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## The Fifth Bergamo Open Rhinoplasty Course

# Piezosurgery: A True Revolution for Nasal Bone Osteotomies in Rhinoplasty

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### BACKGROUND

In line with the modern trend toward minimally invasive surgery, the use of ultrasonic waves for cutting bone has recently been introduced in oral and maxillofacial surgery. This generally results in no visible injury to the adjacent soft tissues from the generated micromovements.<sup>1,2</sup> In rhinoplasty, the lateral osteotomy technique should not only be precise, reproducible, and safe but also minimize postoperative sequelae, including ecchymosis and edema.

The goal of this surgical step is to mobilize the nasal bones while simultaneously maintaining an esthetic contour. The use of ultrasound in rhinoplasty has the coincident aim of minimizing the surgical approach and overcoming many of the complications of this procedure.<sup>3,4</sup>

We present our own experience with a piezosurgery approach for nasal osteotomies, emphasizing the advantages of this method. We also suggest an innovative approach based on the navigation of the piezosurgery device.<sup>5</sup>

### MATERIALS AND METHODS

In this study, we used ultrasonic piezosurgery to perform sharp osteotomies in 183 patients via a percutaneous approach, without a subperiosteal tunnel. The osteotomy was continuous rather than perforating.

All patients were evaluated for ecchymosis, bleeding, edema, and scarring, immediately and at 1 and 2 weeks postoperatively. In addition, a prospective randomized pilot study<sup>6</sup> compared the outcome of post-traumatic rhinoplasty performed with 2 different external techniques: ultrasound osteotomy using the piezosurgery medical device (Mectron, Carasco, Italy) and traditional external osteotomy. A reduction in postoperative pain and local sequelae was demonstrated with the piezosurgery device. Three patients undergoing piezo-navigated rhinoplasty are presented.



**Fig. 1.** Osteotomy course after removal of soft tissue cover on cadaver. The osteotomy course is regular and continuous.

### RESULTS

Using ultrasound piezosurgery, we observed reduced bleeding during surgery and immediately postoperatively, minor edema and periorbital ecchymosis, and no visible scarring. Compared with a traditional external osteotomy, there was considerably less trauma, postoperative edema, and ecchymosis. In addition, a navigation system attached to the piezosurgery device provided a 3-dimensional view during the nasal bone osteotomy procedure.

### DISCUSSION

During osteotomies, the piezosurgery device decreases the risk of damage to surrounding soft tissues and to the most critical structures, such as nerves, vessels, and mu-

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Plast Reconstr Surg Glob Open 2016;4:e788; doi:10.1097/GOX.0000000000000769; Published online 29 June 2016.

**Disclosure:** The authors have no financial interest to declare in relation to the content of this article. The Article Processing Charge will be paid for by Organization of the 5th Bergamo Open Rhinoplasty Course.

**Bergamo Open Rhinoplasty Course:** PRS Global Open proudly publishes the abstracts and proceedings from the Fifth Bergamo Open Rhinoplasty Course that was held in Italy on March 15-19, 2016.



**Fig. 2.** Preoperative setting of the navigation system in a piezo-navigated rhinoplasty.

cosa.<sup>7</sup> Our experience using ultrasound for osteotomies in rhinoplasty started with a 2002 cadaver study that demonstrated a rapid linear cut, minimal or no internal mucosal damage, minimal periosteal detachment, and technical feasibility (Fig. 1).

Gerbault et al<sup>8</sup> claim that extensive exposure allows the surgeon to analyze and surgically correct deformities of the osseocartilaginous vault more accurately. However, when used in this way, the technique is too aggressive and the advantages imparted by the use of piezosurgery are not guaranteed.

### CONCLUSIONS

Our results support a relationship between minor surgical trauma and improved soft and hard tissue behavior during healing with piezosurgery. As such, this innovative technique represents a true revolution in bone surgery, opening a new era for delicate surgical approaches involving facial aesthetic bone.

The authors are developing an innovative navigation-guided piezosurgery rhinoplasty technique (Fig. 2) in which the possibility of performing osteotomies under navigational control permits a less invasive approach. The accuracy and reproducibility of surgery conducted in this manner are presently under evaluation.

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