Nasal Airway Preservation Using the Autospreader Technique

Analysis of Outcomes Using a Disease-Specific Quality-of-Life Instrument

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Objective: To measure the efficacy of a specific midvault reconstruction technique (the autospreader flap) in dorsal reductive rhinoplasty with a validated quality-of-life instrument.

Design: A prospective observational outcomes study of patients desiring reduction of the nasal dorsum who either (1) had no breathing obstruction, who underwent purely aesthetic rhinoplasty, or (2) had concomitant severe nasal obstruction due to septal deviation, internal valve narrowing, and/or turbinate hypertrophy, who subsequently underwent combined functional and aesthetic rhinoplasty. Preoperative and postoperative evaluation was performed using the Nasal Obstruction Symptoms Evaluation (NOSE) scale.

Results: Thirty-eight patients completed preoperative and postoperative evaluation. No complications occurred. Patients in the purely aesthetic group were noted to have low preoperative NOSE scores, with no change postoperatively. There was a significant improvement in mean NOSE score postoperatively for the combined functional and aesthetic group (P < .001).

Conclusions: Midvault reconstruction using the autospreader graft may help prevent postoperative nasal obstruction due to midvault collapse. Combining this procedure with dorsal reduction in functional rhinoplasty patients with traditional airway reconstruction techniques is effective in improving nasal airway function as measured by a patient-based, disease-specific quality-of-life instrument.


Maintenance of the structural integrity of the midvault in nasal surgery is paramount in preventing both cosmetic deformities (overnarrowing, inverted V) and nasal airway stenosis. This is particularly true in dorsal reduction surgery. Spreader grafts were first popularized by Sheen in the 1980s and have become the standard of care for midvault reconstruction. More recently, multiple authors have published novel techniques of using the redundant dorsal portion of the upper lateral cartilage as its own "autospreader" graft. One advantage of this technique is that it obviates the need to harvest septal cartilage. In cases where prior septoplasty has left only structurally essential dorsal and caudal struts, this technique may preclude the need to harvest ear cartilage, saving the patient unnecessary morbidity.

While several authors have examined the efficacy of functional rhinoplasty maneuvers using validated outcomes instruments, to our knowledge, no studies to date have evaluated outcomes in aesthetic reductive rhinoplasty patients using such instruments. In the present study, we sought to examine the effectiveness of autospreader grafts in preventing postrhinoplasty nasal obstruction in aesthetic rhinoplasty patients. To this end, we performed a prospective outcomes evaluation on patients undergoing aesthetic dorsal reduction surgery with or without concomitant functional rhinoplasty using the Nasal Obstructive Symptom Evaluation (NOSE) scale. The NOSE survey scale is a validated and disease-specific quality-of-life (QOL) instrument designed for use in patients with nasal obstruction.

STUDY DESIGN AND PATIENT SELECTION

The study was conducted at Stanford University Medical Center, Palo Alto, California, with the approval of the human subjects commit-
The study hypothesis was that patients undergoing cosmetic rhinoplasty with dorsal hump takedown and autospreader grafting, without pre-existing nasal obstruction, would not exhibit worsening of nasal obstruction. We also hypothesized that the use of autospreader grafts in patients undergoing combined aesthetic dorsal hump takedown and functional rhinoplasty would not diminish the benefits of other conventional airway augmentation maneuvers.

Outcomes were measured preoperatively and postoperatively with the NOSE questionnaire to determine the disease-specific QOL (eg, nasal obstruction symptoms). The NOSE scale is used to assess disease-specific QOL and is scaled from 0 to 100, with higher scores meaning more severe nasal obstruction. Baseline NOSE scores were obtained at a preoperative visit, and follow-up NOSE scores were obtained at postoperative visits.

Subjects included in the study were adult patients seen by a single surgeon for cosmetic rhinoplasty with dorsal hump takedown or a combination of both functional and cosmetic concerns.

**TECHNIQUE**

After exposure of the cartilaginous septum via a left-sided hemitransfixion incision, the upper lateral cartilages are disarticulated from the septum in a vertical fashion as close to the septum as possible to preserve the length of the upper lateral cartilage as well as minimize risk of injuring the mucosa ([Figure 1](#)). After removal of a dorsal hump, there is excess length of the upper lateral cartilages. Autospreader grafts are implemented by infolding of the redundant dorsal upper lateral cartilage after scoring. The infolded cartilage is secured with a horizontal mattress suture to the residual native upper lateral cartilage. Use of the mattress sutures facilitates the surgeon’s ability to make minor adjustments to the cartilaginous dorsum without need to resuture.

The disease-specific QOL instrument for nasal obstruction, the NOSE scale, was administered to all patients preoperatively and postoperatively. Statistical analysis was undertaken using a paired 2-tailed t test.

**RESULTS**

Thirty-eight patients completed preoperative and postoperative questionnaires. All patients underwent upper lateral spread grafts as described in the “Methods” section. The mean follow-up was 150 days (range, 30-619 days). Twenty-one patients underwent aesthetic rhinoplasty only, with no pre-existing history of nasal obstruction. Five of these patients had a septal cartilage graft harvested from the septum, though a functional septoplasty was not performed. Preoperative mean (SD) NOSE and visual analog scale (VAS) scores were low (13 [16] and 1.2 [1.6], respectively). Postoperatively, these patients exhibited a slight reduction in their mean (SD) NOSE and VAS scores, reflecting improved status, though this was not statistically significant (10.5 [12] and 0.95 [1.2]; P=.40 for both comparisons to preoperative values).

Seventeen patients who underwent functional rhinoplasty with concomitant aesthetic dorsal reduction submitted preoperative and postoperative surveys. All of these patients had adjunctive procedures performed such as septoplasty, inferior turbinate reduction, and/or bone anchored suture technique. Preoperative NOSE scores for these patients was comparable to that of prior studies and were significantly higher than the cosmetic-only group (57.4 [21]; P < .001 compared with the preoperative scores of the cosmetic-only patients [Figure 2A]). This was also true of the patients’ VAS scores (5.7 [2.2]; P < .001 compared with the preoperative scores of the cosmetic-only patients [Figure 2B]). Postoperatively, the combined functional and cosmetic surgery patients showed significant reductions in mean (SD) NOSE and VAS scores (17.3 [12.6] and 1.8 [1.4]; P < .001 for each compared with preoperative values [Figure 3]).

**COMMENT**

Reconstruction of the nasal midvault has long been understood to be an important aspect of functional and aesthetic rhinoplasty. Spreader grafts have been used by rhinoplasty surgeons since they were introduced by Sheen. Autospreader grafts are a useful, cartilage-sparing technique that allows
While functional rhinoplasty is a heterogeneous group of procedures such as septoplasty, bone-anchored sutures, and various grafting techniques to the lateral nasal wall, our study indicates that the use of autospreader grafts does not, at the very least, interfere with other functional rhinoplasty maneuvers. One drawback of this study is that it was not designed as a prospective, randomized trial. This, however, would have required some patients to undergo nasal reduction without midvault reconstruction. Given the aesthetic and functional consequences of failure to reconstruct the midvault, we elected to design a prospective observational outcomes study. Our study indicates that autospreader grafts are a safe and effective approach to prevent or treat midvault overnarrowing. Future studies of aesthetic or reconstructive nasal maneuvers should also be accompanied by outcomes measures.

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Figure 2. Comparison of NOSE (A) and VAS (B) scores before and after upper-lateral autospreader grafting in patients without pre-existing nasal obstruction. Patients were administered the NOSE and VAS questionnaires preoperatively and postoperatively after purely aesthetic rhinoplasty. Some have questioned the utility of such comparisons. NOSE indicates Nasal Obstructive Symptom Evaluation; and VAS, visual analog scale.

Figure 3. Comparison NOSE and VAS scores before and after upper-lateral autospreader grafting in patients without pre-existing nasal obstruction. Patients were administered the NOSE and VAS questionnaires preoperatively and postoperatively after purely aesthetic rhinoplasty, as noted in the “Methods” section. Data are given as mean (SD) (P=.40 for both comparisons). NOSE indicates Nasal Obstructive Symptom Evaluation; and VAS, visual analog scale.

a rhinoplasty surgeon to preserve the midvault width without the need to harvest cartilage from other locations. To our knowledge, no studies to date have attempted to examine the functional effectiveness of this technique (or any other midvault reconstruction technique) at preventing nasal obstruction in reductive aesthetic rhinoplasty.

Aesthetic rhinoplasty has been shown to be associated with a 10% risk of subjective airway impairment. Acoustic rhinometry has shown that the minimal cross-sectional area decreases considerably after reduction rhinoplasty has shown that the minimal cross-sectional area decreases considerably after reduction rhinoplasty. Some have questioned the utility of such quantitative measures as they do not necessarily correlate with patient symptoms. As such, we focus our outcomes analysis on a validated nasal questionnaire, the NOSE scale. The NOSE scale is a disease-specific QOL instrument that has been used extensively to measure the effectiveness of septoplasty, turbinate reduction, anterior septal reconstruction, and other functional procedures including repair of nasal valve stenosis. Using this measure, we demonstrate that autospreader grafts are effective in the prevention of postoperative nasal airway obstruction in patients undergoing cosmetic rhinoplasty with dorsal hump takedown.

Our results compared favorably with our prior studies on functional rhinoplasty using the NOSE scale.