present in the mandible and has to be detected and treated as soon as possible to avoid a much more complex therapy.

Methods: A 68-years-old woman was referred to the Dentistry department of San Raffaele hospital for a well-defined, unilocular radiolucent lesion in the posterior right maxilla, accidentally found on routine dental check. A conventional intraoral examination revealed a bony hard, non-compressible, non-fluctuant and non-painful swelling in the right posterior maxillary vestibule. The presence of the osteolytic lesion was confirmed by a I level (OPT) and II level (CBCT) radiographic exam, which also revealed an involvement of the right maxillary sinus. The treatment plan consisted of a conservative surgical removal limited to the healthy margins of the lesion under local anesthesia with articain 4% and adrenaline 1:100.000, far from the site to avoid a biopsy impairment. After a full-thickness trapezoidal flap was elevated, a trap door has been created by ostectomy and the enucleation of the lesion was carefully performed. Subsequently an adipose Bichat bulla flap was performed and placed on the entirely bone defect using a 3/0 resorbable suture to close the defect, then the sample (whitish, nodular, of 4 cm maximum diameter) was sent for histopathological examination.

Results: The histological examination showed solid basal cell type ameloblastoma (beta chain+, p63+, CK19+, CKpool+, D240 focal+, actina-, SOX10-, CD117-). The patient has referred no post-operative pain and the lesion healed without any complication. At the 24 months follow-up visit no recurrence of the lesion was observed in the patient on both clinical and radiological examination.

Conclusions: The clinical and radiographic appearances of ameloblastoma are variable, therefore the diagnosis is often very difficult and must be validated and confirmed by histological exams. Management of ameloblastoma is still controversial. Various treatment methods of ameloblastoma have been suggested in relation to many factor, such as the tumor type and clinical presentation. Unicystic ameloblastomas are usually treated conservatively with curettage, enucleation and cryosurgery, while solid of multicystic ameloblastomas are usually treated with radical surgery that often requires plate reconstruction or more extensive reconstructive surgery. Two other major problems are associated with recurrent ameloblastoma: the development of metastasis, termed malignant ameloblastoma, and the transformation into an ameloblastic carcinoma, both with rates of 2% in recurrent ameloblastoma. The therapeutic use of adjuvant radiotherapy with or without chemotherapy for positive margins of recurrent and un-resectable ameloblastomas have resulted in mixed outcomes. However, their use is still strongly advocated to treat ameloblastic carcinoma

and recurrent ameloblastoma after multiple post-surgical recurrences. During treatment planning, it is imperative to balance the efficacy of radiotherapy with risks of developing future life-threatening malignant transformations. Considering the absence of relapses at 24 months, a minimally invasive approach of surgical removal of ameloblastoma seems to be an effective treatment.

Surgical treatment of MR-ONJ with minimally invasive surgery: A case report

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Aim: Medication-related osteonecrosis of the jaws (MRONJ) is an uncommon condition that can occur after exposure to drug agents used to prevent bone complications, such as Bisphosphonates or Denosumab, or treatment with other agents, such as angiogenesis inhibitors. In a review article of February 2019, patients scheduled to receive high-dose of Bisphosphonates or Denosumab and individuals who have received low-dose of Bisphosphonates or Denosumab for at least three years or more deemed at high risk of development of MRONJ. An American Association of Oral and Maxillofacial Surgeons (AAOMS) position paper on MRONJ stated that a 2-month drug suspension before and after dental surgery in patients receiving Bisphosphonates might be wise. The purpose of this paper is to present a case report of mandibular osteonecrosis due to the placement of implants in an elderly patient undergoing treatment with high doses of Bisphosphonates.

Methods: A 92-year-old woman came with a referral from her GPD to the Dentistry department, San Raffaele Hospital, Milan. Her medical history included: breast cancer (healed), severe osteoporosis, cardiovascular disease, partial nephrectomy, hypothyroidism, hypertension, and chronic gastro-intestinal pathologies treated with different pharmacological therapies. The patient had been taking Bisphosphonates per os formulation for more than ten years: the first seven years with low doses, then at high doses. The intraoral

examination revealed in the right mandible a vegetating neoformation of 2 cm and an area of osteonecrosis of circa 1.5 cm in correspondence of three implants. Incisional biopsy of the neoformation was performed and, suspecting BRONJ, OPT, and CBCT scan of the lower jaw demanded. Antibiotic prophylaxis and rinses with chlorhexidine mouthwash 0,20% also prescribed. During hospitalization at another hospital, for the treatment of blood anemia and waiting for a transfusion, she had a partial spontaneous expulsion of bone seizure from the right mandible; after the dismissal, the surgery was scheduled. Under local anesthesia, right mandibular degloving was performed, and bone sequestration with contextual dental implants was removed from 41-43 ridge. Then bone cavity revision was achieved at 44-48 site, preserving sensitivity and functionality of the lower alveolar vascular-nervous bundle. After suturing with 4/0 Vicryl, the cavity was filled with povidone-iodine to reduce the infectious burden, and the patient received dedicated post-surgical instructions.

Results: Unfortunately, due to the old age and the precarious patient's condition (hypertension, anemia, aortic stenosis), it was not possible to document this clinical case over time. However, the first clinical follow-ups after the surgery were positive, with the disappearance of the erosive and granulomatous signs in the mucosa and a presumable bone-healing pathway.

Conclusion: Patients receiving high-dose Bisphosphonates for more than three years are at high risk of BR-ONJ. The European Society for Medical Oncology has stated that "before the beginning of Zoledronic acid or Denosumab therapy, patients should undergo an oral examination and appropriate preventive dentistry, and be advised on maintaining good standards of oral hygiene". Therefore, in this type of patient, great care must be taken before performing invasive dental procedures, such as dental extractions or implants placement.

Modified Khoury technique using a xenogeneic cortical lamina in treating horizontal ridge defects: a clinical and histomorphometric prospective study

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Aim: Khoury's split bone block technique, based on harvesting an autograft from the mandible buccal

shelf, demonstrates excellent regenerative results but is associated with significant patient's morbidity due to the necessity of a donor site. The aim of this study is to assess clinical, radiological and histologic outcomes of a modified Khoury technique, consisting in a xenogeneic cortical lamina and autogenous cortical bone chips, in the treatment of horizontal ridge defects prior to implant placement.

Methods: Patients requiring horizontal ridge augmentation prior to implant insertion were recruited, after eligibility assessment according to systemic and local inclusion and exclusion criteria. After full thickness flap reflection and accurate debridement of the defect, a porcine cortical lamina (Lamina Hard, TecnoSS, Italy) was shaped and fixed with micro-screws to recreate the bony envelope. The entire defect, comprised between the lamina and the residual bone crest, was then filled with autogenous bone chips harvested from the buccal cortical plate surrounding the defect with a manual scraper (Safescraper Twist, Meta, Italy). After 5 months of healing, bone core specimens were retrieved with a trephine bur mounted on an implant handpiece and dental implants were inserted in the biopsy sites. Histologic and histomorphometric analyses were performed, together with quantitative radiological evaluation of CBCT scans obtained at baseline and before the second surgery.

Results: Nine patients were enrolled and treated with the insertion of 13 implants. No post-operative complications were recorded during the healing period. Nine bone specimens have been harvested and histologic assessment showed absence of inflammatory infiltrate, almost complete resorption of the bone chips, which were substituted with mature lamellar bone (mean volume $36 \pm 12\%$), together with marrow spaces. Mean gain of horizontal width was 5.44 ± 2.7 mm. All the 13 implants resulted satisfactorily in function at 12-month follow up. Histologic signs of lamina remnants were found in almost all the samples.

Conclusion: This preliminary study suggests that horizontal ridge defects can be safely treated with this low morbidity approach, obtaining excellent clinical and histomorphometric results. Future trials will better explore the efficacy of this procedure, in comparison with treatment alternatives.

Surgical extraction of an impacted mandibular canine: Case report

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Aim: The present study describes the case report of a transmigrated canine associated with a follicular cyst located near the inferior border of the mandible in a 15-year-old female patient.

Methods: The patient (female, 15-year-old) came at the Department of Dentistry of the San Raffaele Hospital with a slight pain in palpation in the region of the mandibular symphysis. In the anamnesis no previous trauma occurred and during the objective examination a deciduous canine in the 4th quadrant was discovered. All lower anterior teeth had positive results when subjected to the vitality test. Then, an orthopantomography and a computerized tomography were prescribed.

The radiographic investigations showed the presence of an included transmigrated canine in the 4th quadrant with an attached cyst. This tooth was positioned horizontally along the lower edge of the mandible, under the roots of the lower incisors and in accordance with the type T2 of the classification of Mupparapu. In the light of these radiographic considerations, the extraction of the transmigrated canine with the contextual enucleation of the cyst was planned.

Results: Under local anesthesia (Optocaine 20 mg/mL with adrenaline 1:80,000) a paramarginal incision from canine to canine and release incisions from both sides were realised to preserve the interdental papillae and the periosteal vascular-nervous structures. An osteotomy was then realised to expose the crown and part of the root. To remove the impacted element, a small notch at the amelocementitious junction was made and the canine was dislocated and avulsed with the aid of a Berry lever. After the enucleation of the cysts, the curettage of the alveolus was made and the residual cavity has been irrigated with copious physiological solution. Collagen sponges were applied to promote blood clot of the alveolus and the correct bone regeneration. The flap was adapted and the suture in the various muscular and mucous planes were performed with 3-0 resorbable thread. An extraoral compression bandage was performed and a postoperative therapy with 875 mg amoxicillin + 125 mg clavulanic acid three times a day for 6 days was prescribed. The patient could optionally continue the analgesic therapy with ibuprofen 600 mg to reduce the post-operative pain. The evaluation of soft tissues was made after one week and it reported excellent healing. The removal of stitches was performed in order to further improve the patient's comfort degree.

Conclusion: A dental transmigration involving the mandibular canine is a relatively rare developmental anomaly and it's more frequent in women. Nevertheless, the probability of diagnosing this disorder is now greater due to more common CBCT and panoramic radiograph examinations, which are

the radiographic investigations of choice to make the correct diagnosis. Considering the problematics of this case, which are the presence of a dental cyst, painful symptoms and T2 localizations of Mupparapu's classification, the extraction of the transmigrated tooth and the enucleation of the cyst was considered to be the best course of action. Since the transmigrated canine is often associated with the presence in the arch of the corresponding deciduous for a longer time than the normal exchange, the root of the corresponding deciduous tooth could be left in place if the reabsorption of the root had not occurred.

Left maxillary sinusitis with odontogenic origin in relation to ectopic tooth 2.8 with follicular dentigerous cyst: combined transnasal and oral endoscopic approach. Case report

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Aim: of the study: describe the management of combined transnasal and oral endoscopic orosinus pathology.

Methods: a 54-year-old patient underwent dental and otolaryngological evaluation for left odontogenic maxillary sinusitis in relation to a radiotransparent lesion of an ectopic element 2.8. The symptoms reported at the time of access to the hospital were nasal obstruction and nocturnal rhonchopathy. At the ENT evaluation in videorinoscopy with rigid optics, there was a complex deviation of the nasal septum and no evident pathological secretions in progress. While on inspection of the oral cavity the mucous membranes appeared unscathed and there were results of extraction of element 1.6. The radiological examination, face CT, showed the left maxillary sinus almost completely obliterated by a cystic appearance, with slender calcified walls and homogeneous content that has a dental element, probably the 2.8 which fenestrates the vestibular cortex (the lateral wall of the maxillary sinus). This formation erodes the medial wall of the sinus, obliterating the ostio-meatal complex and imprinting the ipsilateral ethmoidal cells. Biohumoral tests showed normal coagulation parameters and normal indices of renal function, liver function and ionemia. The patient underwent a general anesthesia and oral intubation with a combined left anterior FESS operation and a contextual closure of the orosinus communication with advancement of the Bichat fat pad. The patient then returned to control after 15 days and six months, showing good healing

and no sign of recurrence at the rhinoscopic check and on the physical examination of the oral cavity.

Results: based on the clinical and radiological aspect, the diagnosis of a follicular dentigerous cyst (WHO 2017) covered by a multi-layered, non-keratinized paving epithelium, with moderate chronic inflammation, including gigantocellular and cholesteric crystals, can be reached from the microbiological and histological examination. Necrotic amorphous material coexists including rare hyphae and fungal spores, with therefore mycotic and actinomycotic superinfection.

Conclusions: the combined oral and nasal intervention, allowed by the collaboration between the oral surgeon and ENT, has made it possible to shorten the healing time and to resolve the pathology without any sign of recurrence. Furthermore, according to our approach, the optimal management of the sinus pathology related to the odontogenic cause is no longer purely dental or otolaryngology when there is involvement of several paranasal sinuses and a complete or partial obliteration of the osteomeatal complex. Therefore the interventional contemporaneity in order to exclude recurrences and resolve the pathology is desirable.

Computer-guided implant surgery used in a patient with a Kennedy Class III in the upper jaw: A case report

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Aim: The study aims to show how to deal with a case of upper intercalary edentulism in computer guided implantology, instead of with conventional implantology, showing potentially achievable aesthetic results.

Methods: A patient comes to our attention due to an upper intercalary edentulia, in Kennedy's III class. It is decided to perform an implant-prosthetic rehabilitation in computer guided implantology. The case is designed in digital format, combining the STL files of the extra-oral scanner of the plaster models with the files in Dicom format of the 3D examination of the upper jaw arch. A prosthetic template is thus performed on the digital model. Based on the prosthetic design, the implants are positioned and a surgical template is required, to be applied the day of surgery. On the day of surgery the previously performed surgical template is placed on site and the computer-guided implantology drill kit will be used. Only the operculae are performed on the crestal mucosa through the dedicated mucotomes, without opening any flap. After removing these two gingival mucosa capsules, the drills dedicated to computer-guided implantology are passed up to the predetermined diameter for the realization of the implant alveolus.

Always through the surgical template, guided implants are applied. The following diagnostic tests are required a pre-operative orthopantomography (T0), cone beam at the time of the case design (T1), intraoral x ray at the time of dental implants application (T2), an orthopantomography after prosthesis application (T3).

Results: The patient's post-operative period was null with no swelling and tenderness, the operation was not very invasive, with maximum predictability of results. Four months after the surgery, two single prosthetic crowns are screwed onto the two previously placed implants. Having established in a virtual way both the location of the implants and the prosthetic crowns, thus previewing what could have ideally been the finished work, the realization of the treatment as a whole was certainly simpler compared to a surgical technique and "traditional" prosthetic construction.

Conclusions: In computer-guided implantology the application of implants is prosthetically guided, therefore the results are much more predictable and the surgery is much less invasive than the conventional one. Therefore in this type of surgery, the pre-operative component is much more elaborate, but the intra-operative part is much less inquisitive and invasive than conventional implant surgery.

Bone remodeling of alveolar ridges: literature data evaluation

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Aim: Despite tooth extraction usually proceed with no complication for the patient, remodeling of alveolar ridges results in both horizontal and vertical changes of hard and consequently soft tissue dimensions. The extension of these changes is important for decision-making and comprehensive treatment planning. Either if we are assuming to rehabilitate the patient with dental implants or with prosthetic rehabilitation. The clinician should prior know biological events, if don't want to deal with unforeseen complications during treatments. The aim of this review is to evaluate dental literature to assess the medium, both vertical and horizontal, dimension changes of the hard tissues of the alveolar ridge, following tooth extraction.

Methods: A search on the main electronic databases as Pubmed, Chocrane library, Medline was performed. The bibliographies of review articles were checked, and personal references were searched. The searching was made to identify randomised controlled clinical trials and prospective cohort studies that evaluate just human bone healing. No date inclusion criteria

were used. Only studies reporting on undisturbed post-extraction dimensional changes were included, articles reporting socket preservation healing were not included. Another inclusion criteria used was the observation time of the healing, that must be more than 3 months. Were included studies which collected data using surgical re-entry evaluation of acrylic stent or intra-operative measurements, or using radiographic measurements and that reported them either by percentages of changes or millimeters of reduction. Average and percentages of the dimensional changes over time were calculated when possible.

Results: Finally we took in consideration articles published between 1997 and 2012. The literature search yields 18 representative articles which comply with the specifics established. Unfortunately some good studies with excellent data were not included because performed on animal model, nevertheless they can help understand better the alveolar healing process. In human hard tissue, horizontal dimensional reduction (3.54 ± 0.8 mm) was more than vertical reduction at 3 months (1.37 ± 0.96 mm) took on buccal plate and ($1,73 \pm 1,09$ mm) after 6 months of healing. Percentage vertical dimensional change is believe to be 11–22% at 6 months and between 29 and 63% at 6–7 months.

Conclusions: The studies evaluated demonstrated rapid reductions in the first 3–6 months, followed by gradual reductions in dimensions thereafter. The horizontal reduction in the coronal area of the alveolar ridge is much more prominent than in the apical part of the ridge that keeps unaffected dimension, the horizontal changes are also more emphasized than the vertical ones, that are still mostly concentrated on the buccal plate. Even if the lingual plate undergoes unavoidable modifications, this area of the ridge seems to be much more preserved by the remodeling events than the buccal area.

Hypertrophic clot: post-extractive complications in patient under anticoagulant therapy

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Aim: Teeth extraction is the most common oral surgical procedure. Teeth extraction may yield intra and post-operative complications, that include: tooth fractures, luxation of adjacent teeth, fracture of cortical plates, displacement of tooth or root in the maxillary antrum, soft tissue lacerations, adjacent bone fractures, hemorrhage, dry and wet alveolitis, trismus and hematoma (1). The hypertrophic clot

is less common: this is a vascularized exophytic neof ormation that crumbles during chewing, and cyclically recurs. This lesion takes shape after the platelet phase, when the fibrin cap – which does not go into self-resolution – periodically breaks and generates extravasation, finally resulting in recurrent bleeding (2). Histologically, the hypertrophic clot differs from common vascular lesions as it consists of an accumulation of fibrin. Anticoagulant drugs administration can contribute to the development of this complication. A high percentage of patients undergoing teeth extraction regularly take this category of drugs. However, this dosage must be appropriately tailored in order to reduce any bleeding complications (3). We hereby report a clinical case of hypertrophic clot in a patient on low-molecular-weight heparin (LMWH) therapy.

Methods: A 88-year-old male patient was referred, in emergency, to the Clinica Odontostomatologica for recurrent bleeding in zone 2.5 in the previous 30 days. The symptoms started after an extraction in the same site. Anamnesis reports therapy with: antihypertensive, diuretics, beta-blockers drugs and LMWH at a dosage of 4,000 I.U. twice daily. In the post-extractive examination, an exophytic neof ormation of purplish red color with elastic consistency at palpation was detected in the area of the left upper second premolar (2.5).

Results: After diagnosis of hypertrophic clot, surgical therapy was performed under local anesthesia to remove the lesion, using a cold blade scalpel, followed by local hemostasis with collagen sponge and vycril 3.0 stitches. Subsequently, the patient was discharged and the dosage of LMWH is decreased from 4000 to 2000 U.I. After 7 days, the follow up showed no new hypertrophic clots and the patient reported resolution of clinical symptoms.

Conclusion: In conclusion, the hypertrophic clot requires the clinician to remove it. For the management of a patient under anticoagulant therapy, a combined approach between the dentist and the treated clinician is warranted, as dosage adjustment of concomitant medications may be needed. To prevent hypertrophic clots formation, the operator should optimize local hemostasis techniques.

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

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Aim: The main aim of the study was to assess the rates

of complications for 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 who had undergone a computer tomography before sinus surgery (T0), an orthopantomography after implant surgery (T1) and a second orthopantomography at the follow-up (T2) were included in the study. Variables for sample description, type of biomaterials and implant characteristics were also collected. At the follow-up, all survived implants were clinically and radiographically (OPT) evaluated. The complications analyzed in the study were divided in complications during surgery (represented by perforations and haemorrhage), and complications after surgery (represented by oroantral communication and infection).

Results: Sixty-eight lateral sinus lifts were performed in 48 patients and 93 implants were inserted. Mean follow-up established was $9 \pm 1,8$ years. In 14 cases of sinus augmentation, premature complications leading into 3 graft failures were recorded. A total of 19 implants failed. The analysis showed that patients and sinus related factors did not influence premature rate of complications. The complication rate was 20,6%: 9 cases of sinus perforation, 3 cases of infection and 2 cases of oroantral communication (OAC). Stitches and collagen membranes were used to handle the perforation, while the infection was treated with a specific antibiotic therapy (amoxicillin associated with metronidazole). These treatments resulted in 90% of successful sinus surgery. The OAC was resolved with both FESS and intraoral mesh surgery leading to 85% of successful sinus surgery. In a total of three cases it was not possible to insert implant. The residual bone height (RBH) proved 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 of bone lost (compared to the residual bone height measured before the surgery). A statistically significant complication rates difference was highlighted between smokers and non-smokers group, with OR of 8.3 (p-value 0.0173). No statistically significant difference was found when considering implant failure and the biomaterials used for sinus lift, nor among various implants type surfaces.

Conclusions: Lower levels of residual bone height (RBH) prior to the sinus surgery and smoking habits had negative prognostic effects on dental implants placed in grafted sinuses.

Solitary bone cyst of the mandible: a case report

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Aim: Solitary bone cyst (SBC) is a rare nonneoplastic disorder of the jaw bones. It is defined as "an intraosseous cyst having a tenuous lining of connective tissue with no epithelium". Occurrence of SBC is generally seen during the first two decades of life with higher male predilection. This lesion is usually asymptomatic and characterized by slow growth and therefore commonly diagnosed incidentally during routine radiographic examination. Its etiology remains uncertain, though traumatic events including dental extractions have been believed to be the main cause of SBCs. We report a case of solitary bone cyst of the mandible.

Methods: A 17-year-old male patient came to our hospital for a dental visit. The patient gave a history of trauma during childhood. Intraoral examination did not reveal missing teeth. Mandibular and maxillary regions showed no soft tissue abnormality or bony expansion. The periodontium was noted to be healthy with no evidence of gingivitis or tooth mobility, there were no carious lesions either. A routine panoramic view radiograph revealed an oval, well-delineated unilocular radiolucency in left mandibular area. Radiolucency extended into 34-38 area and showed a scalloped appearance. Involved teeth showed no displacement. Pulp necrosis in teeth 35 and 36 was diagnosed and root canal treatments were performed. The CBCT showed intact bone walls and no thinning or periosteal reaction. Surgery was programmed under general anesthesia. A full-thickness mucoperiosteal flap was elevated in the involved area. The surgical approach to the lesion was performed by corticotomy of buccal aspect of the lesion with a round burr, revealing a vacant cavity without an epithelial component. Other two bone accesses were created and curettage of the cavity was performed to induce bleeding into the lesion. The flap was closed with a Vycril 3-0 suture.

Results: Aspiration from the cystic cavity revealed no pus or serosanguinous fluid or haemorrhage. It was done to rule out other types of injuries. The preceding findings suggested the lesion to be solitary bone cyst.

Conclusion: The definite diagnosis of solitary bone cyst is invariably achieved at surgery when an empty bone cavity without epithelial lining is observed. The surgical exploration serves as both a diagnostic maneuver and as definitive therapy by producing bleeding in the cavity.

Third molar extraction: irrigation and cooling with water or sterile physiological solution. A double-blind randomized study

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Aim: The extraction of mandibular third molars is one of the most common dental procedures in oral surgery. The possible side effects and complications are many among which pain, trismus and swelling are the most common. Many attempts have been done, in order to reduce the incidence rate of these complications. The aim of the present study is to evaluate if there is a significant reduction of pain scores, trismus and swelling depending on whether sterile saline solution is used instead of water, for the irrigation of the surgical field and for drill cooling during osteotomy and tooth separation.

Methods: 22 patients have been enrolled for this protocol (11 females and 11 males), in good general health. 18 needed bilateral inferior third molars extractions, whereas 4 required just one tooth extraction. A total of 40 teeth have been removed (half using sterile saline solution and half using water), between April 2016 and May 2017. The Visual Analog Scale scores for pain referred by the patients in the 7 days following the surgery have been considered as the primary outcome of the present study, whereas the sieric concentration of the C Reactive Protein before surgery and 48 hours after surgery has been used to evalutate inflammation. Trismus and swelling have been evaluated immediately before surgery and 2 days after tooth removal. The distance from the tragus to the pogonion (the most prominent point on the chin), the distance from the tragus to the lateral canthus of the homolateral eye, the distance from the tragus to the labial commissure on the homolateral side and the distance from the gonion (the meeting point of lines tangent to the posterior margin of the ramus and to the inferior margin of the mandible) to the homolateral nasal wing have been measured in order to evaluate svelling. The maximal mouth opening (trismus) has been calculated as the distance between the incisal edge of the central upper and lower incisors.

Results: The study was conducted on a sample of 40 extractions performed in patients from 18 to 37 years of age. The VAS scores reached maximum levels two days after surgery, and then they gradually decreased, but the values have been similar in both groups. As far as swelling and trismus are concerned, there were no statistically significant differences. Serum CRP levels did not change significantly during the postoperative period. In two patients those values raised 2 days after surgery, but they returned to normal range 7 days after surgery. There were no long-term complications of the third molar extraction procedure in our series. One patient reported fever (38.5°C) on postoperative day 1. One patient experienced a lesion due to stretching of the labial commissure.

Conclusion: In conclusion, no statistically significant differences have been noticed between the two groups for all the parameters taken into consideration by the present study.

Efficacy of L-PRF plugs for post-extractive socket in reducing bleeding complications in patients under anticoagulation therapy

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Aim: The aim of this clinical study was to assess the efficacy of L-PRF as hemostatic agent, comparing the post-operative bleeding after simple tooth extraction in patients under treatment with Vitamin K Antagonists (VKAs) or Direct Oral Anticoagulants (DOACs).

Methods: Patients under oral anticoagulant therapy (VKA or DOAC) who needed single tooth extraction were enrolled in this study. Each patient underwent simple single tooth extraction with a standardized minimally traumatic technique. Anticoagulation regimen was not modified before and after extraction. All the participants were evaluated pre-operatively, during surgery, thirty minutes after surgery and seven days after surgery (suture removal). Personal data, medical history, pharmacological therapy, local periodontal and dental variables were collected at baseline. Peripheral venous blood withdrawal was performed immediately before surgery by using 9 mL plastic tubes, with no additional chemicals. Subsequently, the blood sample was centrifuged (Intralock®, Boca Raton, USA) at 2700 rpm for 18 min. All dental extractions were performed by the same surgeon (FB) with no elevation of mucoperiosteal flap and/or ostectomy, in the least invasive possible approach and with a maximum surgical time of 15 minutes. After performing the extraction, a careful alveolar curettage was performed and L-PRF plug was positioned in the alveolus as an hemostatic agent. The wound was suture with a 3-0 braided silk. Patients were then instructed on post-operative care to be observed during the 7 days following the intervention. Biological complications were registered and post-extraction bleeding was described according to Iwabuchi classification.

Results: 111 patients were enrolled (52 and 59 in VKA and DOAC group, respectively) and underwent the extraction of 111 teeth. 46 patients were female and 65 male ($77,6 \pm 10,13$ years; age range 32-96). No differences were demonstrated between the two groups in terms of age (T-test for unpaired data; $p=0,405$) and gender (Fisher exact test; $p=1$). The results of the present study did not show any statistical difference between VKAs and DOACs regarding the post-extraction bleeding complications (Fisher exact test; $p=0,801$). The distribution of bleeding events according to Iwabuchi classification

resulted homogeneous between the two groups (Chi-quadro; $p=NS$). In detail: no intra-operative bleeding occurred; 7 patients in VKA group and 8 patients in DOAC group reported a post-operative bleeding managed with a single gauze compression during the week after the extraction; 2 patients of VKA group needed more than two gauze compressions and 1 DOAC patient needed medical intervention the day of suture removal, due to the rupture of hyperplastic clot.

Conclusion: L-PRF may be use as an autogenous, safe and cheap hemostatic agent for the management of bleeding events after dental extractions. Clinicians should be aware of the hemostatic property of L-PRF that may be used routinely in case of patients under anticoagulation therapy to avoid bleeding complications. Patient education for the post-operative care of surgical site appears also strictly necessary.

Follicular cyst: minimally invasive surgery

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Aim: The follicular cyst is a disemбриogenetic lesion that originates from degeneration of the pericorony portion of the dental follicle. For this reason it is always associated with the crown of an included or erupting tooth. It is the second most common form of jaw bones' cystic pathology. Follicular cysts are frequently found in the mandibular angle in association with the inclusion of the third molar. In its initial stages it is asymptomatic and can be found only through an X-ray examination. Over time it tends to increase in size, arriving at the deformation of the bone involved, thus being able to manifest a symptomatology linked to the process of expansion and compression of the surrounding structures. When the lesion is associated with an included tooth, the therapy of choice is surgical and involves complete enucleation of the lesion and tooth. However, in the case of the possibility of save of the associated tooth it is possible to perform the marsupialization technique with a possible surgery stage.

Methods: The case report presents the clinical case of a 40-year-old male patient who presents himself to our observation complaining of algic symptoms and swelling at the level of the right mandibular angle. On clinical examination of the oral cavity it presents swelling accompanied by abscess in 4.8 site. The vitality test of the adjacent dental elements, 4.7 and 4.6 results negative. Orthopantomography and

computed tomography showed the presence of the 4.8 included with large osteolytic lesion extended in the left mandibular angle and in the mandibular ascending branch. Surgical complications of cyst's enucleation of this size are the possibility of injuring the lower alveolar nerve and the lingual nerve as well as the risk of a mandibular fracture both during surgery and in the post-operative period. Following all these evaluations, the surgical technique of marsupialization aimed to extract the included third molar is chosen. The devitalized tooth in 4.6 site is preserved while the tooth in 4.7 site is extracted. A full thickness flap is set up in correspondence with the cystic lesion. Once the cyst is visualized, a portion of the wall is removed, the cavity is emptied of the cystic content and the cyst wall is sutured with the mucous edge. In the postoperative period the patency is maintained by means of iodoformic gauze positioned in the surgical cavity for a few weeks and periodically replaced. The dental element is tractioned more coronally and reached the right position it is extracted. The cyst will heal spontaneously after several months.

Results: At 1 month follow-up, an excellent recovery of the intervention area is clinically evident, absence of symptoms, no hyposensitivity of the lingual nerve and of the lower alveolar nerve. In the follow-ups after 6 months, 12 months and 18 months after the surgery, the OPTs show excellent bone healing.

Conclusions: The surgical technique of marsupialization was a minimally invasive procedure in the presence of large cystic neoformations affecting the maxillary bones, in order to reduce the post-operative risk of mandibular fracture and to preserve noble anatomical structures that are in close relationship with the cystic lesion.

Surgical management of an impacted mandibular third molar germectomy: case report

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Aim: Introduced in clinical practice around 1950 by Andersen, germectomy is a surgical method that involves the removal of mandibular third molar in its early development stage when it has not yet contracted with the adjacent anatomical structures. It's a surgical practice useful to prevent pathologies such as pericoronitis, periodontitis, second molars tooth-crown resorption, pain, cysts or odontogenic tumors, primary or secondary crowding of the

dentition. The purpose of this clinical study is to document the case of a mandibular left third molar germectomy in a 16 years-old female patient.

Methods: The patient (good general health) was sent to the Dentistry Department of San Raffaele Hospital by her trusted dentist for a specialist orthodontic visit in which a 1st level (OPT) and a 2nd level (CBCT) radiographic examination were prescribed. The X-rays revealed the presence of an impacted mandibular third molar in its early development stages. Therefore, based on a joint surgical and orthodontic evaluation, the surgical extraction of the germ was decided to optimize orthodontic treatment.

Results: The surgical treatment was performed under local anesthesia. A full-thickness flap including mucosa, submucosal connective tissue and periosteum was raised from the distal side of second lower molar until mesial portion of first lower molar. The interdental papilla, separated from the flap, remains attached to the periosteum. An osteotomy was then performed with rotatory device to expose the whole crown of the germ. The tooth was separated by a Lindemann bur connected on a straight handpiece. The separation is completed by a lever. In addition to the two fragments, the entire follicular sac is removed. Subsequently, an accurate revision of the cavity was performed using a bone curette. Eventually the flap was sutured with 4/0 absorbable thread, after filling the cavity with a fibrin sponge. Clinical checks at 1 and 2 weeks were made in which a good healing of soft tissues was observed. At 3 months follow-up, the radiographic examinations revealed an adequate bone healing.

Conclusion: In general, the avulsion of the germs of the third molars must be much earlier the more they constitute an impediment to the orthodontic action of a certain treatment. This case report confirmed that based on clinical and radiographic examination, following a scrupulous joint orthodontic-surgical analysis, the early surgical management of impacted third molars is a valuable aid for the resolution of lack of space and of dental-alveolar discrepancy.

Effects of titanium and peek surface's treatments on eukaryotic cells adhesion and proliferation

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Aim: The present study is focused on evaluating the effects of physical and chemical modification procedures on two different biomaterials surfaces, PEEK and titanium. The purpose is to analyze the effects on roughness and wettability after treating

these materials with sandblasting (to increase roughness), plasma cleaning (to increase wettability) and laser micropatterning. Then the adhesion and the proliferation of cell lines and bacterial strains (hDPSCs, MG63, NIH-3T3 and *Staphylococcus aureus*) on these materials were evaluated.

Methods: Samples consist in disks with 8 mm of diameter and 4 mm of height. Aluminium oxide powder (125µm) was used for the procedure of sandblasting; plasma cleaning process was performed with a PDC-32G plasma cleaner at low power (6.8W) for 5 minutes. The laser modification was performed by Geass s.r.l.. Surface roughness and wettability were measured with profilometry and contact angle analyses, also the presence of external contaminations was tested with Scanning Electron Microscopy coupled with Energy Dispersive Spectroscopy. The analyzed cell lines are MG63 (human osteosarcoma cells), NIH-3T3 (mouse embryonic fibroblast cells), hDPSCs (human Dental Pulp Stem Cells) and the bacterial strain *Staphylococcus aureus*. Cell adhesion and proliferation were evaluated with the Alamar Blue assay at the day 1, 3, 6 and 9 from incubation. The specimens were also analyzed with SEM. MTT assay was used to test the metabolic activity of the *Staphylococcus aureus* biofilm on the material surfaces after 1 day of incubation.

Results: Sandblasting and plasma cleaning are both effective treatments to improve PEEK and titanium roughness and wettability. No external contamination occurs during all procedures. All of the surfaces analyzed showed biocompatibility towards cell lines used for the in vitro studies. For the MG63 and NIH-3T3 adhesion at day 1, sandblasted-plasma treated PEEK seems to be the best performing material, no differences were observed for hDPSCs. A better proliferation of NIH-3T3 was observed on sandblasted and sandblasted-plasma treated titanium, and a plateau reached from day 6 to day 9 was observed for all the surfaces. Regarding MG63 proliferation, a linear growth was observed for all the specimens, with a higher rate on sandblasted and plasma treated titanium. The hDPSCs showed no differences among the surfaces till day 6; from day 6 to day 9 a slowdown of proliferation was observed for both laser-treated titanium and laser treated-plasma treated titanium. The analysis of the metabolic activity of the bacterial biofilm showed no significant differences between all the materials, however a lower optical density was quantified for lasertreated and plasma-treated titanium.

Conclusion: The materials and the surface treatments tested in this study show similar properties in terms of cell adhesion and proliferation, and of biofilm formation. Further studies are necessary to clarify if which of these materials and treatments is able to induce a differentiation of hDPSCs, and the mineral matrix deposition from the osteoblasts. Another

critical issue for the future is the investigation of the adhesion of bacteria involved in the development of the peri-implantitis.

Application of L-PRF for socket preservation of an anterior fractured tooth in a young patient: a case report

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Aim: In order to preserve soft and hard tissue following dental extraction, several socket preservation techniques have been proposed. Indeed, especially in aesthetic areas, successful prosthetic-implant rehabilitations are no more based only on function stability of the prosthesis, it is fundamental to achieve the best white and pink aesthetic. Among several proposed graft materials, lately, autologous platelet concentrates (APC) have been applied in dentistry for tissue regeneration due to their capability to release supraphysiological doses of autologous growth factors. Among APC, Leukocyte and platelet-rich fibrin (L-PRF) possess excellent physical stability, advantageous for its application in post-extractive socket. The aim of this study is to present a case of socket preservation achieved by mean of L-PRF, and successive implant placement in the aesthetic area of a young patient.

Methods: We report the case of a woman, who was referred to the Department of Surgical, Oncological and Oral Sciences of University of Palermo due to a suspicious fracture of the upper right central incisor.

Results: A 48 year-old female presented to our attention with a suspected fracture of the upper right central incisor. Anamnestically, the patient reported no health concern and no consumption of tobacco or high consumption of alcohol. The patient presented an orthodontic splint of upper anterior teeth, placed by a colleague to avoid tooth crown loss. Clinical and radiological examination confirmed the tooth fracture of the 1.1. After signed informed consent, we performed the extraction of 1.1 and applied L-PRF clots, until the post extractive socket was completely filled. The tooth crown was adapted on the previous orthodontic splint. Post-surgical antiseptic therapy has been prescribed to the patient. After 3 follow-up months, the patient performed a CT scan. The clinical-radiological evaluations showed the presence of

adequate and ample bone; so the implant placement was planned and performed. During the follow-up period the patient had no complications, 3 months after surgical procedures, the implant was successfully loaded. At the latest follow-up, the clinical examination showed a good pink and white aesthetics.

Conclusion: L-PRF is purely autologous, inexpensive to harvest and easy to prepare. Although all the limitations of a single case-report, the use of L-PRF as a filling material for socket preservation seems promising in order to maintain an adequate volume of soft and hard tissues in order to obtain aesthetic rehabilitations.

Hypercementosis or cementoblastoma? An updated analysis of 790 cases in Abruzzo, Italy

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Aim: Cementoblastoma is an odontogenic benign tumour, characterized by the proliferation of functional cementoblasts that form a large mass of cementum or cementum-like tissue on the root of a vital tooth. This tumor consists of a rounded or nodular mass, attached to one or more tooth roots, criterion which differentiates it from an osteoblastoma (WHO, 2005). Hypercementosis is a non-neoplastic condition in which excessive cementum is deposited in continuation with the physiological radicular cementum. Apart from the idiopathic nature of hypercementosis, this condition is associated with several local and systemic factors. Although hypercementosis and cementoblastoma are typical conditions with distinct clinical evolution, atypical cases may challenge their diagnosis. Cementoblastoma is a neoplasm with unlimited growth potential, so the usual treatment is complete surgical resection, whereas conservative treatment is recommended for hypercementosis. The purpose of this study is to analyse the occurrence of this condition, its location and distribution between age and sex groups in a sample population in Abruzzo, Italy.

Methods: An orthopantomography analysis of 790 cases was performed. All radiographs with radiopaque areas contiguous with roots of vital teeth were considered positive for the inclusion criteria. Samples were divided by age, sex, location groups in order to assess the incidence rate of this disorder.

Results: Among the analyzed radiographs, 11 cases out of 790 showed radiopaque regions related to vital roots, representing 1,4% of the whole relevant population. In our sample, 45,5% of the patients presenting this condition were males while 54,5%

were female. 27% of the findings belonged to patients aged between 20 and 30 years old; 27% of the positive patients were aged between 30 and 40 years old; 18% belonged to patients aged between 40 and 50 years old; 9% of the findings belonged to patients aged between 70 and 80 years old; 9% of the positive patients were aged between 80 and 90 years old; finally, 9% belonged to patients aged 90 years and over. With regard to the status analysed, 46% of the findings were associated with first molars; 27% were connected to II premolars; 18% were related to first premolars and 9% to the canine. No lesions were found in the upper jaws or related to deciduous teeth. This radiographic sign was an occasional finding for all the positive patients.

Conclusion: Results are in accordance with literature, revealing that this kind of condition is rare and it is more frequently related to the roots of lower first molars. The prevalence of this finding is equally distributed between males and females. More than 50% of the total radiographic findings have been found in young patients aged between the second and third decades, and the prevalence decreases with increasing age. No patients came to our attention complaining about swelling, pain or neurological signs. This leads diagnostic hypothesis in most cases towards hypercementosis, which is totally asymptomatic and does not require any treatment. However problems may arise when endodontic treatment or extraction of the affected teeth are necessary. Luckily patients did not require any of these therapies at the present time. Therefore, every subject has now been included in a follow-up program scheduled as one-year endoral radiography, barring any complications.

Ameloblastoma or follicular cyst due to the presence of a third molar included? When the biopsy denies the radiographic hypothesis: a retrospective study

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Aim: Ameloblastoma is a benign tumor that, even if widely known, still today presents problems concerning its nosological and etiopathogenetical characteristics and differential diagnosis. Regarding its epidemiology, however, it is well known with a distinctive onset prevalence in the mandibular angle and within the first 3 decades of life. Due to this frequent localization the formulation of a differential diagnosis with frequent pathologies located in the same region, such as follicular and germinal cysts and keratocyst, is needed. In addition an impacted

third molar with cystic lesion represents a challenge for clinicians in the development of a differential diagnosis. The aim of this retrospective radiological study was to evaluate the agreement between presuntive and real diagnosis of ameloblastoma or follicular cyst due to the presence of an impacted mandibular third molar on radiography.

Methods: This retrospective study included one hundred and twenty-six images {74 males and 52 females; mean age: 45.24 ± 12.86 (range: 18–70)} from the radiographic archive of the Department of Oral Surgery of the University of Naples Federico II that met the following inclusion criteria: a good quality of the orthopantomography images (clear, well defined, without any artifacts and interference); impacted third molar with cystic lesion; presuntive diagnosis of follicular cyst; absence of root resorption of the adjacent teeth, availability of histological exam. The concordance between presuntive diagnosis on radiography and histological exam was established.

Results: One hundred and twenty-six images, out of 250 images, were selected, since they met inclusion criteria, among those from 2012 to 2019. According to the histological exam, 69 (54,7%) were confirmed as follicular cyst but 37 (29,4%) resulted as keratocyst while 20 (15,9%) as unicystic ameloblastoma.

Conclusion: One of the hardest issues in the differential diagnosis is the recurring presence of an included and deeply displaced third molar in the region of the lesion that could lead to a misdiagnosis of follicular cyst. The differential diagnosis is quite simple when pathognomonic signs are present, such as root absorption of the affected dental elements. Nevertheless this does not resolve the problem of the differential diagnosis between ameloblastoma and keratocystic tumor. A presurgical biopsy is crucial since it gives the only essential information regarding the nature of the wound allowing the adequate diagnostic-therapeutic approach to the biological "local development" behavior of the wound.

Conservative approach to osteoradionecrosis of the jaws: case report

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Aim: Osteoradionecrosis of the jaw causes numerous aesthetic and functional deficiencies that severely compromise the patient's quality of life. Cases are often difficult to treat due to associated co-morbidities, secondary fibrosis to radiant therapy and reduced

vascularization. When necessary a free tissue flap is made, which in the event of failure, would lead to more invasive surgical procedures such as important bone grafts or segmental mandibular resections, followed by reconstructions using titanium plates. The patient, subject of this study, is a 72 years old, cardiopathic, with a previous myocardial infarction in 2009, operated several times over the years (98-03-08-15) for the removal of a lingual squamous carcinoma, with a single course of radiotherapy in August 2015. The patient came to our clinical observation with bone exposure in the fourth quadrant, suspected osteolytic lesion in correspondence of 37, marked alveolar symptomatology and numerous dental elements to extract. The aim of this study is to demonstrate, a lower probability of postextractive osteoradionecrosis and an improvement of the lesion's condition already present through exodontic surgery sessions and toilet of the osteonecrotic lesion, made possible by oxygen therapy sessions (HBOT), specific antibiotic therapy and systematic use of chlorhexidine.

Methods: The 72-year-old patient with a history of heart disease and prior tongue cancer was sent to the Department of Oral Medicine and Clinical of the "A.O.U Federico II of Naples" to perform multiple dental extractions under local anesthesia. The therapeutic protocol, aimed to decrease the probability of incurring osteoradionecrosis and at the same time improving the pathology already set, provided as first step 10 sessions of hyperbaric oxygen therapy (HBOT) before tooth extraction and 10 HBOT after, in combination with intravenous antibiotic therapy (ceftriaxone disodium 2g) on the day of extraction and intramuscular 1g the following days until the wound's complete re-epithelization, the use of a mouthwash with chlorhexidine dihydrochloride at 0.2% per fifteen days four times a day. The surgery was performed in the least traumatic way possible, in a sterile environment, after the infiltration of local anesthesia we made dislocation, tooth avulsion and a careful review of the residual cavity, removing of bone sequestrums already formed and finally we sutured and checked the hemostasis. We performed several clinical checks one week, 15 days and one month after the tooth extractions. Further a radiographic check one, three and six months after the surgery was made.

Results: Despite a residual area of bone exposure, much smaller in size, the patient's post-operative recovery was excellent with good functional rehabilitation and a decrease in pain symptoms.

Conclusions: It is important to have a deep knowledge of the clinical, radiographic and histopathological characteristics of osteoradionecrosis of the jaw in order to make a rapid and accurate diagnosis and to overcome possible diagnostic dilemmas. The leading of Patient's therapy has proven to be a safe and reliable option for resolving the case.



Impacted third molars and postoperative complications: systematic review of literature

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Aim: The aim of this study was to realize a Systematic Review to evaluate the type and incidence of post-operative complications associated to impacted third molars which required avulsion surgery. Furthermore, the possible factors that can affect post-operative complications have also been examined.

Methods: The Systematic Review was performed following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis) principles and the research purpose was achieved using the PICO (population, intervention, comparison, outcome) criteria. The search for identifying relevant studies was conducted on PubMed using the Medical Subject Headings search terms "complications", "sequelae", "extraction", "removal", "impacted", "third molars", "wisdom tooth", "postoperative", "surgery". Eleven studies were selected out of 2268 according to inclusion and exclusion criteria. Only two of these studies were retrospective, the others were prospective. Only one of them dealt with maxillary third molars and so, in this case, the lack of similar studies prevented comparison of data. For each study, variables such as characteristics of the third molars, surgical technique and characteristics of the patients were evaluated.

Results: The selected studies showed a total of 2560 patients, 2896 impacted third molars and 742 post-operative complications. Therefore, the overall complication rate calculated on the total number of wisdom teeth was 25,62%. Particularly, the ten studies dealing with only impacted mandibular third molars showed a total of 2454 patients and 2692 impacted wisdom teeth. So, in this case, the post-operative complication rate calculated only on the impacted mandibular third molars was 27,22% consisting of alveolar osteitis (6%), severe pain (4,94%), trismus (4,68%), bleeding (3,7%), infection (3,1%), bad taste (2,22%), edema (1,34%), paresthesia of the inferior alveolar nerve (0,97%), paresthesia of lingual nerve (0,3%) and root fracture (0,22%). These values agree with the range reduced from the literature that is from 2.6% to 30.9%.

Conclusion: The results suggest that postoperative complications of impacted third molars can be several. Furthermore, the numerous factors that can contribute to the onset of these complications are:

patient's age, sex and health; characteristics of the dental element and its relationships with anatomical structures, its angulation (Winter classification), its degree of inclusion (Pell&Gregory classification); operator's experience, surgical technique, indication to the extraction, duration and degree of difficulty of the intervention.

Oral surgery patients: experimental study on a screening test by modified dental anxiety scale for indication to conscious sedation

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Aim: Oral surgeons need to assess preliminary patients' dental anxiety to prevent intra-operative emergencies by a careful planning of a conscious sedation procedure. Among all tools described in literature, Modified Dental Anxiety Scale has been translated and validated in over 10 countries but, despite its popularity, it is essentially related to a subjective psychometric test. In fact, patients by their own declarations may both overestimate or underestimate their dental anxiety level. Authors studied this scale as a screening test to carefully evaluate anxious patients that may require conscious sedation before oral surgical procedures.

Methods: Authors observed retrospectively 40 not psychiatric patients that underwent molar extractions at the Complex Operating Unit of Odontostomatology, University of Bari Aldo Moro during 2019, to create a Modified Dental Anxiety Scale's Receiver Operating Characteristic curve. Each patient's score (range 5 – 25 points; taken 1 hour before surgery) has been matched to the anxiety level assessed at dental chair 20 minutes later of pre-operative anxiolysis by oral chlordemethyldiazepam. "Moderate or severe" dental anxiety was diagnosed for patients reporting persistent anxiety and received additional conscious sedation via intravenous diazepam before extractions (2 mg at the first infusion, followed by further 1 mg every 2 minutes, until reaching the top of individual tranquility or the maximum limit of 10 mg), while "not- or low" dental anxiety was diagnosed for patients reporting no residual anxiety, and receiving no additional sedation.

Results: 24 men and 16 women (59.92 ± 19.54 years old) joined this study: 6 American Society of Anesthesiologists Physical Status class 1, 14 class 2 and 20 class 3. According to Modified Dental Anxiety Scale,

25 had "not- or low" anxiety (range 5-14 points), 14 had moderate anxiety (range 15-18 points) and only 1 had severe anxiety (phobia; range 19-25 points), while clinical evaluation found 21 "moderate or severe" anxious and 19 "not- or low" anxious patients ($P = .607$). The Modified Dental Anxiety Scale's resulting Receiver Operating Characteristic curve showed an Area Under Curve of 0.785 ± 0.057 ($P < .001$) meaning for a moderate accuracy of the test, sensitivity of 76.3%, specificity of 73.7%, positive predictive value of 85.3%, negative predictive value 60.9%. Estimated optimal cut-points between not- or low anxiety (not requiring conscious sedation) and moderate anxiety (requiring conscious sedation) was 7 points, instead of 14 as already described in literature.

Conclusion: Authors found that Modified Dental Anxiety Scale could be employed as moderately accurate screening test to assess the true necessity of conscious sedation in patients eligible for oral surgical procedures. Furthermore, according to the current study results, authors suggest to set to 7 the upper limit of "not- or low anxiety" range of the scale.

Surgical management of the partially impacted mandibular third molar: a split-mouth healing comparison between coronectomy and extraction in four cases

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Aim: The extraction of the mandibular third molar is the traditional treatment option in case of dysodontiasis, but it is not always free from incidents and problems. The coronectomy of the mandibular third molar, performed according to the guidelines, aims to prevent the inferior alveolar nerve from a realistic damage, pre-operatively calculated on X-ray exams. The literature reports similar entity of complications after coronectomy in comparison to the extraction procedures, making the first a simple and validated alternative in risky situations. To better understand the real difference between these procedures in terms of healing in time, four split-mouth cases of coronectomy versus extraction were clinically and radiographically monitored.

Methods: According to an X-ray assessment on OPT and CBCT, four female patients (mean age: 25 years) underwent coronectomy of the partially impacted lower third molar on one side and surgical extraction on the other side. Only in one case, the surgery was performed bilaterally at the same time, in general anesthesia. A post-

operative complete soft tissue closure was obtained in every case and the same post-operative prescriptions and cautions were adopted for coronectomies and extractions. All patients were clinically assessed at 1 week, 1, 3, 6, 12 months and annually after the surgical intervention, with a periodontal probing evaluation distal to the second molar starting in the third post-operative month. A periapical X-ray was taken at 1, 3, 6, 12 months, and annually thereafter. The average follow-up was 31.2 months.

Results: No complications were reported by the patients and no differences were noted between the two sides in terms of post-operative discomfort, with a good healing of soft tissues. The distal periodontal probing was always <4 mm distal to the second molar. A coronal migration of the roots followed by a complete bone impaction in all cases of coronectomy was recorded. As far as the level of bone it concerns distal to the second molar in respect to the enamel-cementum junction no differences were detected.

Conclusions: This case series further confirms the coronectomy as an alternative to lower third molar extraction in risky situations. More cases and longer follow up with this format of investigation will definitively demonstrate the usefulness of this procedure, completely eliminating the neurological problems associated with the mandibular third molar surgery.

Repair of oroantral fistula with autogenous bone block and palatal flap: a case report

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Aim: Oroantral communication (OAC) is a space created between the maxillary sinus and the oral cavity, which, if not treated, will progress to oroantral fistula (OAF) or chronic sinus disease. It occurs most commonly during extraction of upper molar and premolar teeth (48%). The major reason is the anatomic proximity or projection of the roots within the maxillary sinus. Other causes of OAC/OAF include tuberosity fracture, dentoalveolar/periapical infections of molars, implant dislodgement into maxillary sinus, trauma (7.5%), presence of maxillary cysts or tumors (18.5%), osteoradionecrosis, flap necrosis, dehiscence following implant failure and sometimes as a complication of the Caldwell-Luc procedure. Decision on how to treat an OAC should be based on the size of communication, time of diagnosis, and presence of an infection. Furthermore, the selection of treatment strategy is influenced by the amount and condition of tissue available for repair. Many techniques to close OAC/



OAF have been described in the literature, such as buccal flap, palatal flap, buccal fat pad and relate modifications. The aim of the present case report is to describe the treatment of OAF with autogenous bone block and palatal flap.

Methods: a 33-year old systematically healthy man was referred to the Department of Oral Surgery of the University of Naples Federico II, with the complain of leakage of liquids through his nose while drinking, otherwise, he was asymptomatic. He underwent extraction of the right first molar about 6 months before elsewhere. On clinical examination, there were no signs and symptoms suggestive of acute maxillary sinusitis. Intraorally, a fistulous opening round in shape with normal surrounding mucosa and a bony defect was seen along the maxillary alveus molar region. Valsalva test was positive. Radiographic examination (Ortopantography and CBCT) confirmed the bony defect and the absence of acute and chronic sinusitis. The intervention was performed under general anesthesia: the fistulous tract was excised in circumscribed manner along the defect, next the cortical bone graft was harvested from the mandibular ramus of size matching the defect. The graft was strictly fit into the defect and did not require screw fixation. Then, the palatal flap was raised and mobilized to cover the graft and sutured. The patient was put on nasogastric tube feed till three days. The first follow up was planned after 7 days. A cold and soft diet was recommended for 2 weeks and sutures were removed 14 days after surgical procedure.

Results: The patient was observed for signs of infection, dehiscence and necrosis. The healing process and the post-operative recovery were uneventful. The patient was clinically evaluated: intraorally no sign of fistula was detected and the patient did not refer the leakage of liquids through his nose. The patient was radiographically (OPG and CBCT) examined just after 3 months showing bone graft well in place and the absence of any sign of infection in the sinus. The patient up now is satisfied from functional point of view.

Conclusion: autogenous bone block and palatal flap has been shown to be effective in the repair of OAF. The graft has been adequate to cover the defect and palatal flap served as an additional support in minimizing any complications related to the graft.

L-PRF in the intraoperative management of post-extractive socket in patients with comorbidities: a case report

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Aim: The aim of this paper is to evaluate clinical outcomes following dental extraction in patients with previous intake of bisphosphonates.

Methods: 55-year-old female patient reports in medical history diagnosis of multiple sclerosis in therapy until 2013 with corticosteroids and INF- β (then replaced with natalizumab), GvHD (clinically investigated at the time of the study) and bone marrow transplantation for non-Hodgkin's lymphoma (Sezary's syndrome). She also reports osteoporosis, familiarity with rheumatoid arthritis, previous intake of risedronate and subsequent 4 infusion cycles of nerhydrionate for the treatment of femoral osteonecrosis (2018). She came to our attention asking for aesthetic functional rehabilitation of the oral cavity. Intraoral examination revealed secondary caries affecting the disto-palatal furcation of 27, previously restored using a metal-ceramic crown. Due to its poor prognosis, the tooth was avulsed according to the patient. Preoperative drug treatment included: antibiotic therapy (amoxicillin 1g every 8 hours for 7 days) and mouth rinse (chlorhexidine 0.2%). A minimally invasive extraction of the element was performed, followed by a venous blood sample processed by 27x100 RPM centrifugation for 12 minutes with which it was possible to obtain 3 clots of L-PRF (Low Platelet Rich Fibrin). One of these was used as filling material for the socket, and the other two were turned into membranes and placed to cover it. A 6/0 nylon simple interrupted suture was placed, and no primary wound closure was performed. Upon discharge, the patient continues antibiotic therapy for one more week after extraction, mouth rinse (chlorhexidine 0.2%) and applications of 1% chlorhexidine gel for a further 14 days. The woman underwent follow-up visits at 1, 2 and 4 weeks. The parameters evaluated were the early wound healing score (EHS, Marini et al. 2019) for the post-extraction site and the VAS score for post-operative pain.

Results: The patient reported a VAS score of 1, confirmed by a single intake of paracetamol (1g) in the immediate post-operative period. Febrile episodes and localized cutaneous rash in the limbs were found to be compatible with drug-induced hypersensitivity. This resulted in the suspension of the antibiotic treatment. The parameters included in the EHS were recorded by observation of the photos taken during the check-ups. The score amounted to 2 and 7 at one week and two weeks respectively.

Conclusion: The use of L-PRF is an easily replicable, minimally invasive and relatively low-cost method. The placement of clots and membranes without primary wound closure of the flaps has allowed a rapid re-epithelialization of the socket with an overall improvement in soft tissue quality. Whereas

the purpose of this technique is not to maintain bone volume, the use of L-PRF has been shown to be effective in protecting hard tissue in the early stages of healing. This technique can be recommended especially in the jaw where a primary wound closure - usually recommended in patients with increased risk of medical-related osteonecrosis of the jaw - allows to achieve additional advantages such as a less invasive procedure and fornix depth preservation.

Immediate post extractive implant-prosthetic rehabilitation after surgical extraction of an impacted maxillary canine: case report

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Aim: The purpose of the present case report is to document a post-extraction implant-prosthetic rehabilitation in position 1.3 after the extraction of the corresponding impacted element.

Methods: The patient (female, 53 years old, good general health) was sent to the Dentistry department of San Raffaele hospital by her trusted dentist for the presence of an impacted maxillary canine. After a careful oral examination, the patient was sent to the Oral Hygiene Department for professional cleaning, and then a joint control visit was established with orthodontics specialists. Additionally, a second level radiographic investigation (CBCT) was prescribed to evaluate the element's inclusion degree, its palatal and paraortological position (analysis of the major axis compared to the physiological one) in addition to the morphology of the root. Based on these radiographic and orthodontic considerations, the patient was treated with avulsion of the tooth and contextual positioning of an implant in the same site with immediate loading.

Results: Under loco-regional anesthesia, an intrasulcular incision and a full thickness mucoperiosteal flap were set up to preserve the interdental papillae and the periosteal vascular-nervous structures, minimizing any postoperative pain and swellings. The corticotomy was performed through piezoelectric instrument to create a direct access to the element, allowing preservation of soft tissues, reduction overheating and excellent vision of the surgical field thanks to the cavitation effect and micrometric cutting. Once the element was exposed, osteotomy and subsequently the avulsion of

the individual fragments were made. Using the drill kit and the parallelism pin, the implant site has been prepared and axially controlled to let the positioning of the implant fixture (K 3.3x13mm Winsix) at 30N of torque. Finally, the flap was transposed and sutured with transpapillary points with 4/0 absorbable thread, after filling the created cavity with a fibrin sponge to ensure correct bone regeneration. The risk of any occlusal overload on the implant was considered in term of prosthetic-implant rehabilitation and it was deemed appropriate to guarantee the patient an occlusion with group function. Clinical checks were carried out at 1 and 2 weeks and the control of healing was good. Three months after the positioning of the temporary crown, which allowed the correct conditioning of the tissues and the formation of a correct parabola, the precision impressions were carried out to deliver the final prosthetic crown.

Conclusions: Through careful analysis of the case and correct management of soft and hard tissues, it was possible to meet the patient's functional and aesthetic needs, in the least possible time, contrasting the process of resorption of the alveolar bone following the tooth extraction, guaranteeing the same high survival rates as the implants loaded in a deferred way (from 92.7 to 98%). The present case report has therefore confirmed that implant-prosthetic therapy represents a valid therapeutic alternative when the recovery of an impacted element is impossible, offering the immediacy of the results as the main advantage.

Blood components (L-PRF) in oral surgery: application in three different clinical cases

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Aim: During the last decades, research in the oral surgery field moved towards the development of less invasive procedures and treatments that reduce morbidity, enhance functional recovery and lead to a better tissue and bone regeneration. Platelet derivatives are an innovative tool now widely used in dentistry and beyond, to achieve a better and faster bone regeneration with shorter healing time regarding the soft tissue, and few side effects associated with the surgical trauma. The aim of this paper is to fully understand the potential of APC (autologous platelet concentrate), in oral surgery, which is still a matter of debate.

Methods: Manuscripts were searched to make an overview about the various applications of the platelet derivatives in the dental field. Moreover,



three clinical cases have been selected among those managed at the Oral-Maxillofacial Surgery Unit, at the Policlinico di Modena, Italy. Case 1: third molar impaction. The surgical extraction of tooth 3.8 has been performed and the postextraction site was filled with L-PRF membranes. Case 2: osteolytic lesion at the pre-maxilla. After surgical removal of the cyst, the residual void has been filled with L-PRF mixed with particulated bovine deproteinized bone and the surface of the lesion covered with L-PRF membranes. Case 3: medical-related osteonecrosis of the lower jaw. After the surgical debridement of the necrotic bone, L-PRF has been used to fill of the residual bone defect and to allow for ideal closure of the soft tissue.

Results: Case 1: the post-operative sequelae at the first week post surgery has been very low in terms of pain, swelling and trismus. We did not observe any functional limitation. The surgical wound was still healing. At 6 months we found a good mucous seal, probing depth 3 mm. Intraoral radiographic examination by grayscale revealed a significant radiographic osseous regeneration.

Case 2: the patient did not complain any pain nor swelling during the first week post surgery. At the 7th day follow up there were no signs of infection, untoward reaction, wound dehiscence, and soft tissues were correctly healing. The CBCT performed at 6 months showed progressive radiographic osseous regeneration, a satisfying bone density and a significant thickness in the newborn cortical bone. Case 3: at the 7th day post surgery we found quick soft tissue healing with a good mucous seal, no signs of infection or swelling. The mucous seal was maintained at 6 months post surgery and the CBCT showed a newborn bone tissue towards maturation within a thick completely regenerated cortical bone.

Conclusions: Within the limits of this presentation of only three clinical cases we can confirm the versatility of L-PRF production and application in oral surgery. The post-operative sequelae have been very low in terms of incidence and severity. As a matter of fact, we noted mild post-operative swelling and mild pain. At 6 months re-evaluation, the soft tissue healing was perfectly achieved and upon radiographic examination, bone regeneration could be appreciated. These data goes along with those already existing in the scientific literature. However, more standardization and more prospective studies are needed in order to provide the practitioner with specific guide-lines for the application of L-PRF in the dental field.

Multidisciplinary treatment approach of an odontogenic cyst involving maxillary sinus: a case report

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Aim: Cysts could be defined as benign osteolytic lesions, liquid content, coated with epithelium and a connective capsule. The radicular inflammatory cyst represents 50% of all odontogenic cystic lesions and it could have several causes, including failure of previous endodontic therapy. The aim of this case report is to show a multidisciplinary approach to an odontogenic radicular inflammatory cyst involving the maxillary sinus and to highlight the importance of a correct early diagnosis.

Methods: In April 2019, a forty-three-year-old patient came to the observation of a first dentist, complaining of an algic symptomatology at the level of 2.6, devitalized 10 years earlier: she was prescribed anti-inflammatory therapy and then, due to the appearance of swelling and increased pain, also an antibiotic therapy. The second dentist, from whom the patient went in July for the symptoms' persistence, detecting the presence of suppuration during compression of the mucous membrane to element 2.6, decided to send the patient to an otolaryngologist. The specialist prescribed an Orthopantomography and a CBCT and, in order to reduce intense pain and significant swelling, a drug therapy with antibiotics and cortisone. Given the persistence of symptoms, in September the patient went to San Raffaele Hospital where, through the Orthopantomography and the CBCT previously prescribed, a diagnosis of radicular cyst associated with element 2.6, occupying the entire left maxillary sinus, was performed. To carry out the enucleation of the cyst, after the avulsion of 2.6 in another location, due to the constant severe pain reported by the patient, a FESS (Functional Endoscopic Sinus Surgery) intervention was scheduled at the end of the month.

Results: After 2.6 avulsion, the patient immediately found great pain relief. Indeed, the intervention resulted in the release of a large amount of purulent material from the antral cavity with a consequent strong reduction of the endocystic pressure responsible for severe pain and persistent swelling since July, as reported by the patient. The FESS allowed the cystic wall to be fully enucleated, definitively stopping osteoclastic activity in favor of osteoblastic one, that has led to excellent healing of the lesion, appreciable by the Orthopantomography performed three months after surgical procedure.

Conclusions: The lack of early diagnosis prevented

timely treatment of the osteolytic lesion, favoring its progression. The patient therefore suffered various consequences, both from the symptomatological and the pharmacological point of view, with persistent pain and swelling for about three months and an overload of treatments that guaranteed exclusively temporary relief without solving the problem. The consequence was that the expansion of the lesion required a double surgery in order to remove it. In conclusion, it is necessary to underline the importance both of a correct diagnosis, in order to establish an adequate therapeutic plan, and of the collaboration between the departments of dentistry and otolaryngology, for the resolution of a dental pathology whose expansion extended in a district no longer only of dental, but also otolaryngological competence.

Oral focal mucinosis: a case report

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Aim: The aim of this report is to describe the clinical and histological feature and subsequent surgical treatment of a case of Oral Focal Mucinosis in a 17-year old female patient with spastic quadriplegia subsequent to infantile cerebral palsy, epilepsy in drug treatment and percutaneous endoscopic gastrostomy (PEG) without any oral nutrition.

Methods: The patient was visited at the Dental Clinic of IRCCS Burlo Garofalo for painless and gradually increasing bilateral swelling in both retromolar mandibular regions. The intraoral examination of the maxillary and mandibular arch revealed a poor oral hygiene, complete permanent dentition except for the absence of the third molars, calculus deposits and diffuse gingival hyperplasia. Any previous trauma or infection in the areas of the swelling lesions was not referred. Two tumor-like masses were identified in the buccal retromolar region gingiva of both the right and left mandibula. The maximum diameter of each lesion was 3x4 cm. The volume of both swelling lesions was so large to impede the complete closure of the oral cavity and make swallowing difficult. The bilateral retromolar masses had the same colour of the surrounding oral mucosa. Radiographic examination was impossible due to absence of cooperation from the patient. At first, the clinical diagnostic hypothesis was gingival hyperplasia due to epilepsy's drug treatment. The only possible therapy was surgical removal. The two lesions were completely removed through surgical excision under general anaesthesia.

Results: Following histopathological analysis the two oral lesions were diagnosed as Oral Focal Mucinosis. No

postoperative relapses were detected at follow-ups.

Conclusion: Oral Focal Mucinosis is a rare soft tissue lesion that represents the oral analogue of the Cutaneous Focal Mucinosis. Clinically, Oral Focal Mucinosis is most frequently found on the gingiva as a painless, sessile or pedunculate swelling lesion. The histological aspect is characterized by a localized area of myxomatous connective tissue containing mucinous material surrounded by relatively dense collagenous connective tissues. Oral Focal Mucinosis occurs predominantly in adults during the fourth and fifth decade of life, although it has been rarely reported in children and adolescents. The diagnosis is based on histopathological and immunohistochemical analyses. The etiological origin of Oral Focal Mucinosis remains unclear. The aspect is similar to other soft tissue lesions, like fibroma, pyogenic granuloma, mixoma, mucocele or minor salivary gland tumors that must be considered in the differential diagnosis. In conclusion, Oral Focal Mucinosis is not a frequent oral lesion and the histopathological and immunohistochemical analyses are pivotal in the correct diagnosis.

Digital impression scanning in Lesh-Nyhan syndrome

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Aim: The Lesh-Nyhan syndrome is a rare Xlinked recessive genetic disorder that affects male. Responsible is the inactivating mutations of the HPRT gene (hypoxanthine-guanine phospho ribosyltransferase) that causes overproduction of uric acid, gouty arthritis, neurological and behavioral disorders, choreoathetosis, spasticity and self-injury. At birth there are no signs; between 3 and 6 months, psychomotor retardation, difficulty in sitting and supporting the head, hypotonia, involuntary movements, sandy orange urine and obstruction of the urinary tract appear. Self-destructive behavior, contrary to intentions, appears and worsens with age and stress; with the dental eruption there is the risk of biting the lips, tongue and fingers until amputation. Mental retardation is mild to moderate; the progression of the symptoms is rapid and unstoppable.

Methods: To date, in situations of impossibility of managing the compulsion, the only therapy adopted is the total extraction of the dental elements and the physical restriction. A more conservative alternative is the use of protective devices but requires repeated and often difficult impression taking. A protocol for the prevention of self-injury is being tested at IRCCS Gaslini in Genoa: as soon as the diagnosis has been ascertained, the family is referred to the pediatric dental clinic where



the patient and the family are welcome, is performed the first check up with the application of ministerial protocols for hygiene and prevention of oral diseases and extra and intraoral photographic documentation is taken. Periodic check-ups are scheduled to gently get the patient used to the dentist. The digital scans of the two arches and the bite are also detected; this procedure is repeated 1 time per year until complete eruption of the permanent dentition (12-13 years). Digital copy of photographs and scans are delivered to the family.

Results: The use of the intraoral scanner has made possible to achieve the impressions of the arches guaranteeing the patient greater comfort and reducing the stress of the patient himself and the family-care giver. It facilitated and speeded up the procedure for the operator, allowing the models of the arches to be immediately available for the realization of anti-injury devices when it is impossible to manage the behavior pharmacologically (reserve impression), also allowing the creation of new devices in less time when the previous one is no longer usable due to wear, reducing the number of necessary appointments and speeding up the procedure. The technology has also made it possible to make intraoral protection devices remotely, guaranteeing an excellent level of assistance even for patients not resident in Liguria area.

Conclusion: Prevention with programming of the impression is of primary importance in order to guarantee an improvement in the quality of the life of these patients, to limit the use of dental extraction under general anesthesia, reducing the risks for the patient and the health burden for families, who can take advantage of assistance in the area of origin thanks to the use of remote digital technology.

Nonsyndromic tooth agenesis: an updated analysis of 790 cases in Abruzzo, Italy

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Aim: Tooth agenesis is one of the most common craniofacial malformation in the human, characterized by the developmental fail of one or more teeth. Tooth agenesis is caused by genetic mutations which occur during odontogenesis. Several studies discovered the genetic mutations that explain the causes of non-syndromic tooth agenesis; these have been associated with certain illnesses, because tooth development involves the interaction of several genes that modulate the mesenchymal development. Non-syndromic hypodontia is the most common form

of congenital tooth absence. The absence of third molars is the most common in the populations object of the studies. When the third molar is excluded from studies, then the reported prevalence rates for each tooth vary according to the population. Tooth agenesis may cause the affected person to have impaired masticatory function, suffer from speech alteration and develop aesthetic and psychological problems, predominantly where the anterior region is concerned. The purpose of this study is to analyse the occurrence of this condition, its location and distribution between age and sex groups in a sample population in Abruzzo, Italy.

Methods: An orthopantomography analysis of 790 cases was performed. The diagnosis of dental agenesis was based on radiographic examination; primary teeth and third molars were excluded from the evaluation. Samples were divided by age, sex, location groups in order to assess the incidence rate of this disorder.

Results: Among the analyzed radiographs, 11 cases out of 790 presented missing of one or more teeth, representing 1,4% of the whole relevant population. The 82% of the affected people had only one missing tooth, while the 18% presented more than one missing tooth. In our sample, 72,7% of the patients presenting this condition were female while 2,72% were male. The prevalence of this disorder was 1,06% for female and 0,4 for male patients. The average number of missing teeth for affected person was 1,2%. As concerns localization, 46% of missing teeth were lower second premolars; 7,6% were represented by upper second premolars; 15,4% were upper first premolars; 23% were represented by upper lateral incisors and 7,6% were lower lateral incisors.

Conclusion: The most frequently missing teeth were second lower premolars, whose percentage represented almost half of total affected teeth. The second most frequently missing teeth were lateral upper incisors followed by first upper premolars. As evinced by the results, the prevalence of tooth agenesis decreases with the increasing age. However it's necessary to consider the risk of false negatives due to the difficulty to establish if the missing tooth was an effectively agenetic tooth or if it was lost or extracted during patient's life especially in older patients with edentulous areas. In conclusion, it's important to make an early diagnosis of this disease, especially in early ages, in order to make sure to intercept the problem and formulate a proper treatment plan which includes orthodontic, gnathological, surgical and prosthetic diagnosis and treatment.

Treatment of medication-related osteonecrosis of the jaw: a case report

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Aim: During the administration of certain medicines, medication related osteonecrosis of the jaws (MRONJ) may occur. Nowadays there is a large group of drugs involved in this status, including not only the most popular bisphosphonates, but also Denosumab, Bevacizumab, Sunitinib, Everolimus and many other. Despite this, the real prevalence of this adverse event is difficult to estimate, due to lack of reports by clinicians to the relevant bodies. There are a lot of position papers about the management of MRONJ depending on the severity of the disease.

Methods: A 81-year-old man came to our attention complaining about a painful festering area on his left lower jaw. At physical examination a bone exposed area of about 1 cm and pus were discovered. During the anamnesis collection it was noticed that he took zoledronic acid intravenously administered for at least 18 months because of prostate cancer in 2014, and at the present day he is under aledronic acid therapy taken by mouth because of spread osteopenia and vertebral collapse. After radiographic examination a jagged bone sequestration region of about 2 cm and was found. The case was categorized under a Stage 2 of AAOMS (2009) classification: it includes patients with exposed and necrotic bone or a fistula that probes to bone with evidence of infection; these patients are typically symptomatic and may present with radiographic findings which are localized to the alveolar bone region. The man required a surgical treatment of the area in order to limit the infection. The patient underwent to antibiotic therapy with metronidazole 500mg tablets 2/die in association with azithromycin 250mg tablets 1/die for the first six days, then he continued metronidazole only for the last eight days.

Results: Throughout the fourth day of antibiotic therapy the surgical procedure were performed: after local anesthesia, a detailed bone debridement was conducted after sculpting a flap and using a dental piezo-electric handpiece starting with 50% power, but it was noticed no effectiveness, so the strength was carried to 100%. Bone reduction was limited until all necrotic grey bone was removed: only in that way

necrotic bone was spontaneously expelled. Finally absorbable sutures linking tightly connective tissue were done. The choice to use piezoelectric technology was made with the goal of being as gentle as possible towards local bone and the flap was minimally designed in order to achieve the most complete closure of the flap, which is an important parameter to avoid a new post-surgical exposure.

Conclusions: The man came back for checking after 3, 7, 14, 30 days: the site seems to be steady. To the

present day the plan is checking the development and rearrangement of the bone. The piezoelectric handpiece was effective only at maximum level and it was helpful using bleeding surface bone post-debridement as a intraoperative parameter with the aim of figuring out the limit of necrotic bone.

The Italian validation of the level of exposure-dental experiences questionnaire

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Aim: The purpose of this monocentric cross-sectional study was to evaluate the psychometric characteristics of the Italian version of the Level of Exposure-Dental Experiences Questionnaire (LOE-DEQ) into 23 potentially traumatic events. To evaluate the fit of the model, five hypothesis were taken in consideration: the 4 subscales would have good fit indices in the Italian sample (hypothesis 1), each subscale would be positively correlated with dental anxiety (hypothesis 2), each subscale would be positively correlated with a negative view about the dentist and dental treatment (hypothesis 3), all the correlations described in the previous hypotheses would be below 0.60 (hypothesis 4) and distressing dental treatment experiences (DDP) would have the strongest impact on high dental anxiety (hypothesis 5).

Methods: To collect data, all the patients having access to the Dental Surgery Unit of the University of Naples Federico II, if respondent to the established criteria of inclusion for the present study, were asked to participate. A total of 287 participants took part to the survey, but only 253 participants completed the LOE-DEQ constituting the final sample size. The study provided three questionnaires: the LOE-DEQ providing a score ranging from 0-8 for DBPE, 0-5 for DDP, 0-3 for ODDE and 0-7 for GTE, the Modified Dental Anxiety Scale (MDAS) and the revised version of the Dental Beliefs Survey (DBS-R). For the statistical analysis, after a preliminary handling of missing data treated through the MICE method, a total of 5 imputed datasets was created. To evaluate the model fit of the 4-factor model structure behind the LOE-DEQ were chosen the chi square/degrees of freedom (χ^2/df), the root mean square error of approximation (RMSEA), the standardized root mean square residual (SRMR), the comparative fit index (CFI) and the Tucker-Lewis index (TLI). The Cronbach's alpha index was used to evaluate the

internal consistency reliability of each scale and the Pearson's correlation index was used to establish the criterion, convergent, and discriminant validity of the LOE-DEQ relating the LOE-DEQ score with the MDAS score and the DBS-R score. The association between the LOE-DEQ subscales and high dental anxiety was analysed thanks to a binary logistic regression. Finally, estimates for both the Cronbach's alpha and Pearson's correlation coefficient were pooled using the mice R package.

Results: The original 4-factor model was confirmed by the following index: $\chi^2/df = 1.41$; CFI = 0.95; RMSEA = 0.04 (CI = 0.03 to 0.05); SRMR = 0.001; TLI = 0.94. The Cronbach's alpha ranged from 0.66 to 0.75 assessed the internal consistency reliability. The criterion validity ranged from 0.18 to 0.26 was partially confirmed. The convergent validity ranged from 0.14 to 0.42. was partially confirmed. The discriminant validity, below 0.60, was confirmed. Regarding the associations between the LOE-DEQ dimensions and high dental anxiety only DBPE and DDP were significantly associated with high dental anxiety. Considering all the variables together, only DDP proved to be associated with high dental anxiety.

Conclusions: The results obtained confirmed the validity of the original 4-factor structure and the good criterion, convergent, and discriminant validity of the LOE-DEQ in the Italian sample size. Except for the subscale GTE, the Italian version of the LOE-DEQ could be considered as a good and useful instrument for the clinical dental practice because distressing dental experiences lived within the dental setting are more predictive of high dental anxiety.

Osteoma of the jaws as first clinical sign of Gardner's syndrome: a retrospective study from two Italian centers

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Aim: Gardner's syndrome, a variant of familial adenomatous polyposis, is an autosomal dominant disease characterized by gastrointestinal polyps that develop in the colon as well as in the stomach and upper intestine (duodenum), multiple osteomas, and skin and soft tissue tumors. Polyps have a 100% risk of undergoing malignant transformation; consequently, early identification of Gardner syndrome is critical. The aim of this retrospective study is to report 19

cases of Gardner's syndrome in which the first clinical sign was osteoma of the jaws diagnosed at Complex Operating Unit of Odontostomatology of University of Bari and Dental clinic of University of Chieti from 2000 to 2020.

Methods: Ninety-four patients affected by osteomas were diagnosed and surgically treated at University of Bari and University of Chieti from 2000 to 2020. From each patient, the following data were achieved: age, sex, pathological anamnesis (occurrence of intestinal polyposis or intestinal disorders), familiarity with osteomas/polyposis. Once achieved a certain histological diagnosis of osteomas, all the affected patients underwent genetic tests in order to value the presence of APC mutation. Patients with APC mutation, subsequently, underwent total body CT, colonoscopy with histological analysis of polyp detected where appropriate, dermatologic visit. Odontostomatologic follow up of patients affected by Gardner syndrome consisted in clinical oral examination and RX OPT annually.

Results: Nineteen cases showed APC mutations, 10 males and 8 females with average of 56 yo. Rx OPT revealed 24 osteomas (9 posterior mandible, 6 anterior mandible, 6 posterior maxilla, 3 anterior maxilla). Total body CT revealed: 9 osteomas of neurocranium (1 occipital, 1 sphenoidal sinus, 2 ethmoidal cells, 2 frontal sinus, 3 maxillary sinus) and twelve osteomas of long bones (7 femur, 4 humerus, 3 tibia, 1 ulna, 1 fibula). None of the patients complained cranio-facial pain. Six patients showed facial asymmetry as a result of expansion. Colonoscopy showed polyposis in 13 patients one of whom with history of rectal adenocarcinoma. Dermatologic visit highlighted 2 epidermoid cysts and 1 desmoid cyst.

Conclusion: Considering the certain malignant transformation of polyps in Gardner's Syndrome, it is very important the odontostomatologic screening since childhood in order to early detect osteomas as first clinical sign of Gardner syndrome.

Follicular maxillary cyst associated with dental implant: a case report

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Aim: Follicular cyst is a type of odontogenic cyst, which encloses the crown of an unerupted tooth and attached to the amelocemental junction and is the second most common odontogenic cyst contributing about 16.6% to 21.3% of all odontogenic cysts. Occurrence of dentigerous cysts is usually in 3rd and

4th decade. The treatment indicated for dentigerous cysts are surgical enucleation of the cyst, along with removal of the involved tooth or the use of a marsupialization technique, which removes the cyst while preserving the developing tooth. The present case report describes the management of follicular cysts associated with dental implant in an adult male.

Methods: The patient who came to our observation was a 49-year-old man who presented the impacted left maxillary third molar associated with follicular cyst. Intraoral examination revealed absence of left maxillary third molar and an ovular swelling in vestibular fornix. Panoramic radiograph revealed that the left third maxillary molar was unerupted in mesio-version and associated with an osteolytic lesion, surrounded by a sclerotic border, involving the crown of the aforementioned third molar, the first upper molar with a resorption of the mesial root's third apical and the mesial surface of implant fixture in 2.4 site. Considered radiological characteristics, we decided to proceed with the extraction of the left maxillary third molar and with the excision of the associated neoformation. We decided to evaluate the condition of implant fixture during surgery intervention.

Results: The surgical intervention was carried out with a local anesthesia. A para-marginal triangular full thickness flap was executed from 2.3 site to 2.7 site. The neoformation was enucleated in toto and the upper third molar extracted. The distal surface of implant fixture in 2.4 site was exposed but it not showed mobility. Therefore we decided to preserve the integrity of implant fixture. The flap was sutured for closing the wound primarily. The specimen was prepared and sent for histopathological examination and the subsequent histological examination was compatible with the diagnosis of follicular cyst.

Conclusion: During a follow-up visit, 2 weeks later, intraoral examination revealed absence of swelling. The patient reported absence of pain. Moreover, panoramic radiographic at 18 months revealed the bone healing process and the restitutio ad integrum of involved implant.

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

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Aim: Surgical removal of the impacted third molars is one of the most commonly performed procedures in oral surgery. Trismus, surgical edema, pain, alveolar osteitis, surgical site infections, bleeding and paresthesia are the most observed complications that occur following impacted third molar surgery. In the majority of cases postoperative pain is said to affect the quality of life of patients. The objective of this study is delineating a reproducible operative protocol for reducing postoperative pain and the early and late complications of surgery of impacted third molars, to make post-operative recovery more comfortable for the patients.

Methods: Twenty-five 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 25 patients the facial measurements recorded have registered an average trismus of 7 mm at seven days, and of 0 mm at 21 days. At 3 days the incidence of hematoma was 20% and the incidence of edema was 30% , meanwhile at 7 days their incidence was 0%. Alveolitis has been observed in the 10% of cases. No case of bleeding has been registered. Postoperative pain has been measured as moderate at 12h in the 23% of cases, and as absent at 3, 7 and 21 days.

Conclusion: The initial results obtained don't show significative differences with data reported in the literature. Complications need to be diagnosed and managed early in order to reduce morbidity rate. Morbidity increases with age of the patient, duration of the surgical procedure, and depth of the impacted tooth in the bone. Therefore, meanwhile a larger patient sample will be available, it's possible to assert that postoperative complications can be better managed with an adequate pharmacological treatment and a less invasive surgical approach.

Effect of primary closure with tube drainage compared with conventional suturing after surgical extraction of mandibular third molars

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Aim: This paper presents a preliminary study on the evaluation of the effects of the drainage tube on postoperative discomfort after the extraction of lower impacted third mandibular molars comparing them with those of the conventional primary closure of the surgical flap. The parameters analyzed were pain, swelling and trismus.

Methods: Preliminary data were collected for a prospective randomized experimental clinical study (split mouth) which was not completed due to the ongoing COVID-19 pandemic and for this reason only 8 subjects were recruited. The patients selected presented both impacted lower third molars in the same position (Pell e Gregory class II, III e A, B, C) and FMBS ed FMPS <15%. Each patient underwent two oral surgeries (test site and control site) for impacted teeth removal with the same surgical technique except for the closure of the flap: in the control group, the flap was approximated without tension and sutured with simple interrupted sutures using 3-0 braided silk, and in the test group, after suturing a small surgical tube drain was inserted into the socket of mesial incision on buccal side. Patients were examined immediately preoperatively and on the first, third, and seventh postoperative days. Pain was evaluated and recorded in the postoperative period via visual analog scale (VAS). The maximum mouth opening was determined measuring the distance between the incisal edges of the upper and lower central incisors. Facial swelling was measured using a measurement scheme consisting of two horizontal and one vertical measurements: the horizontal measurements correspond to the distance between the corners of the mouth to the ear tragus and between soft tissue pogonion to the ear tragus. The vertical measurement corresponds to the distance between the outer canthus of the eye to the angle of the mandible. The data were analyzed with the Mann-Whitney statistical test.

Results: It was noted that the trismus was greater on the first, third, and seventh postoperative days in the control group compared to the experimental group. On comparison of both the techniques, there were statistically highly significant difference only on the third postoperative day ($P = 0.001$). When swelling was being evaluated, highly significant statistical difference was observed between the two groups on the first and third postoperative days ($P < 0.05$),

but on the seventh postoperative day, there was no statistically significant ($P > 0.05$). The results show that the pain was at high frequency on the first postoperative day and gradually diminished after 3 days and 7 days. There was no statistically significant difference on first, third and seventh postoperative days between both the groups ($P > 0.05$).

Conclusion: Swelling and trismus after third molar surgery is significantly greater at primary closure sites, mainly due to accumulation of hematoma following surgical trauma, instead the surgical drain probably decreased the amount of pooled blood or serum from the surgical wound. The results of the present preliminary study showed that use of tube drain significantly reduced postoperative discomfort in terms of swelling and trismus after extraction of impacted mandibular third molars.

Minimally invasive extra-oral surgical approach for removal of ectopic lower third molar using piezoelectric device

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Aim: This paper reports a case of extraction of ectopic lower third molar using a minimally invasive extra-oral approach combined with piezo-surgery in order to prevent intraoperative injury of anatomical structures.

Methods: A 64-year-old female patient presented an ectopic impacted third molar positioned next to the lower border of the mandible overcoming it and with a direct contact with the soft subcutaneous tissue and muscle layers. Oral examination underlined a fistula in the retromolar area. The tooth was located immediately below to the inferior alveolar canal (IAC) and it was possible to appreciate a radiolucent area resembling an odontogenic cyst associated with the crown of the tooth. According to the recent operative classifications of lower impacted third molars this clinical condition was classified as TMCIII and an extraoral surgical approach was proposed as treatment option. The skin incision was executed 2 cm below the lower mandible border, between the angle and 3 cm ahead of the masseter muscle (Risdon's procedure), in length reduced to approximately 2 cm if compared to those reported in the literature (4-5cm). After soft tissue dissection, periosteum detachment and osteotomy in the area of the impacted tooth was performed using a piezoelectric device (Piezosurgery Touch, Mectron, Italy) with PR2 and OT12S inserts,

in order to reduce the risk of resection of marginal mandibular branch of the facial nerve (CN VII), facial artery and vein, and submental artery. The extraction of the impacted tooth was successfully performed. After the removal of the tooth and cystic tissue, it was possible to appreciate with a surgical specimen the connection between the intraoral fistula and the extra-oral surgical site. The skin was sutured by intradermal technique using monofilament nylon thread for maximum cosmetic benefit.

Results: The suture was removed after 10 days; the surgical site showed a good healing and intraoral fistula resolved. Two weeks post-operative follow-up was uneventful and no facial weakness was found. At 6-month visit, the patient showed adequate bone healing of the extraction site at X-ray OPT.

Conclusion: The choice of mini-invasive extraoral submandibular surgical approach can be a valid and justified surgical-therapeutic option in the management of ectopic impacted lower third molars localized in an inaccessible region (angle and lower border of the mandible) or when it is completely localized below the IAC and so inferior alveolar neurovascular bundle could be damaged to reach the tooth with an intra-oral approach. Advantages of this approach include good exposure of the surgical site, a lower probability of pathologic fractures and a reduced loss of mandibular bone caused by osteotomy, because the target is closer to surgical access site. The major disadvantages of the extraoral approach include the possibility to injury to vessels and nerves or vessels (CN VII, facial artery and vein, and submental artery), not only during the incision of soft tissues but also during osteotomy and odontomy with bone-drill handpiece, and the cosmetic sequelae of the skin scar. The first one can be avoided through a careful surgical planning and improving the surgical technique with the use of piezoelectric device for periosteum detachment and osteotomy in order to decrease the perioperative complications and morbidity. The cosmetic sequelae of the skin scar can be avoided identifying the "skin crease" referring to Langer lines, and using an intradermal aesthetic suture in order to avoid post-operative scarring.

Pleomorphic adenoma of the cheek: a case report

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Aim: Pleomorphic adenoma (PA) is the most common benign tumour affecting salivary glands. Around 90% of these tumours, related to Major Salivary gland,

are affected by parotid gland. Among minor salivary glands, palate is the most commonly affected site followed by lips, cheeks, gingiva, floor of the mouth, and tongue. The aim of this report is to present a case salivary gland PA in an adult patient successfully treated by surgical excision.

Methods: A 40 years-old patient came to our observation without any particular systemic problem referred at the anamnesis. He presented a 1,5 cm wide and rounded shape neoformation to the left cheek, intramural, with sub-zygomatic localization. This neoformation was present since 6 years growing-up. No symptoms related to the neoformation have been reported by the patient, only referred a foreign body sensation. At the intra-oral examination, the neoformation was covered by intact, normochromic and normotrophic mucosa. It was positioned near the outlet of the parotid gland (Stenone's duct). It was not symptomatic on bimanual palpation, but it was mobile with respect to the superficial and deep planes. The neoformation presented a hard-elastic consistency. There was no palpable cervical lymphadenopathy. It was decided to proceed with a complete surgical excision of the neoformation and a histological analysis of its tissues.

Results: The surgical intervention was carried out under local anesthesia. A horizontal intraoral incision was made on the buccal mucosa. The tumour was found between the cheek mucosa and buccinator muscle. The tumor was resected from the surrounding tissue, careful attention was paid in maintaining the integrity of the tumor capsule. The vascular structure along with the parotid duct was visualized and preserved. The mucosa sutured carefully after haemostasis had been secured. The specimen was prepared and sent for histopathological examination and the subsequent histological analysis was compatible with the diagnosis of Pleomorphic Adenoma.

Conclusion: 1 week later, intraoral examination revealed absence of swelling. The patient reported absence of pain. Post operatively, we did not notice any abnormalities and there was no signs of recurrence after 1 year. Complete surgical excision with good safety margins is the treatment of choice. The possibility of late recurrence after many years of surgical excision and malignant transformation as well should be a concern. A regular follow-up for at least 3-4 years has been recommended.

Mandibular third molar displaced in the sublingual space: review of the complications and case report

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Aim: The extraction of mandibular third molars is one of the most frequent procedures in oral surgery. As well as all surgical intervention, it can cause complications if an appropriate clinical and radiographic evaluations didn't make before the surgery. The most serious complications described in literature are the injury of the inferior alveolar nerve (IAN) or lingual nerve and mandibular fracture. Different clinical and radiographic variables need to be evaluated before the extraction of a lower third molar: grade of impaction, angulation, available space, depth, bone density, relation with the mandibular canal, buccolingual position, dental morphology. A buccolingual position of the tooth in relation to the mandibular lingual and buccal walls is an important factor to consider when calculating the scale of surgical difficulty. Sometimes the tooth is totally lingual and the cortical plate is very thin. The aim of this case report was to show a specific complication related to a migration of the lower third molar in the sublingual space.

Methods: A 35-year old male patient was referred to the Department of Oral Surgery of the University of Naples "Federico II" with complaint of pain symptoms, slight swelling on the right side of the mandible, discomfort during swallowing and limitation in mouth opening. Clinical observation shows the presence of a semi-included 4.8, without signs of acute inflammation. Radiographic examination (orthopantomography and CT cone-beam) showed the inclusion of the tooth and its predominantly lingual version, with a thin lingual cortical plate. After locoregional anesthesia, a full-thickness mucoperiosteal flap was raised. The incision of the flap extended from the vestibular side of the retromolar trigone to the marginal periodontal portion of the second molar, corresponding to its distolingual cusp. The incision was continued in a vestibular direction around the intrasulcular surface of the second molar. A vestibular-relaxing incision was then made, between the first and second molars, at 45° angle. During luxation, the tooth migrated in the sublingual space. Urgent OPT and CBCT were requested to evaluate the exact position of the tooth. An incision starting from distolingual angle of second molar was extended at gingival margin of the first premolar. The lingual flap was raised and the dislocated tooth was found by means of blunt dissection and grasped with dental forceps and removed. The mucosa was sutured with a 4/0 absorbable suture. Patient was given oral antibiotics and corticosteroids for 1 week.

Results: The healing process and the post-operative recovery were uneventful. No complications occurred such as bleeding, paresthesia, excessive edema and sense of constriction of airflow. The patient was clinically examined just after 3 days, 7 days (in concomitance with suture removal), 14 days after, one month after

and 6 months after.

Conclusion: An adequate clinical and radiological evaluation is essential for risk assessment and surgical difficulty in order to prepare an optimal treatment plan. The complications, although rare, are distressing for patients and, sometimes, they could be difficult to manage, if the operator is not experienced.

Carcinosarcoma of the parotid gland with osteosarcomatous differentiation: a case report

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Aim: The carcinosarcoma is a rare and aggressive true malignant mixed tumor composed of epithelial and mesenchymal malignant elements. It may occur from longstanding or recurrent pleomorphic adenoma or arise de novo. We report an extremely rare case of carcinosarcoma de novo harboring an osteosarcomatous component, together with literature review of the reported cases.

Methods: On September 2019, a 68-year-old smoker female subject presented to the Department of Maxillofacial Surgery, Ancona General Hospital, with a painless swelling in the right zygomatic area, which increased in size during the last 6 months. Clinical examination revealed a mobile and tense-elastic swelling without facial weakness or palpable lymphadenopathy. The preoperative Magnetic Resonance Image showed oval lesion measuring cm 4.1x3.5x2.3, composed by multiple cystic areas, in the right cheek mucosa in close proximity to the coronoid process of the jaw. No regional lymph nodes metastasis was detected. The patient underwent to right parotidectomy with partial resection of involved masseter muscle. The surgical specimen was sent to the Institute of Pathology of the Marche Polytechnic University.

Results: Macroscopically, the parotid gland showed a whitish, solid and hemorrhagic nodule, measuring cm 5x3. Microscopically, a biphasic neoplasia, composed of a moderately differentiated adenocarcinoma, NOS, (CK7+, CAM 5.2+, p63-, Desmin-, Vimentin-, S100-, BHCg-) and osteosarcoma (Vimentin+, Desmin+, p63+), with spindle cells (SMA+) and osteoclast-like giant cells (CD68+, Catepsin k+), was observed.

The tumor proliferative activity was about 35%. No evidence of benign mixed tumor was found. Thus, a final diagnosis of carcinosarcoma de novo of parotid gland, was rendered. The patient received adjuvant platinum-based chemoradiation therapy. Post-operative chest and abdominal Computed Tomography and Positron Emission Tomography did not reveal any signs of regional or distant metastasis. To the best of our knowledge, only 11 cases of parotid gland Carcinosarcoma with an osteosarcomatous differentiation have been reported. Usually, the sarcomatous elements are chondrosarcoma and fibrosarcoma. The most common epithelial components are poorly differentiated adenocarcinoma and squamous cell carcinoma. Local recurrences and distant metastases affected the 43% and 57% of patients, respectively. The mean disease-free survival and metastasis-free survival were equal to 6 ± 4.2 months and 5.9 ± 3 months, respectively. The death rate was equal to 57% with an overall survival rate of 7.5 ± 3.4 months.

Conclusion: We described an extremely rare case of parotid gland carcinosarcoma with osteosarcomatous differentiation. Preoperative clinical diagnosis is difficult, due to nonspecific clinicoradiological findings. Furthermore, the biphasic nature of the tumour might pose a diagnostic histological challenge. The sarcomatous element tends to predominate over the carcinoma; therefore, immunohistochemistry is recommended to distinguish carcinosarcoma from primary sarcoma. The immunohistochemical investigations also help determinate its origin. There are two main hypotheses for the genesis of carcinosarcoma. Collision theory implies development of two independent elements which then intermingle. Monoclonal hypothesis, more widely accepted, implies a common precursor in the form of dedifferentiated or pluripotent cells that undergo divergent differentiation. More than 99% of carcinosarcoma arise from pleomorphic adenomas, so entire specimen must be processed to look for any component of benign mixed tumor. Although a definitive treatment protocol has not been established, surgery and postoperative adjuvant radiotherapy are recommended. Despite therapy, over half of patients died of metastasis, especially to the lung, bone and nervous central system.

Extraction of mandibular third molars: proposal of a new scale of difficulty

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Aim: Extraction of mandibular third molars is one of

the most common procedures in oral surgery and, as with all surgical operations, appropriate clinical and radiographic evaluations are essential to avoid or reduce the incidence of any complications and to prepare an appropriate plan for treatment. The most serious complications are injury of the inferior alveolar nerve (IAN) or lingual nerve, and mandibular fracture. The objectives of the present study were therefore, first, to review the clinical and radiographic variables before extraction of an impacted third molar, and, secondly, propose and validate a new scale of surgical difficulty based on variables not previously considered (relating to morphological abnormalities, the type of undercut, and the transverse position of the tooth).

Methods: Two hundred patients with impacted third molars were enrolled, and a preoperative clinical and radiographic assessment of difficulty was made by an oral surgeon using the new index. The variables considered were: angulation, available space between the ramus of the mandible and the distal side of the second molar, depth according to the position of the highest portion of the third molar related to the occlusal plane and the cervical line of the second molar, bone density, relation with the mandibular canal, buccolingual position and dental morphology. Five oral surgeons with similar degree of experience then evaluated the surgical difficulty during operation. At the end of the operation the duration was recorded and the surgeons, who were not aware of the aim of the study, were asked to record the difficulty of the operation by indicating if it was simple, moderately simple, difficult, or extremely difficult. So, we assessed the reliability of the index according to the level of agreement between the preoperative and postoperative evaluations by using Kappa test.

Results: The preoperative evaluation placed 43 third molars in the "low" difficulty group, and in 36 of these (84%) there was agreement between the preoperative and the postoperative assessment of a "simple" operation. Seventy-two third molars were considered preoperatively as being in the "medium" difficulty group, and in 57 of these (79%) there was agreement between the preoperative and the postoperative assessments of "moderately simple". Thirty-four third molars were considered preoperatively as being in the "difficult" group, and in 25 of these (74%) there was agreement between the preoperative and postoperative assessments of "difficult". Fifty-one third molars were considered preoperatively as being in the "plus" group and in 42 of these cases (82%) there was agreement between the preoperative assessment of "very difficult" and the postoperative assessment of "extremely difficult". The level of agreement was 0.73, indicating a substantial concordance according to the guidelines of Landis and Kock.

Conclusion: An adequate risk assessment and evaluation of surgical difficulty are essential in the preparation



of an optimal treatment plan. Not only the relation between third molar and the IAN is important to establish the difficult but additional previously underestimated variables are also essential, including severe dental abnormalities and the buccolingual position of the tooth. These factors in themselves could complicate an operation that would be considered "simple" using only the other measures.

Innovative diagnostic and therapeutic aspects in dentistry in the geriatric patient

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Aim: Poor oral health is a common condition in patients suffering from dementia. Several aspects of this systemic pathology contribute to causing oral problems: cognitive impairment, behavior disorders, communication and, motor skills deterioration, low levels of cooperation and medical-nursing staff incompetency in the dental field. Objectives: The objectives of this study were to evaluate the prevalence and the characteristics of oral pathology in a demented elderly population, as well as to check the association between the different degree of dementia and the oral health condition of each patient.

Materials and methods: In this observational study (with cross-sectional design) two groups of elderly patients suffering from dementia, living in two different residential care institutions were recruited. The diagnosis of dementia of each included patient was performed using the Clinical Dementia Rating Scale. In order to evaluate the oral health condition of the included subjects, each patient underwent a physical examination of the oral cavity, during which different clinical parameters were analyzed (number of remaining teeth, oral mucosa, periodontal tissues, bone crests). To each parameter, a score was assigned. Spearman's Rho test was used.

Results: Regarding the prevalence of oral pathology in elderly suffering from dementia, it emerged that 20.58% of the included patients had mucosal lesions and/or new mucosal formations (in most cases undiagnosed and therefore untreated). The prevalence of periodontal disease was equal to 82.35% and a marked clinically detectable reabsorption of bone crests was found in almost all patients (88.23%). 24.13% of patients, who underwent the oral examination, had totally edentulous maxillae and/or with retained roots, without prosthetic rehabilitations. The correlation index r showed the presence of a linear correlation (inverse relationship) between the degree of dementia and the state of health of the oral cavity of each patient.

Conclusions: Several factors contribute to poor oral

health in the elderly suffering from dementia: cognitive functions deterioration, behavioral disorders and inadequate medical-staff nursing training on oral hygiene. This study also demonstrated that the lower the dementia degree is, the lower tends to be the oral health status. In order to guarantee a complete assistance to these patients, residential care institutions should include in their healthcare program specific dental protocols.

Comparison of the physicochemical characteristics of Bio-Oss® and sphene granules of various sizes

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Aim: The aim of this first part of the present in vitro study is to investigate the physicochemical properties of Bio-Oss® and Sphene granules of various sizes: large, small and pulverized.

Methods: We have investigated 1000-2000 µm (large), 250-1000 µm (small) commercially available Bio-Oss® and 100-200 µm (pulverized) Bio-Oss®, obtained by crushing and subsequent sieving separately the large and small granules. Sphene bioceramic (TiO₂*CaSiO₃) granules of the same sizes described above, obtained by crushing and sieving of laboratory 3D printed sphene scaffolds and foams were investigated as well. Morphological characterization of the biomaterials was performed by scanning electron microscopy (SEM), equipped with elemental dispersive X-ray spectroscopy (EDS) to determine their chemical composition.

Results: Bio-Oss® granules appeared like typical bone material with rough surface independently from the particlesize. Large and small granules were characterized by the presence of large pores with diameters in the range of 30-300 µm, while these were not present on the pulverized granules. On the other hand, small pores of about 1 µm appeared to be present on granules of all sizes. The chemical composition derived by EDS analysis showed the presence of Ca and P. The sphene granules deriving from 3D printed scaffolds, presented a particular macrostructure, characterized by a 3-dimensional reticular organization. Nevertheless,

even for this biomaterial the surface appeared to be rough and large pores of about 300 μm were present on the large and small granules, while approximately 1 μm pores were present on granules of all sizes. The morphology of the pulverized particles was very similar to that of the pulverized Bio-Oss[®]. The sphenic granules derived from crushed sphenic foams showed a very similar morphology to that of Bio-Oss[®] granules for all granule sizes. The surface was rough and large pores in a range of 50–500 μm were present on the large and small particles while smaller pores of about 10–40 μm were present on the pulverized granules as well. Pores with dimension of about 1 μm were present in all granule forms. The chemical composition for all sphenic granules was characterized by the presence of Ca, Si and Ti.

Conclusion: The presence of pores of large dimensions on the studied granules is required to form blood vessels and induce bone growth around the graft material, while the presence of pores of small dimension is necessary for the penetration of body fluids and ion transportation. The rough surface offers a large surface area for the attachment of osteoblasts. These preliminary results suggest that the novel bioceramic granules could be a valid bone substitute biomaterial and that the pulverized form could have clinical applications.

Maxillary bone defects: new possibilities

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Aim: Tooth Transformer[®] is an innovative patented system that is able to transform a tooth in autologous material for bone regeneration. In few minutes, an extracted tooth is processed automatically and transformed into grafting material with optimal characteristics. Tooth transformer reduces the crystallinity of hydroxyapatite and, through his exclusive procedure, makes the morphogenetic proteins and growth factors present in the dentin available. The particulate obtained is able to determine an osteo-induction mechanism, capable of stimulating cell adhesion, proliferation and differentiation during bone regeneration. The graft, thus created, is safe because the bacterial load is completely eliminated. It has an absolute biocompatibility and is free from immunological adverse reactions. The high wettability allows great easiness of use and promotes bone regeneration. The purpose of our study is demonstrating that dentin and bone tissue are similar; so, dentin can be considered as bone -like grafting material and as a carrier of osteo-morphogenetic proteins (BMP-2).

Methods: In our study, 6 patients were enrolled (4

men, 2 women), aged between 30 and 55 years. All patients had good general clinical conditions. Bone regeneration and fixture positioning surgery was performed in all patients. Patients were divided into two groups: in the first group (3 patients) a graft (dentin auto-transplantation) was performed with positioning of the slow-absorbing membrane above it; in the second group, however, the cavalry membrane of the same graft was not inserted. A post-operative radiological check was performed in all patients. The patients underwent clinical control at 15 and 30 days. After 5 months, after a Tc control, the implant seats were implanted and the graft site cored.

Results: From the clinical and radiographic examination it was observed that, after 5 months of healing, the bone defects were completely filled with newly formed tissue. Soft tissue healing after graft procedures was uncomplicated. Histological analysis revealed no inflammatory or infectious reactions affecting the tooth graft. The appearance of the regenerated tissue was homogeneous and the grains of the grafted tooth were indistinguishable and were surrounded by new bone formation.

Conclusion: Our results revealed that the dental graft seemed well integrated into the regenerative tissue, without any inflammatory or infectious reaction. In addition, the patient's tooth can be used as an autologous regenerative material, avoiding (where possible) any grafting of heterologous material. In fact, the graft undergoes bone remodeling phenomena, demonstrating excellent integration with the host site. In any case, future controlled studies with long-term follow-up are needed in order to better evaluate the potential of demineralized dentin self-transplants in the field of bone regeneration.

Simplified Apposition Technique (SAT): histologic and radiographic report of a case at 2.5 years follow-up

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Aim: Following tooth extraction, morphological and dimensional changes of the alveolar ridge occur. According to this, the aim of this case report was to scientifically validate a new minimally invasive surgery technique called "Simplified Apposition Technique" (S.A.T), which consists in the use of deproteinized

bovine bone (BO, Bio-Oss, Geistlich Biomaterials), human fibrin glue (HFG, Tisseel, Baxter) and collagen membrane (CM, Bio-Gide compressed, Geistlich Biomaterials) in association with a post-extraction socket, in order to obtain an increase of the horizontal ridge dimension in the atrophic bone crest.

Methods: A 69-years-old man patient was enrolled and written informed consent was obtained. Before the surgery, he was subjected to a Cone Beam Computed Tomography (CBCT) to evaluate the bone width of the analysed site. The radiographic examination was repeated after 11 months and after 2.5 years of follow-up. The patient presented a prosthetic bridge in zone 4.5-4.7 with an atrophic bone crest. The hopeless tooth 4.7 was extracted, using a flapless procedure. Then, a mucoperiosteal flap was raised, making a crestal incision in the edentulous mandibular. According to SAT, the ridge reconstruction and the filling of the socket were performed using BO, HFG, and CM. A modified horizontal mattress and single sutures were used to secure the membrane and the graft material in place. After 10 days, sutures were removed. After 11 months, a flap was raised to place an implant in zone 4.6, and, simultaneously, the bone chips, remaining in the drills, were preserved for the histological evaluation.

Results: The surgical procedures were performed without complications and the follow-up evaluation on day 10 and 1 month showed no signs of inflammation and soft tissue closure, partly obtained by second intention healing, using the association of CM and HFG. CBCT, performed at 11 months, revealed no residual radiolucency and good integration of the graft material. At baseline, the crest width was 3.7 mm, and, after 11 months, it increased, reaching 6.5 mm. The CBCT carried out after 2.5 years showed a maintenance of the reconstructed volumes. At the light microscopy evaluation, the bone chips exhibited various stages of bone formation and maturation, showing a good quality of lamellar compact bone without any inflammatory response. The area regenerated using BO and HFG demonstrated newly formed osseous tissue and very good integration with the pre-existent bone.

Conclusion: The promising histological and surgical findings provide valuable proof that S.A.T could be considered a successful bone regeneration method, minimizing risks of postoperative morbidity and stabilizing the increased horizontal bone over time, as demonstrated by the CBCT at 2.5 years of follow-up. S.A.T allows to obtain an increase of the horizontal ridge dimension of the atrophic bone crest with new hard tissue formation, exploiting the osteoinductive and osteoconductive properties of the used biomaterials. Further studies are ongoing, in order to support the combined use of this technique with different substitutes, always in association with the released factors deriving from post-extraction sockets.

Marsupialization of keratocystic odontogenic tumour: report of 6 cases

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Aim: The keratocystic odontogenic tumour (KOT) is a benign cystic tumour of the maxillary bones characterized by local aggressiveness and a tendency to frequent recurrence. Until recently it was classified among the odontogenic cysts of the jaws, with the name of keratocysts or primordial cysts. It originates from the residues of the epithelial tissue that participates in the formation of the tooth (dental lamina). It appears as a single- or multilocular cystic lesion, with invasive growth, which tends to expand within the bone tissue, inducing its reabsorption, up to surface, deforming its contours. Multiple treatment for the KOT have been proposed: enucleation (Partch II), decompression (Partch I) 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. The decompression and second stage-enucleation is the most proper treatment in case of medium size lesions and proximity with vital anatomical structures. The present study aims at assessment and histomorphometric analysis of KOT epithelium and fibrous capsule before and after decompression treatment. Histological evaluation and immunohistochemical expression of podoplanin, Bcl-2, COX-2, IL1 were analysed by using conventional microscopy. In addition, volume change pattern of decompression was analysed by using TC Dentalscan.

Materials and methods: Six patients who were diagnosed with KOT of the mandible were selected and treated by marsupialization. They underwent an incisional biopsy of the cyst before decompression. Then the connection with the oral cavity was maintained by iodoformic gauze with gentamycin. During the follow up period weekly irrigations through the lesion access were applied. 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 immunohistochemical parametris 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 haematoxylin eosin. The epithelium and fibrous capsule thickness were measured by Olympus dp-soft software.

Results: The epithelium after the marsupialization epithelium has been shown to be thicker than before the marsupialization treatment. Wilcoxon test was used for the statistical analysis. The volumetric analysis was conducted with Inversthilius 3.1 and Meshlab. Moreover, a volumetric reduction of cystic cavity and a volumetric increase of bone tissue were registered, comparing TC realized at T1 and T2.

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 esthetical damage. Although the rate of recurrence is low using this procedure, periodic check-ups are necessary.

Covid-19: preventive strategies for infection control in the dental practice

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Aim: Covid-19 is a respiratory disease caused by a new type of coronavirus named SAR-CoV-2 (Severe Acute Respiratory Syndrome-Coronavirus-2). The virus can spread from person to person with a predominantly respiratory transmission through aerosol and droplets. Dentistry is one of the most exposed professions to the virus contagion due to the inalation of airborne particles and aerosols produced during dental procedures. Infact the practice of dentistry involves the use of rotating dental and surgical instruments that create a visible spray that contains droplets of water, saliva, blood and microorganisms. Preventive strategies should be applied in order to protect the team and the patients from the risk of infection. The aim of this article is to identify and discuss procedures and protocols that allow to control COVID-19 in dental practice.

Methods: The search was performed on PubMed and Google Scholar databases. The keywords used were: "dentistry", "dental practice", "COVID-19", "SARS-CoV-2", "infection". We selected studies analysing the impact of COVID-19 on dentistry.

Results: First of all telephone triage should be performed to investigate current health status and the presence of risk factors for COVID-19 development. The body temperature of all the patient should be registered before entering the dental office. If the patient

had a positive history of contact or symptoms the appointment should be delayed for 14 days. Hand hygiene plays an important role in limiting the spread of the virus. Any patient entering the dental clinic had to disinfect hands with alcoholic gel solutions, while dentists should wash their hands before touching a patient, after exposure to body fluids, after touching a patient and after touching contaminated surfaces or equipment. Before starting any dental procedures, mounth rinses with 1% hydrogen peroxide or 0.2% povidone may reduce viral load in oral fluids. Dentists should take strict personal protection measures and the use of an appropriate protective equipment is essential. It includes masks, hair caps, gloves, googgles, shields and waterproof gowns in order to protect mouth, nose, eyes and body. During aerosol-generating procedures on patients assumed to be non-contagious the use of filtering facepiece respirators (FFR) such as N95 or FFP2 is strongly suggested. These respirators are more effective than surgical masks even if their use is uncomfortable for operators and cause an increase of facial skin temperature. Furthermore, when performing dental emergency in suspected COVID-19 patients a higher level of respiratory protection such as FFP3 should be considered. The use of a double high-speed aspiration is considered an important means to control aerosols evacuating during dental treatments. However aerosol-generating procedures should be avoid whenever possible. After treatment environmental cleaning and disinfection procedures had to be applied. To remove contaminated air in treatment areas, frequent room ventilation and the use of air purifers with expensive high-efficiency particulate arrestor (HEPA) filters is suggested. Inanimate surfaces should be disinfected with sodium hypochlorite 0,1% or 70% isoropyl alcohol and sterilization of all instruments that have been contaminated is reccomended.

Conclusion: In this article the most appropriate procedures were discussed to minimize the risk of infection in dental practice and to prevent the spread of SARS-CoV-2.

Anatomy of the alveolar antral artery as related to maxillary sinus lift procedure: a cone-beam computed tomography study

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Aim: This research focuses on the role played by cone-beam computed tomography evaluating the incidence, frequency and characteristics of the alveolar antral artery (aAA) and ultimately pursuing a reduced risk in

lateral window sinus lift elevation surgery.

Methods: The study examines 100 cone-beam computed tomographies performed between 2012 and 2019 on 100 subjects (200 maxillary sinuses). The subjects presented edentulism from the first premolar to the first molar and were candidates to maxillary sinus lift surgery, 42 (42%) were male and 58 (58%) female. The average age of patients was calculated to be 68.46 to +9.66 years, with an age range from 43 to 88. The software used was PaX-Zenith3D (Vatech, 13, Samsung 1-ro 2-gil, Hwaseong-si, Gyeonggi-do, 445-170, Korea). The observations and measurements of the study were performed examining the following parameters: (i) the presence; (ii) the mesio-distal length; (iii) the cranio-caudal height from the maxillary crest to the first upper molar; (iiii) the calibre at first upper molar level. The data was statistically analyzed by means of SPSS software.

Results: The presence of aAA's intraosseous anastomosis was shown on cone-beam computed tomography in 100 cases out of 100. There were no statistically significant differences in its presence between the right side and the left. The mesio-distal length presented an average value of 24.06 ± 5.66 mm on the right side, and of 23.21 ± 5.43 on the left. The mesio-distal left length is significantly greater than the right length (>1 mm). The cranio-caudal distance was measured at 12.25 ± 3.84 on the right, and 13.44 ± 3.91 on the left. 20% of the cases presented a cranio-caudal distance higher than 15mm in the region of the first molar. The calibre averaged 1.07mm. The cranio-caudal female distance was 12.67 mm on the right side and 13.56 on the left. The cranio-caudal male distance was 11.66 mm on the right side and 13.43 on the left. The female mesio-distal length was 23.44 on the right side and 22.49 on the left. The male mesio-distal length was 24.22 on the right side and 24.14 on the left. The female calibre was 1mm on the right and 1.02 on the left while the male data were respectively 1.18 and 1.13 for right and left side. The male caliber difference between right and left was statistically significant (p value <0.05).

Conclusions: As previously reported in the results, the alveolar antral artery was found in 100% of the cases, showing how a knowledge of the maxillary sinus vascularization is essential during the programming surgical phase in order to prevent blood complications during the operations involving this region.

Anatomical variability of the mandibular canal: computed tomography evaluation

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Aim: The purpose of the study is to evaluate the prevalence and the morphological aspects of bifid mandibular canals and to analyze the course and the radiological characteristics of retromolar canals, using computed tomography.

Methods: The tomographic scans of patients who underwent an oral surgery at the Odontostomatology Area of the University of Naples "Federico II" between June 2018 and January 2020 were analyzed. Scans that did not clearly show the entire path of the mandibular canal and those that showed osteolytic and/or osteosclerotic neoformations in the posterior region of the mandible were excluded. The study sample comprised 115 patients (230 evaluation sites). Each CT scan was analyzed using the MPR tool of RadiAnt DICOM Viewer software. The intercepted bifid mandibular canals were classified according to the classification of Naitoh et al. (2009). As regards retromolar canals, sagittal CT-derived images were used to measure three distances, according to the modalities described by von Arx et al. (2011): horizontal distance from retromolar foramen to second molar; height of retromolar canal; width of retromolar canal. Retromolar canals have been classified into 3 categories, according to their course and morphology: vertical, curved, horizontal. Moreover, volumetric reconstructions of the analyzed retromolar canals have been elaborated, using Simplant Pro 18 software.

Results: The study found that 50.4% of patients have at least one bifurcation or trifurcation of the mandibular canal. 33.9% of the 230 analyzed mandibular canals are bifid and only 4.3% are trifid. The anterior canal is the most frequent type of the bifid variations of the mandibular canal, with a prevalence of 12.6%, followed by the retromolar canal (8.3%), the dental canal (6.1%) and the bucco-lingual canal (3.5%). 3.5% of the canals are bifid but it is not possible to classify them according to the adopted classification: in seven sites, an accessory canal branches off from the lower face of the main canal and runs in the front and lower direction; in only one site a Temporal Crest Canal is observed. In relation to the retromolar canals, 63.2% are vertical, 36.8% are curved. The mean distance from retromolar foramen to second molar is $15.7 \text{ mm} \pm 3.8 \text{ mm}$. The mean height of retromolar canal is $13.3 \text{ mm} \pm 2.8 \text{ mm}$. The mean width is $1.05 \text{ mm} \pm 0.28 \text{ mm}$.

Conclusion: The prevalence data that emerged from the study show that the branches of the mandibular canal represent a common radiological finding. In planning any surgery in the posterior region of the mandible, therefore, it would always be advisable to search for accessory mandibular canals and possibly to analyze them in relation to their position and course. These

assessments can be performed in a much more precise and detailed manner on tomographic scans.

Salivary cytokines for the diagnosis of oral cancer: a review

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Aim: Cytokines are a heterogeneous group of soluble small polypeptides or glycoproteins, with the function of growth promoting, differentiation and activation of cells. Cytokines can have either pro- or anti-inflammatory activity as well as immunosuppressive activity, depending on the microenvironment. It has been demonstrated that at least 20% of malignant tumors exhibits extensive inflammatory infiltrates with high cytokine expression in the tumor microenvironment. The aim of this review of the literature is to highlight the possible correlation between salivary cytokines and presence of oral squamous cell carcinoma (OSCC).

Material and methods: The Medline, Web of Science and Scopus databases were searched, using as entry terms: "Salivary cytokines and oral squamous cell carcinoma", "Salivary interleukins and oral squamous cell carcinoma", "Saliva cytokine and oral squamous cell carcinoma", "Salivary cytokines and oral cancer", "Salivary interleukins and oral cancer". We selected only articles in English, published after 2010 and studies on saliva sample. We excluded case reports, conference proceedings, personal communications and letters to editor. Articles about molecules different from cytokines and reporting diseases different from OSCC were excluded. Articles selected was classified in three subtypes of studies: Studies that analyzed cytokines concentration in OSCC patients and healthy patients; Studies that analyzed cytokines concentration in different OSCC stages; Studies that analyzed cytokines concentration before and after surgery.

Results: Starting from 14318 articles, 26 studies met inclusion and exclusion criteria of the review. Eight articles were in group one (I), 11 in group two (II) and 7 in group three (III). Twenty-one studies (80%) showed statistically significant correlation between altered concentration of some cytokines and oral cancer. It is important to mention that in group II ten articles (90%) had statistically significant results.

Conclusion: Correlation between oral cancer and

cytokines is currently an interesting field of research, also because of the high number of articles produce in last 10 years. Moreover, the use of saliva for the analysis seems to be promising, to identify a panel of cytokines useful for diagnosis of OSCC, also in early stages. IL-6 and TNF- α are the salivary molecules most frequently found in association to malignant lesions of the oral cavity. Also, IL-8 seems a promising marker. More studies are necessary to strengthen the relationship between salivary cytokines and OSCC diagnosis, avoiding important confounding factors like presence of oral inflammation and/or coexistence of other systemic diseases.

Effectiveness of ibuprofen and celecoxib on the management of pain and postsurgical inflammatory sequelae following third molar surgery: a randomized, controlled clinical trial

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Aim: To manage postoperative discomfort following the avulsion of the mandibular third molar, many strategies have been developed for minimizing clinical manifestations after surgery through a pharmacological approach. The objective of this study was to compare the efficacy of celecoxib and ibuprofen in reducing postoperative sequelae following the surgical removal of impacted mandibular third molars.

Materials: Ninety-eight patients requiring the surgical removal of a mandibular third molar were randomly assigned to receive a placebo (group 1, 32 patients), ibuprofen (group 2, 33 patients), and celecoxib (group 3, 33 patients). Drugs were administered after tooth extraction twice a day for 5 days. The primary outcome, pain, was evaluated using a visual analogue scale at 30 min, 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 5, 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. Compared to placebo, treatment with celecoxib and ibuprofen resulted in improvements in the primary outcome. Furthermore, when compared to the other groups, patients in the celecoxib group showed a significant reduction in postoperative pain scores at 6 h ($P < 0.001$), 12 h ($P = 0.011$), and 24 h ($P = 0.041$) after surgery. Measurements of the facial distances, recorded pre- and postoperatively to determine the degree of swelling in the study groups, did not differ between the three groups at any of the observation time points ($P > 0.05$). Moreover, the maximum mouth opening values did not differ significantly between the treatment groups at any of the observation time points ($P > 0.05$).

Conclusions: This study suggests that celecoxib used as postoperative therapy after third molar surgery shows favorable effects in the management of perioperative pain compared to ibuprofen and placebo. Celecoxib was found to be safe and simple to use in the postsurgical management of discomfort following third molar surgery.

Case report: LAM affected patient undergoing allogeneic stem cell transplantation with a huge cystic lesion; a multidisciplinary approach

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Aim: We present a case report of a patient affected by L.A.M. who has been treated in order to eradicate dental infectious foci; the radiological examination highlights a huge cystic lesion in the IV quadrant but there was a very short time before the allogeneic stem cell transplantation. The aim of this study was to evaluate the correctness of our therapeutic choice, according to patient's clinical situation and time available before therapy.

Materials and methods: 49-years-old male affected by L.A.M was referred to the Department of Oral Surgery and Systemic Pathologies, Dental School, University of Turin in April 2016. The patient was waiting for stem cell transplantation [(WBC: 3,9 (109/L), RBC: 3,25(1012/L), PTLs: 47 (109/L)]. He arrives with an orthopantomography in which we can highlight:

- root residues of 1.5, 1.8, 2.6, 2.7 e 4.6 with variable periapical osteolysis in all sites.
- periapical bone demineralization and destructive decay of 1.6.
- destructive decay of 2.4

After oral and radiologic examination extractions of 1.8, 1.7, 1.6, 1.5, 2.4, 2.6, 2.7, 4.6 and 4.8 were planned

and a maxillofacial bones TC was required to evaluate the translucency of IV quadrant. The TC highlight a phlogistic periapical osteolysis of 4.3 on the distal side indissociable from the periapicoradicular lesion of 4.4 and 4.5. We also detected spongiosa osteosclerosis near the incisors of the third quadrant progressively more evident going to the fourth quadrant. Considering the short time before transplantation, according to the transplant team, we decided to not extract all the teeth of fourth quadrant but to do endodontic treatment and cystectomy because the only endodontic treatment hadn't permitted us to see the bone healing (6 months required). On 27/04/16 endodontic and conservative treatments of 4.3, 4.4, 4.5 were done in the Conservative and Endodontic department of Dental School, Turin University. On 30/04/16 extractions of 1.8, 1.7, 1.6, 1.5, 2.4, 2.6, 2.7 were done with flap, Spongostan Tissucol and sutures in order to obtain a first intention healing in the first quadrant. Emostasis was good. On 02/05/16 extractions of 4.6, 4.8 and cystectomy were done. From the medical report emerges the presence of fibrous connective tissue chronically inflamed. The patient has done another orthopantomography on 21/06/16 in order to have the transplantation suitability (transplant was done on 08/07/16). The post therapy follow-up was planned every 6 months: in those occasions we had done professional scaling, oral clinical examination and orthopantomography.

Results: The last orthopantomography, done on 10/10/2019, shows us the complete resolution of the lesion in the IV quadrant.

Conclusions: This case report shows an emblematic situation that frequently occurs for the dentist who have to treat patients before transplantation. When the days available for the oral management are less than 21, tooth extractions have to be chosen wisely, taking consideration of patient primary disease and systemic conditions. In this case despite the presence of a huge lesion including 3 elements, the choose of a clinical protocol without teeth extractions permitted to obtain a complete bone healing, even though the contextual immunosuppressive therapy. The most important aspect of our protocol is that we hadn't extract four teeth in a young patient with a good life expectancy.

Split crest technique: case report and 7-year follow-up

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Aim: Alveolar atrophy is the most important problem that has limited the use of endosseous implants since their introduction. When an anterior maxillary tooth is lost, often as a result of trauma or endodontic complications, the labial wall of the alveolar socket resorbs rapidly and the residual ridge actually consists of the previous palatal wall. Therefore, the alveolar ridge is predominantly reduced in the horizontal dimension, and immediate implant placement with routine techniques is not possible because of the discrepancy between the thickness of the ridge and the diameter of the implant. Although many procedures have been proposed to augment the alveolar crest with autogenous bone grafting, such as the ribs and iliac crest, sometimes in conjunction with a barrier membrane, a risk of dehiscence and infections of the mucosa may jeopardize the graft. Furthermore, a two-stage approach to implant placement is generally advocated, lengthening treatment time and increasing cost. In the early 90's Bruschi et al. introduced a split-crest-bone manipulation technique. The purpose of this technique was to create self-space-making defects by splitting the atrophic crests into two parts with a longitudinal greenstick fracture and placing the implant between them, which is also an effective technique for severely thin alveolar bone. Various types of implants have been used within the ridge widening procedure. Because the taper-shaped implants (Winsix, BioSafin, Torque Type implants, Trezzano Rosa, Milan, Italy) are tapped into position similarly to the driving of a wedge, it is considered to be appropriate for this procedure. The present article reports a case of bone splitting (maxillary) and contextual placements of 3 self-taping fixtures.

Methods: A 57 years-old male patient was referred the Dentistry Department of San Raffaele Hospital. The patient didn't referred any systemic diseases so he was classified ASA I. He came to our department to be rehabilitated in the upper-right arch in a fixed way. After local anesthesia, we proceeded to design a total thickness "book-flap" from the element 1.1 to 1.7: reducing deglowing of soft tissue allows the bloody irroration of the bone. To determine the position of the fixtures in the bone, a sterile pencil was used, taking the provisional restoration as guide. The osteotomic incision was achieved by using piezoelectric instrument in the middle part of the crest: we were sure that 1-2 mm of bone was remaining in the buccal side and in the palatal side of the incision. The expansion was ultimate using manual scalpels: we inserted the fixtures when we obtained 2-3 millimeters gap of the splitted bone walls. All the implants reached over 40 N/cm of torque: this is possible by using Torque Type implants (Winsix, BioSafin, Torque Type implants,

Trezzano Rosa, Milan, Italy)

Results: After 7-years follow-up the restoration appears in 1st level (OPT) and a 2nd level (CBCT) radiographic examination well-tolerated by the patient and there were no significant bone loss at the neck of the fixtures.

Conclusion: The "split-crest" technique is an easy way to restore the bone volumes lost.

Implant-prosthetic rehabilitation in patients with cleft lip and palate

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Aim: Cleft lip and palate is a congenital malformation affecting the craniofacial structures, caused by a stop of development, between the fourth and tenth week of gestation, which causes a failure to weld the primary facial buttons that contribute to the formation of the upper lip and palate. In patients with cleft lip and palate there is agenesia of the lateral incisor and the bone share present is not sufficient to perform a correct implant-prosthetic rehabilitation.

Materials and methods: The case report presents the clinical case of a patient suffering from left unilateral complete cleft lip with lateral incisor agenesia. The patient at the age of 9 months is subjected to primary cheilonaso alveoloplasty surgery. At 6 years of age, the orthodontic treatment began, which allowed the alignment of both dental arches. At the age of 18, the computed tomographic analysis of the jaw bone showed a bone insufficiency that required horizontal and vertical GBR to allow the insertion of an implant fixture. GBR is performed through block grafting and autologous bone particulate taken from the mandibular body. The graft is fixed through a single osteosynthesis screw.

Results: 6 months after the operation, a computerized tomography is performed which shows a bone increase. We proceed with the insertion of a 3x10 dental implant and healing abutment. By using a temporary resin, the conditioning of soft tissues is promoted. After 3 months, the final prosthetic product is applied. After one year follow up, the patient has a satisfactory result.

Conclusions: In patients with cleft lip and palate, the use of dental implants, after guided bone regeneration (GBR), has become the necessary method capable of guaranteeing long-term predictable and reliable results. Autologous bone was the best grafting material. The block autologous bone graft guaranteed a stimulation of the bone neoformation processes and support for the cells involved in tissue regeneration, ensuring, at the same time, a stability of the cicatricial gingival tissues, avoiding their collapse at the atrophic site.

Eco-assisted biopsy of a benign oral floor lesion

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Aim: Lipomas are benign soft tissue neoplasm of mature adipose tissue it rarely occurs in the oral cavity, preferring sites such as the oral floor, tongue, cheeks and lips. It appears as a roundish mass with a soft-elastic consistency and a yellowish color, its onset is generally slow-growing. This study aims to evaluate the feasibility of intraoral ultrasound as a minimally invasive device to perform an eco-assisted biopsy (EAB).

Methods: A 77-year-old male patient, DDM, referred to Oral Surgery Division of Multidisciplinary Department of Medical-Surgical and Dental Specialties of the University of Campania "Luigi Vanvitelli" presented a neoformation on the right side of the oral floor. On clinical examination, the presence of a neoformation of a yellowish complexion contiguous to the lingual caruncles was evident, on palpation it was mobile and soft elastic in consistency. There was no swelling of the submandibular lymph nodes. The patient reported a slow growth of the lesion up to the objectified dimensions that did not allow him to carry out the normal swallowing and phonation activities. The patient underwent an intraoral ultrasound examination with a portable Esaote TMulttrasound machine with a high-frequency hockey stick probe (5-18 MHz) and subsequently underwent surgical excision of the lesion. Following removal, the specimen was sent to pathologic anatomy for examination.

Results: The ultrasound examination showed a very homogeneous solid structure, hyperechoic relative to the surrounding interfaces, 1,572 cm x 1,947 cm in size. The lesion was located above the mylohyoid muscle, for this reason, an intraoral surgical approach was preferred. Moreover, the examination provided relevant information about the position of anatomical structures to be respected and safeguarded during surgery; in fact, the sublingual artery was immediately visible under the base of the lipoma and it was possible to appreciate the gland sublingual with the sublingual caruncles on the right of the same. Histological examination confirmed the clinical diagnosis of lipoma, showing an encapsulated lesion composed of abundant mature adipocytes arranged in lobules.

Conclusions: High-frequency intraoral ultrasonography is an accurate tool in the choice and planning of surgical approach and safeguard of anatomical structures.

Conservative surgical approach of an odontogenic keratocyst: clinical, radiographic and histological evaluation

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Aim: Odontogenic keratocyst (OKC) is an odontogenic cyst representing the third most common cyst of the jaws characterized by a high rate of recurrence. OKC was accepted as a neoplastic lesion in the 2005 WHO classification and it was called keratocystic odontogenic tumor. However, in the 2017 classification of odontogenic tumors, OKC was moved back into the cyst category. Cystectomy, marsupialization, or decompression are the most common treatments proposed for this pathology. This study aims to evaluate clinically, radiographically and through the histological examination the healing of a patient with OKC who underwent surgery with a marsupialization approach.

Methods: An 83-year-old female patient, RF, 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 right hemi-mandibular region and paresthesia of the right hemi-labium, during intraoral examination it was possible to detect an eggshell crackle on palpation of the anterior edentulous mandible, moreover, the patient reported a growth of the lesion over time that prevented her from using the removable prosthesis. At the OPT it was possible to appreciate a unilocular area that extended from the parasymphiseal region to the right hemi-mandible. The CT scan showed a massive erosion that only partially spared the lower cortex and involvement of the mental foramen. Considering the high risk of fracture and the systemic condition of the patient, marsupialization was performed. To allow re-epithelialization, iodoform gauze was inserted inside the cavity and was then gradually removed in subsequent follow-ups. The patient was instructed to irrigate the pouch with sterile saline after meals. After 60 days two micro-biopsies were performed, the first on the cavity bottom, the second on the edentulous saddle in order to evaluate the epithelial metaplasia. Clinical follow-ups were carried out every 3 months, radiological ones after one year.

Results: One year after surgery, the mucosa appears normochromic and normovolemic, however, a small residual area of the pouch is still present.

Radiographically, it is possible to appreciate a remarkable neoformation of bone tissue in the three dimensions. The comparison of the two micro-biopsies, respectively of the cavity fund and the gingiva, can be superimposed confirming the metaplasia process.

Conclusion: By assessing the complete remission of the cystic lesion, although the lesion has not been enucleated, we believe that in cases, such as those described, the marsupialization approach is a valid therapeutic option.

Piezoelectric devices in third molar and supernumerary teeth extraction: a case report and literature review

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Aim: The purpose of this study is to show a case report of third molar and supernumerary teeth extractions, using piezoelectric devices. Moreover, a literature review was performed in order to evaluate the effective advantages of using piezoelectric handpieces instead of rotatory instruments, to reduce IAN lesions risk.

Methods: The clinical case presented is related to a 20-years-old man. He came to the attention of the Department of Odontostomatologic Surgery of Dental Clinic of Vita-Salute San Raffaele University presenting clinical and radiographic evidences of impacted third molar in all the quadrants and of supernumerary tooth in the 4.8 region. The patient referred painful symptoms in the fourth quadrant. Among the possible surgical treatments, we selected the excision of the completely impacted 4.8 and supernumerary tooth positioned in that area, by using piezoelectric devices and by performing an odontotomy. Under local anesthesia, a mucosal paramarginal incision was performed from 4.6 up to the mandibular ramus, where the supernumerary tooth was placed. The periosteum was dissected from the surrounding mandibular bone, till the exposition of the supernumerary tooth. At first, supernumerary tooth was extracted just employing surgical forceps and elevators, used for more delicate wedging of the periodontal ligament and for easier extraction. Then, a piezoelectric handpiece with osteotomy tip was used to perform an osteotomy around the wisdom tooth and subsequently was done an odontotomy, in order to make it easier to excise all the pieces, saving as much bone as possible. The 4.8 was split up in more parts

using piezoelectric devices: at first only the crown was sectioned, after that the roots were divided in two parts. In this way, the tooth was extracted in three parts, avoiding excessive bone removal by jaw branch, in order to make room for the movement of extraction. In this case, as the CBCT shows, the wisdom tooth was really near to the IAN. Therefore, to prevent some hypothetical injuries of the IAN, piezoelectric devices was the elective surgical choice that could guarantee good surgical results with high control. In conclusion, the extraction sockets were revisioned with curettes for granulation tissue removal and the flap was resutured with 3.0 silk suture. The patient was given Amoxicillin + Clavulanic Acid tablet (2 g) and corticosteroids (4 mg). **Results:** The MedLine (NCBI PubMed and PMC) database and EBSCO resource were consulted with the following keywords: tooth extraction, impacted third molar, piezoelectric devices. Initially, a total of thirty-two articles were screened and among them, just seven were selected. Articles of which full text is not available, or related to piezoelectric handpieces use in other medical branches or dental procedures were excluded from the study. In all the selected articles the sequelae of using rotatory instruments or piezoelectric devices were analyzed, in order to evaluate advantages and disadvantages of both techniques.

Conclusion: The main advantages of piezosurgery include soft tissues preservation, optimal visibility and improved control of surgical procedures, decreased bleeding, better healing of hard and soft tissues, increased patient comfort, protection of bone and tooth structures. Therefore, using piezoelectric device allows to decrease short-term outcomes such as pain and swelling. This procedure can be successfully used for extraction of impacted teeth.

Treatment of peri-implantitis with Guided Bone Regeneration: a systematic review

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Aim: The aim of this study is to execute a systematic review (SR) of Randomized Controlled Clinical Trial (RCTs) to evaluate the efficacy of regenerative surgical techniques in the treatment of peri-implantitis.

Methods: According to the guidelines defined by the PRISMA statement a systematic literature search was conducted on three online databases (Cochrane Library, PubMed, Embase) updated in December 2017 and supplemented by a paper search.

Results: 220 study were individuated based on inclusion and exclusion criteria. Only RCTs and articles dealing

with treatment of peri – implantitis with procedures of guided bone regeneration were selected. The research allowed to identify 5 RCTs. The 5 articles reported the results of 5 types of regenerative surgical techniques and materials: autogenous bone graft plus collagen membrane vs bovine – derived xenograft plus collagen membrane; open flap debridement plus amelogenine gel vs open flap debridement; open flap debridement plus titanium granules vs open flap debridement; access flap surgery plus hydroxyapatite vs access flap surgery plus xenologous graft and collagen membrane; xenologous graft plus native collagen membrane vs xenologous graft plus cross-linked collagen membrane. Clinical and radiographic parameters were analyzed and classified in primary and secondary outcomes. Marginal Bone Level (BL), evaluated by endoral radiographs with parallel ray technique, is the primary outcome; the change of the Pocket Depth (PD), Clinical Attachment Level (CAL), Bleeding On Probing (BoP), Probing Suppuration (PuS), Plaque Index (Pi), Full Mouth Plaque Score (FMPS), Full Mouth Bleeding Score (FMBS), Marginal Gingival Recession (ReC) and Implant Loss are the secondary outcomes. For the primary radiographic outcomes a greater bone level gain and percentage of bone filling was observed in BDx treatment (mean bone level gain: 1.1 mm), in EMD treatment (0.09 mm of bone level change) and in PTGs (mean radiographic defect fill: 3.6 mm) compared to the only surgical procedures of OFD (-0.1 mm and 1.0 mm of bone level change). For the secondary outcomes (clinical parameters) BDx group shows better results, while the addition of EMD and PTGs does not bring any clinical benefit compared to the only surgical procedures. The heterogeneity of the treatments involved in this review did not allow the execution of a meta-analysis. Anyway, the individual studies seem to indicate the superiority of regenerative techniques over the only OFD for short observation periods.

Conclusions: The data achieved in this review are unable to give indications on the effectiveness of the different regenerative procedures. Regenerative surgical techniques bring improvements both in clinical and radiological parameters compared to the only surgical treatment, but despite the positive results obtained, we are unable to assert that guided bone regeneration lead to new osseointegration. Therefore are necessary further studies with long follow-up periods and standardized assessment of the outcomes.

Surgical management of four supernumerary teeth: case report

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Aim: The purpose of the following case report is to document the management of four distomolar non syndromic supernumerary teeth, each one in a different sector of the mouth. The development of multiple impacted teeth is a rare condition and often found in association with syndromes or developmental anomalies such as cleidocranial dysplasia or Gardner's syndrome, with an overall prevalence ranging from 0.1% to 3.6%.

Methods: The patient (male, 20 years old, good general health) came to the Dentistry department of San Raffaele hospital to solve his class III malocclusion, in outcome of orthodontic treatments. During the intraoral examination no abnormalities with regard to the size or shape of the patient's tooth crowns or the relationship between his dental age and chronological age were found and all the third molars were impacted. The first (OPT) and second (CBCT) radiographic examination prescribed, however revealed the presence of supernumerary teeth in all the mouth quadrants. After discussing the situation about the most appropriate course of action, in order to optimize orthodontic treatment and reduce the likely negative effects of the supernumerary teeth, the surgical extraction of the supernumerary teeth under local anesthesia were planned.

Results: All the teeth were removed under local anesthesia following the same surgical procedure with few minimal differences regarding the position and the shape of the tooth, realizing a mucoperiosteal envelope flap starting from an incision distal to the II molar, preserving the interdental papilla, then after osteotomy and dislocation, the wisdom teeth and the distomolars were removed from their respective sectors. In the case of a multi-rooted tooth, it is often convenient to have the coronotomy proceed to the root separation, as the roots must be extracted following their natural curvature so as not to fracture them. In the present case the sectioning of the tooth was performed using a piezoelectric handpiece. The use of the ultrasounds allows the removal of the dental root without damaging the alveolar walls, process that results especially difficult in the presence of ankylosis. After the surgery the post-extraction alveolus was sutured using a silk thread 3.0 performing an horizontal mattress knot which is very useful in closing an extended surface in the sense of its length. A higher contact surface will reduce tension on the tissues, thereby decreasing the risk of necrosis. The results of all the operations were monitored with a strict follow-up lasted 12 months in which a good healing of both hard and soft tissues was evaluated.

Conclusions: Different management options are available for patients with multiple hyperdontia not associated with complex syndrome, because supernumerary teeth tend to adversely affect the adjacent dentition, causing malocclusions and malformations at a rate of 21.6%. According to the patient's needs and condition, surgical option revealed to be the best option. A multidisciplinary approach also represented a focal point in the management of the case as a structured treatment plan drafted by the oral surgeon in cooperation with the orthodontist allowed a more comprehensive view of the clinical condition and a more effective treatment.

Dynamic navigation system for surgical endodontics: a case report

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Aim: Dynamic navigation systems have recently been introduced in dentistry that facilitate and improve the accuracy of implant insertion. The dynamic navigation surgery system integrates the surgical instruments used and the radiological images acquired through CBCT (dental Cone Beam Computed Tomography) examination, using an optical positioning device with two chambers and a dedicated computerized interface that shows the position of the calibrated drill and of a target that guides the patient. The clinical interface shows in real time the three-dimensional position of the drill on the three planes of the space, guides the user in drilling allowing him to maintain the programmed milling axis during the planning of the final position of the implant. Such a system could be used for other surgical procedures, including the access cavity and apicectomy in endodontics. In surgical endodontics, the aim is to prepare a minimally invasive access cavity which, however, should allow enough space to perform the correct apicectomy, retrograde filling and mechanical removal of the lesion. The present clinical case shows the use of the Navident system in surgical endodontics in the preparation of the access cavity and in the apicectomy, with the aim of providing a simpler, faster, more predictable and accurate technique for the treatment of a lesion in an upper lateral incisor.

Methods: A 34-year-old male patient presented himself with a symptomatic right upper incisor, pain during chewing and positive vertical percussion test. The tooth has been endodontically treated orthogonally 1 year earlier. From the CBCT exam held by the patient, a periapical lesion was observed on element 1.2. It was decided to perform a surgical endodontic intervention

in dynamic navigation. The dynamic navigation system has been used for the execution of a cavity of access to the minimally invasive lesion, after removal of the periapical lesion and of the third apical root, the root canal system is retrogradely prepared and obturated with a bioceramic material: EndoSequence BC RRM (Brasseler, USA).

Results: Good radiological healing is observed after 6 months after surgery.

Conclusion: The dynamic navigation system has made it possible to perform a precise minimally invasive bone access cavity and removal of the root apex in a microsurgical endodontic intervention. It was possible to precisely orient the drill in the three spatial axes through the screens of the Navident software, reducing the risk of iatrogenic errors, an important factor when you are near noble structures. The clinician had the possibility in real time and at any time of the surgical act, to know the position of his calibrated drill, with respect to the anatomical structures visible from the CBCT sections in the three planes of the space, being able to create a minimally invasive access cavity and a resection root with chamfering control as well as its extension in the apico-coronal, bucco-oral and middle-lateral dimensions.

Treatment of oro-antral communication (OAC) with titanium mesh: a case series

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Aim: Oro-Antral Communication (OAC) can be defined as a pathological condition in which an open connection is created between the oral and the maxillary sinus cavities. It represents a frequently encountered complication in the surgical practice of the latero-posterior region of the maxilla. Although various techniques have been proposed, the successful long-term closure of OAC is still one of the most complex problems to be faced in oral and maxillofacial surgery. The aim of this study is to prove the efficacy of a one-stage surgical procedure, consisting of an otorhinolaryngologic (Functional Endoscopic Sinus Surgery, FESS) and odontoiatric approach (titanium mesh application), for the treatment of OAC associated with odontogenic sinusitis. In particular, we aim to demonstrate that the use of a titanium mesh may guarantee optimal support and stabilization of soft tissues and may promote guided bone regeneration, thus resulting in excellent success rates in the surgical treatment of this type of defect.

Methods: Twenty-two patients affected by OAC underwent a one-stage surgical procedure consisting of a FESS technique associated with the toilet of the



oro-antral fistula and the closure of the OAC by a titanium mesh and a mucoperiosteal vestibular flap. A postoperative antibiotic and cortisone-based therapy was prescribed. Patients were then re-evaluated, with both otorhinolaryngologic and odontoiatric check-ups. The otorhinolaryngologic visit consisted of clinical examination and Fibroscopy. The odontoiatric visit, in the context of which a sample of four patients was examined, consisted of clinical examination, intraoral radiography and Cone Beam Computer Tomography. Bone regeneration with complete closure of the defect was the primary outcome considered.

Results. A 90.9% success rate was recorded, while the remaining 9.1% of cases failed. The two cases of failure were probably referred to the systemic conditions of the patients, that were smokers and with osteoporosis. In 50% of the cases the formation of new bone tissue was confirmed. In 31.8% of cases fibrous tissue with traces of bone tissue and in 9.1% of cases fibrous tissue without traces of bone tissue were observed.

Conclusion: Although further studies are needed, especially RCTs including a more representative sample of patients, this case series proves that a one-stage combined surgical treatment could be an effective long-term and minimally invasive technique in the treatment of OAC. In particular, the titanium mesh, used as a guide in tissue regeneration, ensures the presence of a mechanical scaffold, good tissue stability and rapid healing both at the oral and sinus levels, with the disappearance of all symptoms. Finally, it also allows long-term dental rehabilitation of the area previously affected by the defect.

Summary of the treatment activity (years 2011-2018) in intravenous sedation of non-collaborating patients

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Aim: Providing dental care to patients with disabilities may require modifications to the traditional treatment plan. Special needs patients include individual whit physical limitations, medical complications, developmental problems and cognitive impairments. Oral health care teams should embrace an interdisciplinary approach to care this patient cohort. Therefore, these health care professionals must undergo to specialized training and the medical management should provide

a qualified equipment, services and programs. Clinical care of the special need patients should be based on risk assessment, in which the general health status is correlated to the level of collaboration level and to the dental needs. Techniques for behavioural management must be initially used, but in case of failure, sedation is an alternative to the patient who is not to be subjected to general anaesthesia. Monitored anaesthesia care (MAC) has been described as a specific anaesthesia service for diagnostic or therapeutic procedures performed under local anaesthesia along with sedation and analgesia, titrated to a level preserving the spontaneous breathing and airway reflexes. MAC essentially comprises of three basic components: A safe conscious sedation, measures to allay patient's anxiety, and effective pain control. This study reports the activity of the Department of Surgical and Special Odontostomatology of Ancona, during the years 2011-2018.

Methods: Patients records who underwent to the MAC protocol in the period between 2011-2018 were analysed. The health cares were divided in 3 macro-areas (hygiene, conservative and surgery) and the numerical data were processed using calculation software (Microsoft Excel, Microsoft TM).

Result: An average of 111 patients / year underwent to MAC protocol treatment. The duration of each procedures was 28.33 minutes. The 52.2% of performing cares was conservative treatments, the 30.2% were professional hygiene sessions and the 17.6% surgical procedures.

Conclusion: Dental health professionals need to be prepared to accommodate patients with special needs, regardless of the type of disability. Caring these patients requires pre-treatment planning and proper assessment, including scheduling appointments, performing a thorough medical/dental history in consultation with physicians, social workers and caretakers, and appropriate patient communication. Intravenous conscious sedation is certainly a very useful technique in a large number of both diagnostic and surgical services, which can be used in the traditional operating room and in adequately equipped alternative locations. The technique has proven effective in ASA 1-2 patients, finding a considerable degree of satisfaction from patients and family members without neglecting the reduction of stress on the operator. An individualized anaesthetic plan and management and teamwork between the dentist and anaesthesiologist are key points to guarantee safe, successful, and satisfactory anaesthetic procedure.

Non-transfusional hemocomponents: from biology to the clinic - a review

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Aim: Non-Transfusional Hemocomponents are autogenous products prepared by centrifugation of a patient's blood sample. These preparations can be solutions or gels and can be injected. Non-transfusional blood components for surgical use are innovative instruments of regenerative medicine and are widely used in clinical and surgical practices that require tissue regeneration. Different techniques are available for platelet concentrates, therefore there are various products with different biological characteristics and clinical uses. They can be classified into four main categories: pure PRP (P-PRP), leukocyte rich PRP (L-PRP), Pure PRF (P-PRF) and white blood cell-rich PRF (L-PRF). The objective of this study was to review the literature on this topic highlighting their use in regenerative dentistry.

Methods: Literature review on clinical applications. Prevention of hemorrhagic complications after dental extraction: Platelet hemocomponents have been used to prevent post-operative hemorrhagic complications in dental extractions in heart surgery patients treated with artificial mechanical heart valves. For example, PRP gel or PRF placed in the alveolar socket after extraction without any heparin administration after the suspension of oral anticoagulant drugs allowed for an adequate hemostasis after the dental extraction. Reconstructive and implant surgery: In implant surgery, PRF membranes have been used to cover the head of the implants and thus act as a fibrin bandage between the allograft and the gingival tissue. Moreover, the use of PRF led to a substantial thickening of the keratinized gingival tissue around the implants, playing a significant role in enhancing the stability of the grafted bone surface and in determining the final result of prosthodontic rehabilitation, improving the aesthetic integration. PRF seems to reduce post-operative pain and edemas and to limit infections. Thus, the control of inflammation seems to be another advantage resulting from the use of PRF during bone grafting. Periodontology: The effect of platelet concentrates in periodontology is controversial. PRP and PRF have been used to induce and accelerate bone regeneration in the treatment of periodontal defects at the distal root of the mandibular second molar after the surgical extraction of mesioangular impacted mandibular third molar. A notable reduction in the probing depth and an improvement in the probing attachment level have been found. Orthopedics: Preclinical studies support the use of PRP for the treatment of tendon injuries and disorders, ligament injuries, and muscle injuries. Moreover, PRP can stimulate chondral anabolism and

reduce catabolic processes, and may improve joint homeostasis reducing synovial membrane hyperplasia in osteoarthritis. Plastic Surgery and Dermatology: PRP has been successfully used to improve wound healing when used for skin chronic ulcers. More recently, interest has been increasing in the application of PRP in dermatology, particularly in skin rejuvenating effects. It has also been trialed as a new therapy for androgenetic alopecia.

Conclusions: Studies of blood-derived biomaterials are increasing in efforts to create different therapeutic formulations that can adapt to the needs of various biomedical applications, including orthopedic and maxillofacial surgery, sports medicine, bone reconstruction, tissue engineering, and cosmetic and dental implant surgery. The authors' efforts will be directed toward research and clinical trials under rigid protocols to improve the effects of these products, especially in regenerative procedures.

Central giant cell granuloma of the mandible associated to dental implant: a case report

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Aim: To report a case of a central giant cell granuloma (GCG) of the mandible developed following implant placement and successfully treated through surgical excision.

Methods: An otherwise healthy, caucasian, 56-year old female was referred to the section of Oral Medicine and Oral Surgery of the University of Parma, because of the presence of a radiolucent, well-defined area in the left mandible. The patient reported no history of smoking and alcohol consumption and the anamnesis was negative for systemic disorders. At clinical evaluation, it was noticeable a well-circumscribed, non-tender, painless, swelling, of approximately 2 cm in the lower left premolar area. The orthopantomography showed a radiolucent area in the third quadrant (roots of 3.3 and 3.4), adjacent to the mesial surface of an implant 3.5, which was placed 8 months before. Both teeth had signs of old root canal treatments (most probably silver cones). The patient reported that endodontic treatments were performed at least 10 years before. Differential diagnosis included odontogenic (inflammatory) cyst, odontogenic tumour and fibro-osseous lesions (e.g. giant cell lesion). After the evaluation of an orthopantomography performed one year earlier, odontogenic cyst was excluded because the lesion was not visible before implant placement. A



mucoperiosteal flap with a mid-crestal and two lateral incisions was performed under local anaesthesia. The lesion, which was solid in nature and was made of soft, friable tissue, was removed. An osseous curettage was performed to remove possible small fragments adherent to the bone. The specimen was fixed in formalin and submitted for histopathological evaluation.

Results: The histological examination revealed connective tissue containing many multinucleated giant cells surrounded by ovoid and spindle-shaped mesenchymal cells with multiple interposed blood vessels. A final diagnosis of central GCG, possibly associated to the implant placement, was rendered. Serum test showed normal calcium and phosphorus levels, while overexpression of angiogenic protein basic fibroblast growth factor (bFGF). Complete healing occurred in 2 weeks follow-up and the orthopantomography, performed after 8 months, did not highlighted signs of recurrence.

Conclusion: The etiopathogenesis of central GCG is mostly unknown. Local irritation or reaction to foreign body have been advocated as possible trigger factors. Central GCT associated to a dental implant is extremely rare. Few reports in the anterior mandible have been reported, so far, and it seems to be more common among young men. Treatment of choice is surgical excision, followed by cavity curettage because of the high potential of recurrence. The present case may lead to hypothesize that the presence of peri-implant particles can induce macrophages recruitment, possibly leading to the development of central GCG.

Oral squamous papillomas: different surgical strategies outcomes of 251 cases

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Aim: Human Papilloma Virus (HPV) are members of the Papillomaviridae virus family which is divided into 39 genera. Uptodate more than 250 different HPV types have been identified and categorized in five different genera: Alpha-; Beta-; Gamma-; Nu- and Mu-papillomaviruses. HPVs with tropism for oro-genital mucosal epithelia belong mainly to Alphapapillomaviruses genotype: the alpha genus

are therefore of main clinical importance as this group contains both "so-called" low-risk and high-risk HPVs, responsible for a wide variety of clinical HPV-associated oral lesions. Oral HPV infection is often associated with benign lesion such as squamous cell papillomas and condylomas. Focal epithelial hyperplasia (FEH) is also characterized by multiple HPV-associated lesions, it is a benign familial disorder with autosomal-recessive inheritance. Less frequently, HPV is associated with precancerous and malignant lesions: specific types such as HPV-16 and HPV-18 are strongly involved in the multifactorial process of oropharyngeal squamous cell carcinoma development. The present study aims to analyze and compare epidemiological aspects of 251 HPV benign lesions treated with three different surgical approaches.

Materials and methods: Two hundred fifty-one benign HPV associated lesions (i.e. papillomas or condylomas) were surgically treated at the Center of Oral Medicine, Pathology and Laser Surgery of the Academic Hospital at the University of Parma, between January 1998 and December 2019. After local anesthesia, excisional biopsy was performed either with:

- traditional cold blade 15C;
- molecular quantum resonance (RQM) scalpel;
- Nd:YAG laser (1064 nm, 3.5w, 70Hz).

When needed, suture was placed and removed during follow-up visit after one week. Histopathological examination was conducted after each excisional biopsy to confirm the diagnostic hypothesis. Minimum follow-up time to be included in this study was 6 months. A retrospective epidemiological analysis was conducted regarding: gender, age, site of the lesion, surgical technic and eventual recurrence.

Results: Two hundred fifty-one benign HPV associated lesions were surgically removed in patients mean age of 50 yo, mini. 8 years old max. 85 years old. One hundred forty-three lesions (56,9%) belonged to female patients and 108 (43,1%) to male. Our study showed HPV associated lesions to be localized in almost half of patients (47,9%) on tongue or hard palate, less frequently in cheeks (16,3%) and upper or lower lips (14,4) and in less than 10% of patients on soft palate. Forty-nine lesions (19,5%) were treated with Nd:YAG laser, 32 with RQM (12,7%) and 170 (67,8%) with cold blade scalpel. Recurrence was observed in 8 patients (3%), after a mean time of 14 months. Recurrence occurred in 6 patients treated with traditional surgery (75%), in one patient treated with laser surgery and in one patient treated with RQM scalpel (12,5%), meaning that 3,5% of patients treated with cold blade and 3,1% patients treated with RQM presented with recurrence while only 2% of patients treated with laser surgery had to undergo a second surgery.

Conclusions: Screening and early treatment of HPV-associated lesions is key to prevent oncologic diseases

development. Histopathological examination, possibly with viral genotyping is crucial for definitive diagnosis and predict the level of patient's risk. Hard palate and tongue were highlighted as most commonly involved sites while the complete surgical excision was confirmed to be the gold standard treatment, with low instances of lesions recurrence. Laser surgery was highlighted to be a valid treatment option due

to its high selectivity for hemoglobin which allows a good hemostasis and its photobiomodulation action that promotes minimal pain and post surgical complications. Furthermore, high temperature reached by surrounding excised tissue (thermal wave of about 5 mm) lead to deep decontamination of surgical area, resulting as a counteract to HPV spread infection and recurrences.

Maxillo-facial surgery

Traditional versus digital surgical planning in bimaxillary orthognathic surgery

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Aim: The aim of this study was to compare the accuracy of jaws repositioning in bimaxillary orthognathic surgery using traditional surgical planning and digital surgical planning.

Methods: A total of 50 patients who had undergone an orthodontic – surgical treatment with bimaxillary surgery were included in this study. The patients were divided into two groups: n = 25 for the traditional surgical planning group and n = 25 for the digital surgical planning group. All patients of both the groups met the inclusion and exclusion criteria determined prior to start the study. The mean patient's age and the distribution by gender were similar in the two groups. A two – dimensional presurgical visual treatment objectives was prepared for all patients by the maxillo – facial surgeon who performed all the 50 surgeries. In the traditional surgical planning group, the surgical planning and the fabrication of the surgical splints were performed on plaster models mounted in an articulator. In the digital surgical planning group, the planning of surgical displacement was digitally performed with a software and the surgical splints were obtained with CAD/CAM method. For each patient of both groups the outcome of the surgery was compared with those planned, by comparing the cephalometric measurements of the presurgical visual

treatment objectives with those obtained in the after surgery's cephalometry, which was done in a lateral teleradiograph performed a few days after surgery.

Results: The statistical analysis showed that the measurements planned on the presurgical visual treatment objectives and those obtained on the after surgery's cephalometry can be considered equivalent in the digital surgical planning group, as well as the surgical movements of the skeletal basis obtained with the surgery compared to those planned. For the traditional surgical planning group, the statistical analysis showed equivalence only for one of the measurements considered for the comparison. By comparing the results of the two group, the digital surgical planning group presented a lower level of error than the traditional surgical planning group.

Conclusions: This study showed that surgical accuracy of jaws repositioning in bimaxillary orthognathic surgery in the studied court was higher for the digital surgical planning group compared to traditional surgical planning group.

Lung adenocarcinoma mandibular osteolytic secundarism: a review of the literature and a case report of mandibular fracture

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Aim: The oral region is an uncommon site for tumor metastasis and is usually evidence of a widespread disease. The jawbones, particularly the mandible, are more frequently affected than the oral soft tissues, and lung is one of the most

common primary sites. The purpose of this report is to discuss published literature about mandibular metastasis from pulmonary tumor and, to present a clinical case of a pathological mandible fracture due to metastatic pulmonary adenocarcinoma.

Methods: We reviewed the English literature up to 2019 by first evaluating the articles concerning metastasis of the jaws, and secondly, by taking in consideration only the articles dealing with jawbones metastatic lung cancer. This decision was made to better investigate the clinical case that occurred to our clinic. In July 2018, a non-smoking 68-year-old male patient, came to our clinic, referred by the geriatric ward, for a specialist evaluation. He complained of pain (VAS: 5) in the right temporomandibular region exacerbated over the past few days, by chewing, and resulting in functional limitation. The patient has been hospitalized with a primary diagnosis of pulmonary adenocarcinoma (T2-T3 N2 Stage IIIA) diagnosed in December 2017 and treated with a completed course of radiotherapy and chemotherapy. High dosage therapy of corticosteroid led to heart and liver complications as well as vertebral collapse. A head CT scan with contrast medium and fine-needle aspiration of the lesion were performed. CT showed a right mandibular condyle fracture associated with a large osteolytic lesion located at the neck of the condyle. The lesion size was approximately 9mm x 6mm x 17mm. The lesion was characterized by irregular margins and cortical involvement both on the medial and lateral sides. The above confirmed the pathological nature of the fracture. Suspicious lymphadenopathy was not observed in the cervical lymph nodes. Fine-needle aspiration of the metastatic lesion confirmed the presence of medium and large sized adenocarcinoma cells.

Results: We took in consideration more than 20 articles concerning jawbones metastasis from pulmonary primary site. In about 30% of cases the oral lesion was the first sign of the malignant disease; in more than 70% of all cases the clinical situation was critical, and patients deceased within 12 months. In the mandible, the molar area is the most frequent metastatic site followed by the premolar area and gonion; condyle localization is rare. The classic symptoms are pain and paresthesia but they may vary according to location. Similar symptoms can be the result of odontogenic infection, trauma, benign odontogenic tumors, systemic disease. Radiographic appearance, although non-specific, raises the suspicion of malignancy with most lesions present as a lytic radiolucent lesion with ill-defined margins. In our case, it was not possible to proceed with a mandibular resection due to the critical clinical condition of the patient who died in September 2019.

Conclusions: Panoramic radiographic examinations should be indicated in cases of known pulmonary malignancy, in order to evaluate the

presence of possible osteolytic lesions of the jaws. In patients showing symptoms not closely related with the intraoral clinical situation, and with reasonable suspicion, second level imaging studies and other diagnostic manoeuvres should be performed to allow early diagnosis and better prognosis.

Airways outcomes of mandibular distraction osteogenesis vs tongue-lip adhesion and tracheostomy in Pierre Robin sequence: a literature review

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Aim: This study was conducted to determine the effectiveness of Mandibular Distraction Osteogenesis (MDO) in the treatment of airway obstruction in Pierre Robin Sequence. (PRS) In particular, the aim of this study is to evaluate whether MDO can relieve the airway obstruction in PRS patients and its advantages in contrast to the other procedures (tracheostomy and tongue-lip adhesion).

Methods: A clinical review of the current literature was performed to evaluate the efficiency of mandibular distraction osteogenesis in the treatment of the airways problems in PRS newborns. The scientific research was conducted by using Pubmed database. A combination of the following search terms was used: Pierre Robin Sequence AND Airways obstruction AND Mandibular Distraction. Original articles, literature reviews and randomized studies were included. The inclusion criteria were applied to identify studies in children with clinical evidence of PRS, including both syndromic and non-syndromic patients. The exclusion criteria were the following: not English articles, articles not considered relevant.

Results: The research identified a total of 11 articles. PRS is characterized by micrognathia, glossoptosis and upper airway obstruction, associated with U/V-shaped cleft palate. Micrognathia causes upper airway obstruction due to the posterior collapse of the tongue and physical obstruction of the oropharyngeal and hypopharyngeal regions. The gold standard of the airways obstruction treatment in these patients is tracheostomy, which immediately relieves the upper airway obstruction. However, the mortality rate is 1-4% and the swallowing dysfunction speech and language developmental problems and late decannulations make tracheostomy an option fraught with serious limitations. The other procedure is tongue-lip adhesion, which consist of the surgical adhesion



between tongue and lip. This kind of treatment has the success range between 57.1% and 84%, however dehiscence rate is 57% which lead to post-operative glossoptosis and airway obstruction that had to be solved by tracheostomy. MDO is a relatively newer procedure that has become very popular for the PRS treatment; its goal is the improvement in breathing and oxygenation by normalizing the upper airway size and shape: the tongue attachments are stretched to the mandible, that positions the tongue anteriorly, relieving the glossoptosis.

Conclusion: The results of the present study confirm that the MDO in the neonates with PRS is an effective treatment option to safely relieve the upper airway obstruction associated with micrognathia and it is a valid alternative of tracheostomy and tongue-lip adhesion. The mandibular advancement could increase the mean airway volume, the anteroposterior dimension of airway in middle of retroglossal area and the retropalatal area, eliminating symptoms of airway obstruction, along with the need of tracheostomy.

How to solve airway and feeding problems in newborns with Pierre Robin sequence: conservative vs surgical management. A literature review

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Aim: This study was conducted to find a method to solve airway and feeding problems in Pierre Robin Sequence (PRS): the aim is to recognize the gravity of signs and symptoms and decide when to use conservative or surgical treatments.

Methods: The scientific research was conducted by using Pubmed database. A combination of the following search terms was used: Pierre Robin Sequence AND Feeding, Airway problems AND Treatment. Original articles, literature reviews and randomized studies were included. The inclusion criteria were applied to identify studies in children with clinical evidence of PRS, including both syndromic and non-syndromic patients. The exclusion criteria were the following: not English articles, articles not considered relevant.

Results: The research identified a total of 9 articles. PRS is characterized by mandibular retrognathia, glossoptosis, often U-shaped cleft palate, resulting in airway obstruction and feeding difficulties, these patients should be evaluated by a multidisciplinary team to assess the airways anatomic findings, delineate the source of obstruction, and address feeding issue. Difficulties in breathing and eating due to the mandibular hypoplasia may cause delayed growth, chronic aspiration, gastroesophageal reflux,

defects in speech, Obstructive Sleep Apnea Syndrome (OSAS), otitis media and death.

The diagnosis of PRS should be assessed through clinical and instrumental analysis. The clinical analysis consists of evaluating the condition of the severity of micrognathia, upper airways and feeding problems. A low dose CT scan is important to evaluate the micrognathia, while the upper airway anomalies should be diagnosed by nasofibrolaryngoscopy, and the lower airway ones should be diagnosed through bronchoscopy. Another objective study that can be carried out is polysomnography, that can document oxygenation, gas exchange and OSAS frequency and duration. Feeding problems are the following: choking, gagging, regurgitation, distress, impaired intake, insufficient weight gain. The most common instrumental exams are videofluoroscopic and fiberoptic endoscopic studies of swallowing.

After evaluating the new-born condition, it is mandatory to classify the its severity and verify if some other genetic conditions coexist with PRS, such as Stickler Syndrome, Treacher Collins Syndrome, Nager Syndrome and Bilateral Emifacial Microsomia. Therefore, the multidisciplinary team should assess the severity of the PRS case. In mild cases, the parents should have some rules and instructions (prone positioning) to improve the airways space. In severe cases, there are three treatment options: tracheostomy, Mandibular Distraction Osteogenesis (MDO), tongue-lip adhesion and palatoplasty if it is necessary for the U-shaped palate,

Conclusion: It is very important to develop a diagnostic protocol of the cases in order to assess their severity and treat them as mild or severe PRS, thanks to the clinical and instrumental diagnosis at birth –clinical evaluation of symptoms and signs, polysomnography, nasofibrolaryngoscopy, videofluoroscopic and fiberoptic endoscopic studies of swallowing and evaluation of associated syndromes.

Upon the surgical management of pathological fractures of the jaws associated with hidden cysts. Two case reports

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Aim: Pathological fractures of the splanchnocranium are quite rare. They occur when a weakening of the bone is generated by unrecognized bone diseases (or surgical practices) and in that cases the fracture rhyme results in proximity to the lesion. This paper has the aim to describe different surgical management of two maxillary bone's fractures related

to cysts, in order to promote a new surgical approach.

Methods: Examining CT scan of our first patient, a 54-year-old woman with a history of accidental trauma, not only a zygomatic - maxillary complex (ZMC) fracture was found, but also an intrasinus cystic lesion that (22.5 x 28.8 mm) had been expanded massively the anterior and lateral walls of sinus. At first, alterations in cutaneous sensitivity or damage to eyesight were excluded; later antibiotic therapy was set and up to 4 days a surgical session in GA was planned. On surgical time we recognized that the right buccal cortex of the maxilla was deformed by the lesion. After isolation of the right infraorbital nerve, the maxillary fracture was reduced, fixing it with a microplate and titanium screws. Necrotic elements 15 and 16 were extracted (the apexes were included in the lesion) and the cyst was easily enucleated using the bone gap created by the fracture's rhyme. Then the anterior maxillary wall was replaced and, in order to overcome bone fragility, a large titanium plate was fixed. The procedure ended with reduction and fixation of other fractures and intraoral and cutaneous sutures.

Afterwards to our observation, a 21-year-old boy with a traumatic mandibular fracture hesitated after a scuffle. The physical examination excluded paresthesias, but showed altered occlusion and mandibular excursions. Looking at orthopantomography and CT, we discovered two fractures of the mandible: one left paramedian and another nearby element 38. Moreover, as occasional finding, we detected a cystic lesion. After 6 days, we were in surgical session in GA. A full thickness flap from 33 to 43 was set and a traditional approach was chosen by opening a vestibular bone trap helped by piezoelectric instrument. Within the endosseous cavity only blood and minimal residues of soft tissue were found. Finally the bone trap was repositioned, the fractures were reduced using miniplates and fixing screws and the flap was repositioned and sutured. Ended the surgical time, a intermaxillary fixation has been applied and maintained for 15 days.

Results: Histological examination of the first case gave a diagnosis of odontogenic cyst . At 13 days after surgical session the facial symmetry and the physiological eye's mobility was restored; the surgical wound was on way of consolidation. On the other hand the histological examination of the fragments found within the bone deficiency that caused the mandibular fracture confirmed a diagnosis of SBC. Within 21 days good stability of the applied titanium plates, optimal healing of hard and soft tissues and physiological mandibular movements were seen.

Conclusion: Using the same surgical time to enucleate cyst and reduce a pathological fracture has the rationale to improve postoperative morbidity and prognosis. Therefore, if the more traditional approach

has its undoubted value, the opportunity to access the cystic lesions from using the gap caused by the fracture line, how we decided to approach our first case, should be, in our opinion, taken into serious consideration in similar clinical and surgical situations.

Modifications at surgery to enhance the prosthetic prognosis in the patient with mandibular defect: a review of the literature

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Aim: The prosthetic treatment is a viable option for restoring the esthetic-functional state that was altered by the surgical resection which caused a mandibular defect. Unfortunately, not all mandibulectomy procedures are often made taking into account the prognosis of subsequent prosthetic rehabilitation. The present review was aimed to assess the surgical procedures to improve the prosthetic prognosis in patients with mandibular defect.

Methods: An extensive search of the literature was performed, on the databases of PubMed/Medline, Scopus, Embase, Google Scholar, Dynamed and Grey Literature, in addition to congress proceedings and books, written in English or Italian. Literature search was performed using combinations of the following keywords: ("prosthesis" or "prosthetic") AND "prognosis" AND "mandibulectomy"; ("prosthesis" or "prosthetic") AND "prognosis" AND ("defect" OR "reconstruction" or "resection") and ("mandibular" or "mandible"). Studies were deemed suitable for this review if they met the following criteria for inclusion: 1) studies providing useful indications about the surgical procedures to improve the prosthetic prognosis in patients with mandibular defect; 2) in vivo studies and 3) studies published in Italian or English language. Studies fulfilling at least one of the following exclusion criteria were excluded from the review: 1) in vitro studies and 2) studies published in languages other than English or Italian.

Results: After the databases search, the selection process yielded 43 papers, while after the manual search, 7 books and 3 congress proceedings were included. With this literature search, the authors identified the surgical modifications to improve the prosthetic prognosis in patients with mandibular defects. These included: the need for a sufficiently large oral orifice, the intraseptal bony cut and the



direction of the mandibular resection lines, the importance of tooth preservation, the usefulness of skin grafting and vestibuloplasty, the management of patients under radiotherapy, and the possible removal of the coronoid process. Free flaps, implant rehabilitation, and new digital technologies were also extensively examined.

Conclusion: To enhance the prosthetic prognosis, the surgeons must preserve the tongue mobility and as many teeth as possible. Also, the surgery that affects the lips should try to maintain or restore mobility and sensation, contour, intercommisure distance, and labial vestibules; skin graft and vestibuloplasty could be needed, while intraseptal bony cuts and specific directions of the resection lines are strictly recommended. Moreover, also the use of fibula graft, osseointegrated implants, and digital technologies can improve the prosthetic prognosis.

Orthodontic-surgical treatment of severe Class II dento-facial discrepancy in a patient presenting Treacher Collins syndrome morpho-genetic traits

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Aim: Treacher Collins syndrome (TCS), also known as Facial-Mandibular dysostosis, is a cranio-facial malformation resulting from a genetic disorder and presenting with typical structural and functional impairment of more than one system within the cranio-facial district. This syndrome is characterized by deformities of the ears, eyes, cheekbones, and chin. Diagnosis is generally based on symptoms and X-rays, then confirmed by genetic testing. TCS is usually autosomal dominant but more than half of all cases presents a new mutation. The involved genes may include TCOF1, POLR1C or POLR1D. Some individuals are so mildly affected that they remain undiagnosed, while others have moderate to severe facial involvement and life-threatening airway impairment. TCS is often suspected from clinical signs and OMENS classification is used to determinate its grade. The name of the classification is an acronym that indicates five different dysmorphic features: Orbit size and position; Mandible hypoplasia; Ear deformity; Nerve involvement and Soft-tissue deficiency. Different techniques are used to confirm the diagnosis of TCS, in particular the cephalometric analysis which shows in affected patients hypoplasia of the facial bones

(malar bone, mandible, and mastoid). The aim of this case report is to describe the orthodontic-surgical management of severe Class II with both mandible retrognathia and maxillary prognathia in a TCS patient.

Methods: The present case report describes the orthodontic-surgical treatment of a young adult patient (a girl of 24 years old) with a chromosomal disorder (5q31.3-33.3 on TCOF1 gene). She came to our observation, in San Michele Hospital, seeking orthognathic correction of TCS dysmorphic manifestations. She had a convex profile with labial incompetence, a skeletal Class II malocclusion, with a 10 mm OVJ due to mandible underdevelopment and hypoplasia of chin and mandible angles. She also had hypoplasia of zygomatic frontal process, lateral pterygoid plates, paranasal sinuses and mandible condyles. The treatment purpose was to improve the skeletal and soft tissue profile, to correct the dysmorphic manifestations and to normalize OVJ and OVB values. In order to improve the facial aesthetic, the surgical treatment with orthodontic presurgical dentaldecompensation was the chosen. The treatment plan consisted in bonding the upper and lower dental arches and performing the Straight-Wire sequences of archwires: 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. To achieve the best facial and skeletal results, modified extended Le Fort I osteotomy including the malar zygomatic processes was performed. A combined segmented osteotomy with 5 mm segmentectomy including the area corresponding to 1.4 and 2.4 (previously extracted) was performed to obtain premaxilla retrusion onto posterior maxillary segment. The entire maxillary complex was then impacted 4 mm vertically making the new OVJ 4 mm and the new FH^{NA} angle 87,5°. Since moving 4 mm forward the mandible would not have achieved significant improvements, for a better facial aesthetic, a 3 mm total maxilla advancement was performed making the new OVJ 7 mm and new FH^{NA} angle 91°. Bilateral Sagittal Split Osteotomy (B.S.S.O.) with 6 mm advancement and maxillae and mandible Rigid Internal fixation (R.I.F.) were performed to normalize the OVJ value. Finally, Medpor/Porex Angle Prothesis was placed, and extended genioplasty with 7 mm advancement was performed. In the following year after surgery, the orthodontic treatment continued to achieve interarch coordination and the fixed appliance was removed. Retention was provided by upper Hawley biteplate and lower 3-3 bonded lingual retainer.

Results: 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: In the next evaluations of the patient final

records, the major goals set at the beginning of the treatment were successfully achieved, providing the patient with adequate masticatory function and pleasant facial aesthetics.

IgG4-Related orbit mass: a diagnostic challenge

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Aim: The aim of the present study was to report a case of an orbital mass IgG4-related. IgG4-related disease (IgG4-RD) is a newly described systemic autoimmune disease, characterized by infiltration of IgG4+ plasma cells accompanied by tissue fibrosis of multiple organs throughout the body and swelling or tumor-like, nodular or proliferative lesions. It was initially described as affecting the pancreas, but commonly involves the head and neck region as well.

Case report: A 75-year-old female in good health came to our hospital on October 2019 complaining intermittent diplopia since August 2019. Clinical examination revealed the presence of a left orbital subcutaneous neof ormation. Subsequent CT with contrast medium showed a neof ormation of soft tissue the left eyelid which erodes the medial wall of the left orbit and the nasal process of the frontal bone. The chest radiography excluded pleuroparenchymal lesions. Blood exam highlighted an iron deficiency anemia framework. The clinical suspects were of a lymphoma, Mikulicz disease or Kuttner tumour. In local anesthesia an incisional biopsy of the mass was performed. The histopathological examination was not conclusive; inflammatory process with the presence of histiocytes, lymphocytes, granulocytes and plasma cells, (CD68+, CKS 100-, SMA-) which cause necrosis of the muscle structure. Serum immunoglobulin levels, including IgG4, were required and a second biopsy was performed in general anesthesia. Serum level of IgG4 were higher >135mg/

dL and pathological examination pointed out the presence of an intense intense lymphocytic infiltrate mainly plasma cell, with histiocytes and granulocytes. Immunohistochemistry highlighted the positivity of CD138 (negative: CD3, CD20) and ratio of IgG4/IgG positive cell > 50%. These results allowed a definitive diagnosis of ophthalmic IgG4-related disease as proposed by Umehara et al.(2017): Imaging studies show enlargement of the lacrimal gland, trigeminal nerve, or extraocular muscle as well as masses, enlargement, or hypertrophic lesion in various ophthalmic tissues. Histopathologic examination shows marked lymphocyte and plasmacyte infiltration, and sometimes fibrosis. A germinal centre is frequently observed. IgG4 β plasmacytes are found and satisfy the following criteria: ratio of IgG4 β cells to IgG β cells of 40% or above, or more than 50 IgG4 β cells per high-power field (400). Blood test shows elevated serum IgG4 (>135 mg/dl). Diagnosis is classified as 'definitive' when (1), (2) and (3) are satisfied; 'probable' when (1) and (2) are satisfied; and 'possible' when (1) and (3) are satisfied. Screening of the neck, chest, abdomen and pelvis with computed tomography did not reveal any other organ involvement. The patient underwent rheumatologic examination, and subsequent oral Prednisolone and Azathioprine treatment with resolution of the proptosis. There was also improvement of the eye pain. A CT was performed after 1 month and a reduction of the mass was highlighted.

Conclusion: In the head and neck region, IgG4 disease has been described to cause enlargement of the extraocular muscles, pituitary stalk, retrobulbar soft tissues, salivary glands, lacrimal glands, and cranial nerve branches. IgG4-RD commonly involves the maxillary and mandibular branches of the trigeminal nerve, with preferential involvement of the infraorbital nerves. The common differential diagnosis on radiology includes lymphoma, granulomatosis with polyangiitis, Sarcoidosis and Grave's orbitopathy. The degree of fibrosis in the affected organ is a major determinant of treatment response. Prognostically, orbital IgG4-RD usually shows dramatic response with steroids but relapses are common and hence long term low dose steroid or combination with immunosuppressant may be necessary.