Alar Setback Technique

A Controlled Method of Nasal Tip Deprojection

Hossam M. T. Foda, MD

Objectives: To describe an alar cartilage-modifying technique aimed at decreasing nasal tip projection in cases with overdeveloped alar cartilages and to compare it with other deprojection techniques used to correct such deformity.

Design: Selected case series.

Settings: University and private practice settings in Alexandria, Egypt.

Patients: Twenty patients presenting for rhinoplasty who had overprojected nasal tips primarily due to overdeveloped alar cartilages. All cases were primary cases except for one patient, who had undergone 2 previous rhinoplasties.

Intervention: An external rhinoplasty approach was used to set back the alar cartilages by shortening their medial and lateral crura. The choice of performing a high or low setback depended on the preexisting lobule-to-columella ratio. Following the setback, the alar cartilages were reconstructed in a fashion that increased the strength and stability of the tip complex.

Main Outcome Measures: Subjective evaluation included clinical examination, analysis of preoperative and postoperative photographs, and patient satisfaction. Objective evaluation of nasal tip projection, using the Goode ratio and the nasofacial angle, was performed preoperatively and repeated at least 6 months postoperatively.

Results: A low setback was performed in 16 cases (80%) and a high setback in 4 (20%). The mean follow-up period was 18 months (range, 6-36 months). The technique effectively deprojected the nasal tip as evidenced by the considerable postoperative decrease in values of the Goode ratio and the nasofacial angle. No complications were encountered and no revision surgical procedures were required.

Conclusions: The alar setback technique has many advantages; it results in precise predictable amounts of deprojection, controls the degree of tip rotation, preserves the natural contour of the nasal tip, respects the tip support mechanisms, increases the strength and stability of nasal tip complex, preserves or restores the normal lobule-to-columella proportion, and does not lead to alar flaring. However, the technique requires an external rhinoplasty approach and fine technical precision.


HE OVERPROJECTED nasal tip, commonly referred to as the Pinocchio- or Cyrano de Bergerac-type nose, is a relatively uncommon but challenging deformity. On evaluating the degree of nasal tip projection, which is defined as the distance that the nasal tip travels anterior to the facial plane, it is important to exclude factors that may cause an illusion of overprojected nasal tip, such as a deep nasofrontal angle, marked dorsal saddling, retrodisplaced chin, or short upper lip. The next step in evaluating an overprojected nasal tip is to properly analyze the anatomic factors that contribute to the development of such a deformity.

Anatomically, the nasal tip is supported by 2 cartilaginous arches formed by the medial and lateral crura of each side. The major support of the nasal tip is derived from the length and strength of these medial and lateral crura. Other important mechanisms that provide support and maintain projection of the nasal tip include the ligamentous attachment of the medial crural footplates to the caudal end of the septal cartilage, the fibrous connections between the upper and lower lateral cartilages, and the interdomal ligament, which spans over the anterior septal angle.

The most widely used tip deprojection techniques rely on weakening of the nasal tip support by adopting maneuvers that destroy one or more of the tip sup-
PATIENTS AND METHODS

This study was conducted on 20 patients (14 women and 6 men) with a mean age of 28.3 years (range, 18-54 years). All patients included in the study had overprojected nasal tips primarily due to overdeveloped alar cartilages. The patients had undergone no previous nasal surgical procedures except for one patient, who had 2 rhinoplasties done elsewhere. Preoperative assessment of the degree of nasal tip projection, by measuring the Goode ratio and the nasofacial angle, was performed using computer imaging as described in a previous article. These measurements were repeated at a minimum of 6 months after surgery and compared with their preoperative values. In addition, an overall nasal evaluation was performed, stressing the height of the nasal dorsum, length of the nose, nasolabial angle, amount of columellar show, and degree of tip definition and rotation. The basal view was analyzed for the width of the alar base, size and shape of nostrils, and the length of the lobule (part between the tip and the nostrils’ apex) compared with columellar length.

The nasal septum is approached first to correct any associated septal deviation and to harvest cartilage to be used later in the procedure. We prefer using a hemitransfixion incision to preserve the nasal tip support by keeping the medial crura attached to the caudal septum. The mucoperichondrial flaps are elevated, and the extent of undermining is determined by the site and degree of deviation. The deviated portions of the septum are resected, making sure to preserve at least a 1-cm strut of dorsal and caudal septal cartilage to maintain nasal support. Before closure of the septal incision, a long piece of cartilage is harvested from the ventral part of the septum near the maxillary crest, since the cartilage is found to be thicker and stronger in this area. The hemitransfixion incision is then closed with interrupted 3-0 chromic sutures, and the septal flaps are approximated together using 4-0 chromic sutures in a running mattress fashion. The alar setback technique, like other technically demanding nasal procedures, requires an external rhinoplasty approach. This approach provides the wide exposure necessary for the alar cartilage modifications to be conducted in a precise way under direct vision. Bilateral alar marginal incisions are connected via an inverted V-shaped transcolumnellar incision followed by carefully exposing the tip cartilages. The dorsal skin flap elevation is continued upward, making sure to stay in the avascular supraperichondrial plane, until reaching the nasofrontal angle. Alar cartilage modification starts by performing a conservative cephalic trim of the lateral crura to promote tip refinement. The width of the remaining lateral crus should not be less than 6 mm to maintain adequate tip support. The medial crura are spread apart, and any soft tissue found between them is excised using fine tenotomy scissors.

The level of the columella-lobular junction, which usually corresponds to the nostrils’ apex, is identified and marked on the medial crura using a marking pen. The vestibular skin is elevated off the medial crura at the columella-lobular junction, and a No. 15 blade is used to transect the medial crura at the previously marked level. Guided by the degree of tip overprojection, resection of a 3- to 6-mm segment of the medial crus is performed, making sure to leave the vestibular skin intact. Equal excisions are usually performed except if one dome is more projected than its mate; in that case, more medial crural excision is done on that side to equalize the heights of the new domes.

The level of excised segments of the medial crura is planned according to the preexisting lobule-to-columella ratio. If the columella was found to be disproportionately longer than the lobule, then a low setback (Figure 2A-B) is performed in which the cartilage excision is limited to the columellar segment of the medial crura. However, in cases that show a relative lobular redundancy (30% or more of nasal base height), only the lobular segment of the medial crus is shortened by a high setback (Figure 2C-D) to avoid any further increase in lobular length in relation to the columella, which may make the preexisting lobule-columella disproportion even worse.

After completing the medial crural excisions, a pocket is dissected downward between the medial crura, stopping short of the anterior nasal spine, and a strong columellar strut (3- to 4-mm thick) is fashioned out of the harvested septal cartilage and placed in the medial crural pocket. The cut ends of the medial crura are carefully approximated together and splinted to the interposed columellar strut using 5-0 polydioxanone sutures in a horizontal mattress fashion (Figure 1C).

Attention is now directed to the lateral crura, which are vertically transected at the junction of the lateral third to the medial two thirds (Figure 1B). Before transecting the cartilage, the vestibular skin is elevated from the undersurface of the lateral crus for about 5 mm on each side of the planned cartilage incision. The free proximal and distal ends of the transected lateral crus are then overlapped to the desired extent and fixed with a 5-0 permanent, transcartilagenous, horizontal mattress-type stitch (Figure 1C). The degree of cartilage overlap is guided by the amount of tip rotation required. If further narrowing of the nasal tip is needed, the domes are approximated together with a 5-0 permanent transdomal suture.

After completing the setback of the alar cartilages, the nasal dorsum can be safely lowered to fall in line with the deprojected nasal tip, and medial and lateral osteotomies are performed in a routine fashion. Finally, the nasal skin is redraped to its normal anatomic position, and the external rhinoplasty incisions are meticulously closed.
finding is overdeveloped alar cartilages with long medial and lateral crura. These cases represent the true Pinocchio-type nose, and adequate deprojection in this category is practically impossible without decreasing the size of the alar cartilages themselves.

In recent years, we have successfully corrected the overprojected nasal tip due to the overdeveloped alar cartilages by an alar setback technique. The technique uses an external rhinoplasty approach to set back the alar cartilages by shortening their medial and lateral crura, followed by reestablishing the alar cartilage anatomy in such a way that increases the strength and stability of the nasal tip complex. This article describes the surgical technique and results of that procedure.

**RESULTS**

Of the 20 patients, 16 (80%) had long nostrils and a disproportionately long columella (Figure 3A and C). In these patients, the columellar segment of the medial crura was shortened by using a low setback technique. The remaining 4 patients (20%) showed a relatively long lobule (Figure 4A and C), so a high setback was performed to shorten the lobular segment of the medial crura. The follow-up period ranged from 6 to 36 months (mean, 18 months); none of the patients showed tip contour irregularities, pinching, or alar notching. In addition, the technique resulted in a well-balanced nasal base with an acceptable lobule-to-columella ratio and no alar flaring (Figure 3D and Figure 4D).

Measuring the degree of nasal tip projection at 6 months after surgery and comparing it to the recorded preoperative values showed a considerable amount of deprojection as evidenced by the decreased Goode ratio and nasofacial angle.

The mean decrease in Goode ratio was 0.085 (range, 0.07-0.11), and the mean decrease in nasofacial angle was 5° (range, 4°-7°). At 18 months postoperatively, the nasal tip projection was remeasured in 10 patients and showed no significant difference from the values recorded at their 6-month follow-up. All patients were satisfied with their aesthetic result and no revision surgery was required.

**COMMENT**

The alar setback, like most contemporary rhinoplasty techniques, presents a modification and refinement of concepts that were described years ago. The concept of changing nasal tip projection by interrupting the continuity of the alar cartilages dates back to the early 1930s when Joseph11 and Safian12 described deprojecting the nasal tip by shortening the medial and lateral crura. Later, various deprojection techniques were described that depended on interrupting the continuity of the alar cartilages. These techniques can be generally divided into 2 broad categories. The first category sacrifices the domal...
segment of the alar cartilages, and the second preserves
the domes and depends on shortening of the medial crura,
lateral crura, or both.

Deprojection by direct excision of the domes was
described by Safian in 1970. Later, Smith described
excising the domes while preserving the vestibular skin
intact to pull the medial and lateral crura together to cre-
ate a new dome. Brennan further overlapped the me-
dial ends of the lateral crura over the medial crura out-
suturing. Recently, Kridel and Konior reconstructed
the cut ends of the alar cartilages by suturing them through
an external approach.

Techniques that depend on shortening the medial

crura were pioneered by Lipsett, who, in 1959, de-
scribed deprojection of the nasal tip by excising a piece
of medial crus with its overlying vestibular skin. Many
authors modified the Lipsett maneuver, mainly by pre-
serving the vestibular skin and suturing the cut ends of
the medial crura together. A main step in the Lipsett tech-
nique and its modifications is weakening of the alar car-
tilage to allow its angulation to create a new dome. This
was done by furrowing, scoring, or morselizing the
newly created domes.

Surgical techniques involving excision of domes or
shortening of the medial crura can produce effective
deprojection, but they have 2 main disadvantages. The
first is the high risk of tip contour irregularities in the
form of pinching, notching, or bossa formation. This is

Figure 3. A and C, Preoperative views of a patient with a severely overprojected tip. B and D, Postoperative appearance of the patient 2 years after surgery using
a low alar setback to shorten the long columella and nostrils, resulting in a more balanced nasal base with no alar flaring.
due to the possible displacement and distortion of the transected or weakened cartilages during the healing phase. The second disadvantage is the high tendency of developing postoperative alar flaring; hence, some authors\textsuperscript{3,14,18} described using alar base narrowing procedures in conjunction with these nasal tip depromotion techniques. These complications did not occur with the alar setback technique, since the domal segments of the alar cartilages were left intact, thus preserving the natural contour of the nasal tip. Alar flaring, which occurs mainly if the medial crura are shortened in relation to the lateral crura,\textsuperscript{7} was not encountered, since the alar setback maneuver involves shortening of both the medial and lateral crura.

Surgical techniques that involve shortening of the lateral crura\textsuperscript{20-22} may result in varying degrees of tip depromotion; however, the major disadvantage of these techniques is that significant superior rotation of the nasal tip is inevitable. This was not a problem with the alar setback, because after shortening of the medial crura, the degree of rotation was controlled by adjusting the amount of lateral crural overlap.

The last group of tip depromotion techniques, depending on alar cartilage modification, is that involving shortening of both the lateral and medial crura. In 1974, Fredricks\textsuperscript{23} described an aggressive tripod resection technique, which included excision of full-thickness segments of the columella and alar bases, along with lateral crura, domes, and the caudal septum. Other authors presented more conservative approaches. Rees\textsuperscript{24} described transecting the medial and lateral crura proximal to the domes and left the cut ends to overlap. Close et al\textsuperscript{25} refined the technique by resecting equal segments of lateral and medial crura followed by direct suturing of the

Figure 4. A and C, Preoperative views of a patient where overprojection is associated with a short columella and a relatively long lobule. A high alar setback was used to deproject the tip and restore a normal columella-to-lobule ratio. B and D, One-year postoperative views.
cut ends together. Our proposed alar setback technique is also based on shortening of the medial and lateral crura, but it differs, in many aspects, from the other techniques that used the same concept.

First, on reconstructing the alar cartilages, it is well known that the sutured ends of cartilage do not heal together but get fixed by fibrous tissue, which is still weaker than the intact cartilage. This may predispose to further loss of projection, alar notching, pinching, or even alar collapse. In our technique, the cut ends of the lateral crura were overlapped before suturing them together, whereas the cut ends of the medial crura were splinted to a strong columellar strut. This overlap and splinting of cut ends result in a stronger and more stable reconstruction that withstands the unpredictable healing forces better than other techniques that depend only on fibrous tissue union.

A second point is that other techniques, which limit the medial crural excision to its columellar segment, may result in a relative increase in length of infratip lobule, which was a problem in one third of the cases reported by Close et al.25 In our proposed technique, the flexibility of performing a high or low setback allowed preserving, or in some cases restoring, the normal lobule-to-columella ratio (Figure 3C-D and Figure 4C-D).

Finally, the alar setback technique allows decreasing the nasal tip projection in an incremental fashion without violating the nasal tip support mechanisms. The hallmark of the technique is the method used for reconstructing the alar cartilages, which increases the strength and stability of the tip complex. Therefore, the final tip projection achieved intraoperatively is not expected to change over time.

Accepted for publication July 17, 2001.

Corresponding author and reprints: Hossam M. T. Foda, MD, PO Box 372, Sidi Gaber, Alexandria, Egypt (e-mail: hfoda@dataxprs.com.eg).

REFERENCES