

## SURGICAL SOLUTIONS TO NASAL TIP PTOSIS

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**Abstract:** Nasal tip is one of the most important esthetic entities of the nose and hence an important domain for a plastic surgeon to try to correct its various malpositions. Often, during the correction of nasal deformities, it is important to correct even the tip of the nose. To develop an efficient therapeutic plan, it is important to meticulously analyse all anatomic structures involved in tip rotation and its correlation with other sectors of the nose. The therapeutic plan for the correction of ptotic nasal tip includes surgical manoeuvres including resections, sutures or a number of cartilage grafts judiciously placed caudally, alar crus, supratip or alar margins to give a normal configuration to the nose.

**Cuvinte cheie:** rinoplastia, lobul nazal, ptoza lobului nazal

**Rezumat:** Lobulul nazal este unul dintre cele mai importante entități estetice ale nasului, și, prin urmare, este de o importanță capitală pentru un chirurg plastician să încerce să corecteze diferitele malpoziții ale acestuia. Adesea, în intervențiile corectoare ale piramidei nazale, acest deziderat trebuie atins. Pentru stabilirea unui plan terapeutic eficient este necesară analiza minuțioasă a tuturor structurilor anatomice implicate în rotația vârfului și raportul acestuia cu celelalte sectoare nazale. Planul terapeutic de corectare a lobulului căzut va impune manevre chirurgicale prin care, cu ajutorul rezecțiilor, a suturilor sau a numeroaselor grefe cartilajinoase, judicios amplasate caudal, alar, supradomal, la nivelul marginilor narinare, să i se redea nasului o linie normală.

Nasal tip ptosis is often observed following nasal trauma. As a part of the aging face, tip ptosis is the predominant feature of nasal aging. In addition, it is one of the most common findings in patients presenting for primary rhinoplasty. Nearly every rhinoplasty involves manoeuvres to achieve and maintain adequate tip rotation. Nasal tip ptosis is also one of the most common findings in patients presenting for secondary rhinoplasty, and iatrogenic destruction of nasal tip support is a common finding in late development of tip ptosis following rhinoplasty.

Tip rotation is most commonly assessed on the profile view of the nose by measuring the nasolabial angle. The nasolabial angle is measured by a line from the subnasale to the superior vermilion and by a tangent to the columella. The aesthetic ideal for the nasolabial angle is defined by a range of 90-100° in men and 100-110° in women.

Multiple factors, such as prominence of the anterior nasal spine, maxillary retrusion or prognathism, and asymmetry of the medial crura, may influence the inclination of the columella without correspondingly affecting the inclination of the nasal tip or long axis of the columella. Because of this, use of the nasolabial angle in assessing tip ptosis may be misleading. A more accurate assessment uses measurement of the long axis of the nostril rim with the Frankfort plane. In this assessment, the aesthetically ideal angle ranges from 10-30° in women and 0-15° in men. The long axis of the columella should be parallel to the long axis of the nostril rim, and the alar rim should form a smooth arch 2-4 mm above the edge of the columella. Nasal tip ptosis is then defined as a more acute angle between the long

axis of the nostril and the Frankfort plane than the aesthetic ideals mentioned above.

### Etiology

The tripod concept of nasal tip support and the major and minor tip support mechanisms must be considered in nasal tip ptosis. If the lower lateral cartilages of the nose are compared to a tripod, with the medial crura as one leg and the lateral crura as the other two supporting legs, envisioning changes in tip rotation with alterations in the tip supporting structures is easy. In addition, the integrity of the medial and lateral crura, the attachment of the medial crural feet to the caudal end of the quadrangular cartilage, and the scroll-like attachment of the caudal end of the upper lateral cartilage to the cephalic margins of the lateral crura are the major tip support structures to consider.

The minor tip support mechanisms include (1) the dorsal cartilaginous septum, (2) the interdomal ligaments, (3) the nasal spine, (4) the membranous septum, and (5) the alar attachments to the skin. Alterations in the size, shape, and integrity of the limbs of the tripod, together with the disruption of the major and minor tip support mechanisms, result in profound alteration in tip rotation.

If medial crural integrity is compromised, the nasal tip rotates inferiorly as the supporting limb of the tripod buckles under the weight of the overlying skin-soft tissue envelope. This is the most common factor in tip ptosis secondary to trauma, including iatrogenic insult. Additionally, noses with congenitally short or flimsy medial crura display this type of tip ptosis. Loss of the supporting attachment of the lateral crura and

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the upper lateral cartilage results in tip ptosis. Trauma, including excessive trimming of the lower lateral cartilage during rhinoplasty, can result in this type of inferior collapse of the nasal tip as the major tip support mechanisms are compromised. Senile ptosis of the nose can also be explained by this factor, as the ligamentous attachments of the upper and lower lateral cartilages lose their integrity with age.

Excessive length of the lateral crura depresses the tip inferiorly, as does excessive caudal projection of the cartilaginous septum. This is a common finding in patients with the tension nose. Finally, the tethering of the columella, as in clefting of the palate (particularly with bilateral clefts) or in contracture following nasal or lip trauma, can result in nasal ptosis.

In short, nasal ptosis commonly results from a discrepancy between the tip support and the downward force of gravity on the overlying skin soft-tissue envelope.

### Surgical therapy

Correction of nasal tip ptosis requires careful preoperative analysis with identification of the structural pathophysiology, followed by surgical alteration of the tip structures. Surgical therapy typically involves strengthening of the medial feet, conservative trimming of the lateral crura, and conservative shortening of the caudal end of the nasal septum.

### Septal surgery

Septal surgery is usually the initial manoeuvre in treatment of nasal tip ptosis. A hemitransfixion incision can be used to gain access to the caudal end of the septum. Caudal septum excision may be needed in a nose with excess septal cartilage. Occasionally, excision of membranous septum may be needed. Graft material to augment the tip support may be harvested from the mid cartilaginous septum following elevation of submucoperichondrial tunnels. One should be careful in preserving adequate continuous dorsal caudal septal support. Resection of the nasal spine and division of the depressor septa muscle can be performed at this time if necessary. The septum should be carefully straightened and secured to the midline.

### Medial crura surgery

Deficient medial crura support is commonly found in patients with nasal tip ptosis. Placement of a medial crura strut graft of septal cartilage is the criterion standard therapy for this finding.(1) The graft can be placed through an intranasal or external approach, although precise placement and fixation are more easily accomplished through external exposure, particularly in the patient with previous surgery. The graft is sutured between the medial crura with absorbable sutures on a straight needle.

The graft should lie above the nasal spine to avoid deviation of the nasal tip. Absence of septal cartilage as a donor graft requires an alternative source. Conchal cartilage may be sufficient, but its natural curvature requires remodeling prior to placement. In patients with severe tip ptosis and buckling of the medial crura, autogenous rib grafts provide a straight and structurally sound strut graft.

### Lateral crura surgery

Conservative resection of the caudal margin of the lateral crura is another maneuver that can provide minimal-to-moderate tip rotation. Conservatism cannot be overemphasized in this maneuver. At least 6 mm of lateral crura should be preserved to avoid alar notching and collapse.

Another tip rotating maneuver includes shortening the length of the lateral crura. This can be accomplished by dome division, by resection of the overlapping cartilage, and by permanent suture reconstitution of the intact strip with 6-0 nylon sutures. This maneuver narrows the nasal tip as well as providing tip rotation.(2,4) Again, perform conservative

resection. Resection of the redundant membranous septum may be necessary with these manoeuvres to preserve tip rotation.(3)

If increased tip projection is required in addition to tip rotation, a "lateral crural steal" manoeuvre can be performed.(5,6) This manoeuvre is accomplished by adding to the medial crural length by borrowing from the lateral crura. The nasal tip cartilages can be restructured with either vertical mattress suturing or dome division just lateral to the dome and reconstruction of the tip with increased length of the medial crura. These manoeuvres increase the length of the medial leg of the tip tripod and increase the tip projection.

### Tip grafting

Onlay grafting of the nasal tip may be necessary to achieve adequate tip rotation. Tip grafts are usually carved from septal cartilage, but auricular or costal cartilage grafts may be used in the absence of adequate septal graft material.(7) Desired tip rotation can be achieved by altering the positioning of the graft. More cephalic placement results in greater rotation but decreased projection. Securely fix the graft to the stable and symmetric lower lateral cartilage base with multiple 6-0 nylon sutures. Double or even triple stacked grafts may be necessary to achieve the desired projection and rotation.(8)

The graft should be thin and bevelled to prevent sharp edges from showing through in patients with thin skin.(9,10) Subcutaneous thinning of the supratip skin may be necessary in patients with thick or fatty tip skin.(11)

**Figure no. 1. Nasal tip ptosis surgery using autologous cartilage grafts from nasal septal cartilage. Preoperative (a, c) postoperative after 8 months (b, d)**



### Adjunctive manoeuvres

In rare circumstances, additional manoeuvres may be necessary to correct nasal tip ptosis. In elderly patients with senile tip ptosis, a "rhino-lift" may be performed by undermining the nasal dorsal skin and excising a horizontal ellipse of tissue over the glabella. In certain postoperative

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patients with nasal tip ptosis, reattaching the lower lateral cartilages and suspending them from the upper lateral cartilage may be necessary. In patients with a deficient columella, such as in a cleft rhinoplasty, rotating soft tissue or recruiting it into the columellar area may be necessary to correct nasal tip ptosis. The surgeon should develop a flexible operative approach and should be prepared to perform a combination of surgical manoeuvres to fully rotate the nasal tip.

### Postoperative care

Postoperatively, a nasal tape and thermal splint dressing is applied to aid in proper redraping and healing of the skin and soft tissue envelope to the newly modified nasal skeleton. The tip is supported by a tape sling. The patient is instructed in wound cleansing and application of antibiotic ointment, and saline nasal irrigations are performed for removal of clots and crusts in the nose. The patient is instructed to avoid situations that could result in nasal trauma for 6 weeks following surgery. Postoperative visits include periodic examination of the healing process, assessment of soft-tissue edema resolution, and postoperative photographic documentation.

### Complications

Postoperative complications include infection, bleeding, hypertrophic or irregular scar formation, nasal asymmetry, and the recurrence of tip ptosis<sup>12</sup>. Most minor complications can be handled with conservative medical therapy and straightforward communication with the patient. The most effective prevention against complications is careful preoperative preparation and meticulous operative technique. Occasionally, revision surgery is necessary to correct postoperative nasal asymmetry. One should inform the patient of this possibility preoperatively and remind the patient that most revision surgery should not be undertaken prior to 6 months following the original surgery to allow ample time for assessment of healing.

### Conclusions

Nasal tip projection and rotation is a very important issue to be addressed in every rhinoplasty patient. Different surgical techniques should be used to improve tip ptosis according to each different case. Owing to the very small operative field, most important factors for a good outcome remain careful planning, precise technique as well as experience of the operating surgeon.

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