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An Update on the Lateral Nasal Osteotomy in Rhinoplasty: An Anatomic Endoscopic Comparison of the External versus the Internal Approach

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In 1997, we performed an anatomic study of 19 fresh cadaver heads to compare lateral nasal osteotomies using the internal continuous technique and the external perforated technique.[1] Direct nasal endoscopy was used to evaluate the nasal mucosa after osteotomy, and it was found that 11 percent of external perforated osteotomies resulted in mucosal tearing as opposed to 74 percent of osteotomies performed by the internal continuous technique. Both procedures used 2-mm osteotomes. We concluded that the external approach was preferable because it results in a more controlled fracture with less intranasal trauma while minimizing associated morbidities of hemorrhage, edema, and ecchymosis.

Since our original study, several authors have refined the endonasal approach in an attempt to decrease the morbidity. Thomas and Griner[2] studied the use of narrow osteotomies in fresh cadavers and determined that there was a benefit to preserving nasal support while reducing postoperative edema and ecchymosis. Furthermore, Tardy and Denneny[3] found similar advantages when using a 2-mm to 3-mm osteotome. Kuran et al.[4] found a statistically significant difference in the extent of intranasal injury to cadaveric heads when using a 3-mm osteotome versus a 5-mm-wide osteotome (33 percent versus 94 percent). Finally, Becker et al.[5] also concluded that 2.5-mm to 3-mm osteotomes produced less intranasal trauma when used for intranasal continuous lateral osteotomies.

During the same period, we have refined our preferred technique of external perforated lateral osteotomy, which has proved to be well controlled, predictable, and reproducible.[6,7] Furthermore, there are certain unique advantages to this technique based on the preservation of the periosteal attachments, as follows[8]:

- Decreased amount of dead space
- Reduced subluxation and subsequent airway compromise
- Greater overall stability after positioning

Regardless of technique, however, the indications for lateral osteotomy remain uniform:

- To narrow the lateral walls of the nose
- To close an open-roof deformity (after dorsal hump reduction)
- To create symmetry by allowing for straightening of the nasal bony framework[9]

Before detailing our technique, it is important to understand the relevant anatomy of the underlying nasal bones. The thickness and density of the bony pyramid are critical to the lateral osteotomy because they affect the reproducibility of the procedure and the ability to control the final aesthetic result. Kuran et al.[4] studied the thickness of the osteotomized segments of the nasal pyramid and found that the average thickness did not exceed 2.5 mm. Harshbarger and Sullivan[10] confirmed these results by studying 17 cadavers. They drilled holes in a grid pattern

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along the lateral bony vault and measured the thickness with a depth gauge. Their results indicate that the bone is thickest at the radix and thins progressively along the lateral bony vault to the pyriform aperture. At no point along this course does the bony thickness exceed 2.5 mm. The fracture patterns after greenstick fracture of the osteotomized segments reliably followed this thickness gradient. These studies demonstrate that this transition region of the lateral bony vault can be reliably osteotomized with a small osteotome and can give predictable fracture patterns.

Although lateral osteotomies are typically performed as one of the last steps in rhinoplasty (after the dorsal nasal height, septum, and tip have been adequately addressed), the low-to-high technique can be performed at any time during the surgical sequence. The technique outlined below is our preferred technique[6,7]:

1. Inject the lateral nasal sidewalls as well as the intranasal walls with 2 cc of 1% lidocaine with 1:100,000 epinephrine and allow 5 to 7 minutes to elapse before incising.
2. Percutaneously introduce a sharp 2-mm osteotome on the midportion of the bony nasal pyramid at the level of the inferior orbital rim and nasofacial junction. Ensure that it is held at a plane parallel to the surface of the maxilla.
3. Sweep the osteotome down the lateral nasal sidewall in a subperiosteal plane to avoid injury to the angular artery.
4. Position the osteotome at an angle such that one edge is in contact with the bone, and strike with the mallet. The endpoints are a change in the feel and sound at that location.
5. Extend the osteotomy in an inferior, superior, and superior-oblique manner at the level of the pyriform. Leave a 2-mm gap between each individual osteotomy.
6. Perform the same procedure on the contralateral nasal wall.
7. After the osteotomies have been completed, use gentle pressure between the thumb and forefinger to perform a greenstick fracture of the nasal bones to position them in the desired location.
8. Cover the site with flesh-colored Steri-Strips and apply a dorsal compression splint (Denver splint) for 7 days to minimize postoperative edema.

Postoperatively, we recommend head-of-bed elevation, antibiotics for 3 days (cephalexin), a steroid taper (dexamethasone), and activity restriction. Furthermore, patients are instructed on how to perform nasal hygiene with nasal irrigation and sprays.

Although there are many ways to perform lateral osteotomies, we have found predictable, reproducible results with our refined external perforated technique. It is well controlled and has minimal postoperative morbidity, including access incisions that are virtually imperceptible at 4 to 6 weeks. We believe that this technique still holds advantages over the modified intranasal continuous technique in that it preserves the periosteal attachments, which decreases dead space, reduces airway compromise, and affords greater stability after positioning.

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Discussion

An Update on the Lateral Nasal Osteotomy in Rhinoplasty: An Anatomic Endoscopic Comparison of the External versus the Internal Approach

Discussion by John J. Minoli, M.D.

In their Cosmetic Follow-Up article, Rohrich et al. clearly elucidate the advantages of the external lateral nasal osteotomy and provide a succinct step-by-step guide on how to perform the maneuver. They appropriately reference clinical work that demonstrates the reproducible, precise nature of the technique and the minimization of postoperative ecchymosis and edema.[1] Their article also delineates the proven advantages of preserving periosteal support via execution of a perforated osteotomy as opposed to a continuous one.[2–4] In deference to the widely used alternative endonasal approach, the authors offer an even-handed, comparative treatment of advances there too.[2]

The external perforated lateral nasal osteotomy has been described as a technique that leaves imperceptible scars.[1] Although it is true that scarring from the percutaneous approach is limited, the concept of an external incision conjures debate when an internal option exists. (Such was the case during the era when open rhinoplasty was still gaining popularity; that procedure produces a 4-mm to 5-mm external transcolumellar scar.) Here, the 2-mm external incision is situated at a natural aesthetic junction along the nasofacial boundary and is camouflaged by inherent shadowing. For several years, I have been using an external perforated lateral osteotomy made by a 2-mm osteotome and have found that the scars heal rapidly and are very difficult to see. My patients agree.

With regard to an important technical aspect, it has been demonstrated that the use of a narrow osteotome (i.e., 2 to 3 mm wide versus 5 mm wide) limits tissue injury.[2,5,6] Although more difficult to manipulate, a narrower osteotome offers clear advantages to the patient. If the point of using a 2-mm to 3-mm osteotome is granted, it would seem easier for surgeons with limited rhinoplasty experience to manipulate a narrow osteotome through the more direct external approach rather than through the oblique orientation mandated by the endonasal approach. In general, directness of procedure facilitates ease and reproducibility of a given technique, particularly in novice hands.

One final point of consideration: This follow-up article deviates from its original report with respect to the pathway of the lateral nasal osteotomy. The original article describes a high-to-low-to-high pattern, which allows for preservation of a small but important triangular wedge of maxillary bone at the pyriform aperture, thereby stabilizing the inferior turbinate and protecting nasal airflow.[7] This article describes a low-to-high pattern, omitting the concept of bony preservation at the pyriform aperture. It would be important to know in a subsequent study whether this variance of pattern discernibly affects nasal airflow, as has been shown in previous independent studies.[8–10]

In summary, the authors are to be commended for advancing this relatively atraumatic technique; it offers a high degree of control and reproducibility during a difficult rhinoplasty maneuver. Their article remains clear, concise, and clinically applicable.

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