An Algorithm for Treatment of the Drooping Nose

Ali Sajjadian, MD; and Bahman Guyuron, MD

Nasal tip ptosis (“drooping” or long nose) occurs when the tip of the nose is more caudal than what is deemed ideal. Intrinsic factors, such as elongated or caudally-rotated lower lateral cartilages, can lead to nasal tip ptosis. Extrinsic factors, such as elongated upper lateral cartilages or excessive caudal anterior septum and heavy nasal skin, can push the nasal tip caudally and lead to drooping of the nasal tip. The loss of maxillary or nasal spine support may enhance the potential for tip ptosis. In addition, a hyperactive depressor nasi septi could, as a result of continuous pull on the tip, result in tip ptosis. Aging or previous nasal procedures (such as the Goldman-type tip surgery) where the continuity of the lateral and medial crura of the lower lateral cartilages have been violated may cause a weakening of the tip-supporting mechanisms and de-rotation of the nasal tip. Correction of this deformity is challenging and rewarding; it can resolve both the cosmetic deformity and nasal obstruction symptoms related to this entity. The goal of this article is to present our current principles of diagnosis and treatment of nasal tip ptosis, as well as to introduce and algorithm of preferred methods and techniques for its reliable and stable correction.

**RESULTS:** Correction of the nasal tip ptosis requires accurate diagnosis, a recognition of the interplay between various anatomic components, specific strategy planning, and a correction of anatomic abnormalities. (Aesthetic Surg J 2009;29:199–208.)

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The tip can be caudally rotated by the action of the depressor septi muscle in both static and dynamic situations. The role of this muscle in ptosis of the tip is evaluated during animation on both frontal and profile views.

### PRINCIPLES OF MANAGEMENT OF NASAL TIP PTOSIS

**Algorithm**

It is crucial to differentiate between those who have true ptosis of the tip and those who appear to have a long anterior nose caused by retraction of the subnasale, with or without cephalic malposition of the alar bases. In cases where nasal length is too excessive because of disproportionate anterior length of the septum, excision of an anteriorly-based wedge of septum, along with removal of a proportional amount of the membranous septum, is required. Patients who exhibit excess tip projection will often have long lateral crura that may also have to be shortened. Otherwise, shortening of the LLC will result in loss of tip projection.

Should the problem be related to long lateral crura alone, the lateral crura are transected, overlapped, and sutured. If there is any weakness of the external nasal valve, notching or concavity, lateral crura struts or alar rim grafts are placed to address those conditions. If the ptosis is related to the loss of support of the medial crura, a columellar strut is placed and the footplates are approximated to the strut.

The location of the subnasale is important in distinguishing the possible conditions contributing to ostensible or real nasal tip ptosis. If the subnasale is found to be deficient, augmentation with cartilage grafting is performed. Only rarely is a prominent subnasale seen concurrently with nasal tip ptosis. In that situation, the position of the subnasale is corrected with conservative partial excision of the nasal spine, the caudal septum, and/or medial crura, while also addressing the position of the nasal tip.

The contribution of the depressor septi muscle to tip position should be determined preoperatively under both...
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Drooping nasal tip may result from both dynamic and static conditions. If this muscle contributes to nasal tip ptosis, depressor nasi septi resection and/or release is performed. While placement of a columellar strut in conjunction with approximation of the footplates effectively overcomes the depressor effects of this muscle, it is still prudent to remove this muscle whenever feasible.

Surgical alteration of the major and minor tip-supporting mechanisms produces changes in the shape of the nasal tip and, ultimately, the function of the nasal airway. Selection of the appropriate surgical modification is determined by the desired effect, such as a change in tip rotation, projection, or shape. Medial and lateral crural modification and suturing are performed as needed to treat under-rotation of the nasal tip. The proper position of the radix should be determined first; if there is underprojection, simple radix cartilage grafts can correct the deficiency. However, if the radix is fuller than is optimal, reduction of bone is performed. The position of the radix is determined according to the previously mentioned ideal facial proportions.

An ideal nasal dorsal height is established. In the cases of overprojection of the nasal dorsum, dorsal hump reduction with osteotomy and rasping, as well as direct excision of the bony and individual cartilaginous components, is done in a graduated manner as required. The drooping tip might accentuate the degree of dorsal hump and the amount of the resection should be determined based on the preoperative planning. Mere reduction of the dorsum may provide an optical illusion that the tip is rotated slightly cephalad. In addition, a reduction of the anterocaudal septal projection may result in further loss of the tip projection, which has to be considered in the aesthetic plans. If there is underprojection of the nasal dorsum, an autologous cartilage graft technique is used to augment the dorsal height to the desired level.

Inadequate tip projection and drooping nose deformity commonly coexist. The excessive septal angle is excised in an anteriorly-based wedge-shape through a transfixion incision. The amount of this excision should be 50% more than the desired cephalic position (ie, if the nose is 2 mm long, then the amount removed should be 3 mm).

**Figure 1.** Suggested algorithm for maneuvers to correct the ptotic nasal tip based on anatomic findings. LLC, Lower lateral cartilage.

**Surgical Technique**

An open rhinoplasty approach is often preferred. After bilateral infracartilaginous and stair-step incisions are made, the osteocartilaginous skeleton is exposed. Dissection of the LLC and ULC is done in the suprapерicondrial avascular plane, up to the radix. The release of attachments at the scroll area as part of the cephalic LLC trim minimizes the downward-deforming forces of the ULC on the nasal tip.

The required manipulations are performed according to the algorithm. The proper position of the radix should be determined first; if there is underprojection, simple radix cartilage grafts can correct the deficiency. However, if the radix is fuller than is optimal, reduction of bone is performed. The position of the radix is determined according to the previously mentioned ideal facial proportions.

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**Table 2.** Resulting changes in projection and rotation with different techniques (lateral crural steal, lateral crural overlap, and Fred techniques)

<table>
<thead>
<tr>
<th>Technique</th>
<th>Projection</th>
<th>Rotation</th>
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<tbody>
<tr>
<td>Lateral crural steal technique</td>
<td>Increase</td>
<td>Increase</td>
</tr>
<tr>
<td>Lateral crural overlap technique</td>
<td>Decrease</td>
<td>Increase</td>
</tr>
<tr>
<td>Fred technique</td>
<td>May increase</td>
<td>Increase</td>
</tr>
<tr>
<td>Medial crura anchor suture</td>
<td>Increase</td>
<td>Increase</td>
</tr>
<tr>
<td>Footplate approximation</td>
<td>Increase</td>
<td>Increase</td>
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<tr>
<td>Columella strut</td>
<td>Increase</td>
<td>Increase</td>
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</tbody>
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Figure 2. A, C, E, G, Pretreatment views of a 21-year-old woman. B, D, F, H, Posttreatment views 17 months after correction of a drooping nose deformity.
Various geometric excisions of caudal septum affect the caudal part of the nose differently. A proportionate amount of the membranous septum is excised to eliminate the soft tissue redundancies and approximate the medial crura to the septum. Excision in a rectangular shape will result in shortening of the entire nasal length. This means that both the tip and columella will be displaced cephalically, as opposed to a rotation of the tip engendered by a wedge excision. Rotation or transposition of the tip is only effective if the tip tripod can accommodate the repositioning. The tripod is rotated cephalically by altering its components.

Lateral Crural Modification

Conservative resection of the cephalic portion of the LLC is performed as required to improve definition and increase the tip rotation to a minimal-to-moderate degree. This is done while leaving at least 4 to 5 mm anteriorly and 6 mm posteriorly in order to prevent collapse of the external nasal valve and nasal airway obstruction. Depending on the degree of rotation and projection required, a variety of maneuvers can be used, as discussed below. If required, the inferior margins of the ULC are trimmed of any remaining scroll or recurvature remnants in order to promote further tip rotation. When excessive length of LLC is noted, the most cephalic and lateral portion of lateral crura is dissected bilaterally, then transected and overlapped. This is followed by suturing of the remaining segments with mattress 5-0 semipermanent type suture. If any weakness, notching, or concavity of the alar rim is noted, a piece of septal cartilage graft is placed under the lateral crus of the LLC and sutured in place.

For patients with excessive anterior septal length, one may separate and overlap the medial crura on the septum anteriorly and fix it using 5-0 nylon sutures (Fred technique). Tip projection can also be increased by performing this procedure. However, this results in a rigid tip and the patient should be informed of this possibility.

In cases where the domal arches are wide and tip projection is required in addition to tip rotation, a lateral crural steal technique can be used. The lateral crural steal maneuver is accomplished by adding to the medial crural length by borrowing from the lateral crura using vertical mattress suturing (transdomal). The lateral crural steal technique increases the length of the medial leg of the tip tripod and increases tip projection. While the lateral crural steal technique can increase nasal tip projection, the lateral crural overlap technique decreases it (Table 2). Therefore, the former is used when the tip projection is inadequate and the latter is used when the tip projection is excessive.

Medial Crura Modification

Medial crura support deficiency is a common finding in nasal tip ptosis because of the shortness and divergence of the footplates, as well as the lack of sufficient stability between the medial crura. This is commonly corrected with approximation of medial crura and footplates using a columellar strut graft. The strut graft is place between the medial crura and sutured to the medial crura of the LLC using 5-0 polydioxanone sutures.

If an overactive depressor septi muscle is noted, it is resected or released to improve the aesthetic appearance in the profile view. Iatrogenic alteration of the nose can happen as the result of some lateral crura suturing, such as Tebbetts. This can be corrected with the placement of a columellar strut on an inadequately projecting tip or by overlapping the lateral crus on an overprojecting tip.

The projection of the nasal tip is evaluated according to previously mentioned proportions and ratios. For an underprojected nasal tip, supporting grafts (such as the columellar strut and onlay grafts) are used, depending on the size of the columella and infratip lobule. These grafts
Figure 4. A, C, E, G. Pretreatment views of a 68-year-old woman. B, D, F, H. Posttreatment views five years after correction of a drooping nose deformity.
are fashioned from harvested septal cartilage. Single or multiple grafts are used to augment the medial part of the tripod and improve both projection and rotation. In addition, interdomal and transdomal suturing techniques are typically used to improve tip support and definition of the LLC. It should be mentioned that placement of the columnellar strut and approximation of the footplates can result in slight cephalic rotation of the tip; adding an onlay tip graft may provide an optical illusion that the tip has rotated cephalically.

The last crucial maneuver is the use of the tip rotation suture, if the rotation is achieved through excision of the anterocaudal septum. A 5-0 clear, nonabsorbable suture is passed through the junction of medial and intermediate crura and tied. The needle is passed between the medial crus and the columnellar strut on one side, then passed through the anterocaudal septum to the opposite medial crus and the strut on the other side. The suture is then tied incrementally until an optimal approximation is achieved between the anterocaudal septum and the medial crus. The transfixion incision is repaired using 5-0 chronic cat gut suture.

It is noteworthy that the nasolabial and columella-labial angles follow the same principles. It is our understanding that the wide ranges mentioned by some previous authors are somewhat controversial, not very reliable, and frequently invalid.

**DISCUSSION**

Nasal tip ptosis commonly results from a discrepancy between the tip support and the downward force of gravity on the overlying soft tissue envelope. A variety of factors contribute to a drooping nasal tip (such as long, vertically-oriented lateral crura, which can force the tip inferiorly). Weakened tip support mechanisms, such as atrophy of the bone and subcutaneous fat at the premaxillary region, may also lead to tip ptosis. Thick, heavy nasal skin or excessive sebaceous gland concentration can also lead to drooping of the nasal tip. Given that many rhinoplasty techniques may affect the major and minor tip supporting mechanisms, their reestablishment is important to avoid nasal tip ptosis.

There have been many reports on modifying the LLC to influence the position, rotation, and projection of the nasal tip. Conservative removal of cephalic strips is a well-known method of narrowing and rotating the nasal tip cephalically; overaggressive resection of the alar cartilages could compromise tip support, creating a potential for future alar pinching or alar collapse. The lateral crural overlap technique has been advocated to achieve cephalic rotation of the tip without permanent division of the lateral crus. Suture support of the domes has also been advocated to preserve tip support. The common thread in these techniques is conservation of nasal tip support and/or the reestablishment of major and minor tip supporting mechanisms. The principles behind this type of correction are best appreciated by revisiting the tripod analogy of nasal tip. According to the tripod theory, maneuvers that elongate the medial crura or those that shorten the lateral crura result in cephalic tip rotation. Medial crural suturing techniques and columnellar struts are considered a routine part of procedures to correct nasal tip ptosis. In addition to improving tip support, they assist in lengthening the conjoined medial crural component of the tripod unit, thereby contributing to further tip support and rotation (Figures 2–5).

**CONCLUSIONS**

Nasal tip ptosis is a condition that affects both the appearance and the function of the nose, since
marked tip ptosis can significantly increase upper airway resistance by impeding airflow through the nares. Treating the nasal tip ptosis can correct both cosmetic and functional deformities by improving the aesthetics of the nasal tip and resolving nasal obstruction. Various techniques currently exist for correction of nasal tip ptosis. The algorithm suggested here is only a recommended framework for evaluation and treatment of this nasal deformity. An individualized plan based on accurate diagnosis of all the contributing factors is essential to successful treatment of nasal tip ptosis.

DISCLOSURES

The authors have no disclosures with respect to the contents of this article.

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Accepted for publication February 17, 2009.
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Copyright © 2009 by The American Society for Aesthetic Plastic Surgery, Inc. 1090-820X/$36.00
doi:10.1016/j.asj.2009.02.006