

Effects of Rhinoplasty on the Internal Nasal Valve

A Comparison Between Internal Continuous and External Perforating Osteotomy

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Abstract: The purpose of the study was to compare the effect of 2 widely used methods of lateral osteotomy on the internal nasal valve (INV) by measuring minimal cross-sectional area using acoustic rhinometry (AR) and computed tomography (CT) in the pre- and postoperative setting.

Thirty adult patients noting nasal deformity requiring rhinoplasty were enrolled. Patients were divided into 3 groups of 10 patients. Patients in group 1 had bilateral lateral osteotomies by the internal continuous technique. In group 2, lateral osteotomies were performed by the external perforating technique. In group 3, osteotomies were performed by the external perforating technique on the left side and by the internal continuous technique on the right side in the same patient. Each patient had their INVs measured pre- and postoperatively at 6 weeks using AR and CT of the nasal bones.

Lateral osteotomy decreases the INV (measured by both AR and CT scan) ($P < 0.009$). There was no statistically significant difference between the 2 types of osteotomies with respect to the degree of narrowing on the INV (CT-derived $P = 0.24$ and AR-derived $P = 0.60$).

When comparing AR and CT data regarding the INV, we observed a measurable decrease in the nasal airway after lateral osteotomy in all patients. There was no statistically significant difference to conclude that either internal continuous osteotomy or external perforating osteotomy caused more narrowing of the nasal airway.

Key Words: rhinoplasty, spreader graft, septoplasty, osteotomy, rhinometry, internal nasal valve, internal continuous osteotomy, external perforating osteotomy

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Preserving nasal function is a paramount in rhinoplasty. It is known that osteotomy of the nasal bones has the potential for altering the nasal airway.^{1,2} Different techniques of lateral osteotomy may affect the internal nasal valve (INV), the narrowest segment of the nose.

The internal continuous technique of lateral nasal osteotomy is a common technique that increases the mobility of the bony vault to narrow the nose; however, in certain situations this maneuver may compromise the airway.^{3,4} The external perforating technique of

osteotomy has been stated as a more direct and precise method that may reduce postoperative edema and ecchymosis while decreasing nasal mucosal damage; authors have stated that this technique may result in a more stable greenstick fracture, which may decrease post-rhinoplasty airway narrowing.^{3,5,6}

Nonetheless, there is no objective consensus whether either lateral osteotomy method has more of an effect on the INV. The purpose of this study was to compare the effect of 2 widely used methods of lateral osteotomy used in rhinoplasty on the INV, by measuring minimal cross-sectional area (MCA) using acoustic rhinometry (AR) and computed tomography (CT).

METHODS

Thirty adult patients were enrolled in the outpatient clinic of a single institution from July 2003 to January 2005. There were 24 men and 6 women, and their age ranged from 20 to 45 years old with a mean of 25.7 ± 5.9 years old. The Ain Shams University Faculty of Medicine Board for Higher Education and Research approved the Institutional Review Board sponsored study, and this study conformed to the Declaration of Helsinki regarding patient research.

Inclusion criteria included consecutive patients with minimal medical history noting nasal deformity requiring rhinoplasty with osteotomies. Exclusion criteria included pregnancy, nasal trauma of < 6 months duration, nasal septal perforation, asthma, chronic sinusitis, nasal revision cases, and poorly controlled systemic medical conditions that included ischemic heart disease, severe hypertension, and diabetes mellitus.

Thirty patients were classified into 3 groups of 10 patients. Patients in group 1 (8 men and 2 women) had lateral osteotomies performed by the internal continuous technique bilaterally. Patients in group 2 (7 men and 3 women) had external perforating osteotomies performed bilaterally. Patients in group 3 (9 men and 1 woman), had osteotomies performed by external perforation on the left side and internal continuous on the right side (see Fig. 1).

The Eccovision Acoustic Rhinometry System (Hood Laboratories, Pembroke, MA) with an external nasal adaptor was used to measure the MCA at the internal valve area, or most narrow segment, of the anterior nasal cavity. Measurements were taken pre- and postoperatively at 6 weeks for all patients. The measurements were done for both nasal passages both before decongestion and 10 minutes after decongestion using 0.05% oxymetazoline hydrochloride nasal spray with 3 sprays per nostril. Decongestion was performed to eliminate mucosal variation attributed to the nasal cycle. For each patient, an appropriately sized external nasal adaptor was selected and a thin layer of ointment was applied to prevent acoustic leakage between the nostril and the adaptor. In particular, care was taken not to distort the external nasal valve anatomy and position during measurements. Measurements were repeated and averaged over 3 readings.

Axial and coronal CT scans of the nasomaxillary complex were performed pre- and postoperatively at 4 weeks using a spiral

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