

# Revision of the Surgically Overshortened Nose

Dean M. Toriumi, M.D.<sup>1</sup> Anthony Bared, M.D.<sup>1</sup>

<sup>1</sup>Division of Facial Plastic and Reconstructive Surgery, Department of Otolaryngology–Head and Neck Surgery, University of Illinois at Chicago, Chicago, Illinois

Facial Plast Surg 2012;28:407–416.

**Address for correspondence and reprint requests** Dean M. Toriumi, M.D., Division of Facial Plastic and Reconstructive Surgery, Department of Otolaryngology-Head and Neck Surgery, University of Illinois at Chicago, Rm. 2.42, 1855 W Taylor St., Chicago, IL 60612 (e-mail: dtoriumi@uic.edu).

## Abstract

### Keywords

- ▶ Foreshortened nose
- ▶ over-rotated nasal tip
- ▶ Soft tissue skin envelope
- ▶ alar retraction
- ▶ lateral crural strut graft
- ▶ composite graft

The short nose deformity may arise from multiple etiologies including iatrogenic following rhinoplasty. The weakening of the cartilaginous support and the contractile forces imposed by the healing soft tissue envelope may result in the short nose deformity. The focus of this article is to present the senior author's approach to this nasal deformity.

The surgical correction of the short nose is a very challenging issue in facial plastic surgery. The etiology of the short nose can be congenital, traumatic, or iatrogenic after rhinoplasty. The ideal nasal length is said to compose a third of one's face from the glabella to the subnasale.<sup>1</sup> Albeit a nose that extends less than a third of the vertical height of the face may represent a case of a short nose deformity, other features can contribute to the appearance of a short nose. Naficy and Baker defined these features that contribute to the appearance of a short nose as concavity of the nasal dorsum, low radix, overprojected tip, and an obtuse nasolabial angle.<sup>2</sup> Goode integrated the nasal length when defining ideal tip projection whereby the ratio of tip projection to nasal length is 0.55:1 to 0.6:1. Hence either an overly projected tip or a short nose would result in a ratio greater than 0.6:1. The aesthetic range of the nasolabial angle for men is 90 to 105 degrees, and for women it is 95 to 115 degrees. Nasolabial angles that are more obtuse than the ideal also contribute to the appearance of a short nose. Although not directly contributing to the appearance of the short nose, retracted ala are often found to be present in the short nose deformity. To adequately correct the short nose, each feature must be addressed.

The etiology of the short nose after rhinoplasty is due to weakened cartilaginous support combined with overlying scar contracture. Multiple etiologies contribute to the distinc-

tive features of the iatrogenic short nose. Traditional teaching often incurs resection techniques to change the underlying framework to achieve the desired esthetic effect. Overzealous cephalic trimming of the lower lateral cartilages can lead to alar retraction and external valve collapse. Resection of the caudal septum without tip stabilization can result in excessive rotation and underprojection of the tip. Without adequate cartilage support, the vectors of contracture from the soft tissue skin envelope will continue unopposed.

The scope of this article is directed toward the iatrogenic short nose after rhinoplasty and describes the senior author's approach to the correction of this challenging deformity. The senior author exclusively uses autogenous grafts from either the septal cartilage, auricular cartilage, or costal cartilage. In the case of the correction of a short nose deformity, it is paramount to create support that will counteract the contractile forces of the soft tissue skin envelope. Given the paucity of septal cartilage that is often found in revision cases and the need for strong structural support, the senior author has found that costal cartilage helps to provide sufficient grafting material suited to withstand long-term soft tissue contractile forces. In fact, autogenous grafting material is not the limiting factor in the correction of the short nose; rather, it is the availability and quality of the soft tissue skin envelope. Previous resection or damage to the soft tissue skin envelope may severely limit the extent to which the nose can

**Issue Theme** Revision Rhinoplasty;  
Guest Editor, Richard E. Davis, M.D.,  
F.A.C.S.

Copyright © 2012 by Thieme Medical  
Publishers, Inc., 333 Seventh Avenue,  
New York, NY 10001, USA.  
Tel: +1(212) 584-4662.

**DOI** <http://dx.doi.org/10.1055/s-0032-1319835>.  
**ISSN** 0736-6825.

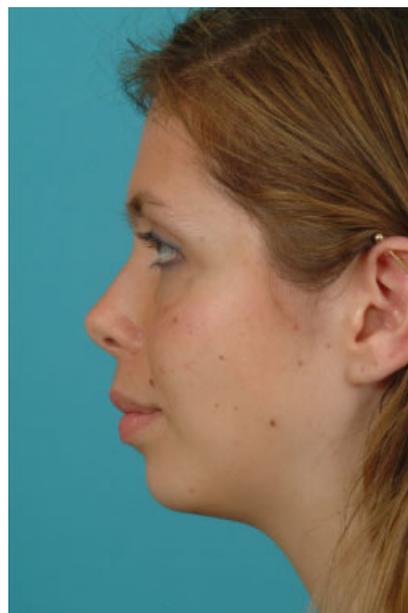
be lengthened. The surgeon needs to make a careful preoperative assessment of the soft tissue skin envelope and communicate with the patient realistic for expectations to be realistic. The goal of the correction of the short nose is therefore an esthetic transformation and the simultaneous restoration of nasal function.

### Preoperative Analysis

The importance of the preoperative analysis cannot be overstated. The senior author implements preoperative imaging software to communicate with the patient what can be realistically achieved. The imaging serves as a concrete vehicle of communication with the patient, especially when ideal lengthening may not be achieved, and helps to ensure similar goals of surgery.

The quality and mobility of the soft tissue skin envelope is carefully assessed. As previously mentioned, it is often the quality of the soft tissue that inherently limits nasal lengthening. It is important to consider the vestibular lining when assessing the soft tissue. A lack of vestibular lining may often necessitate auricular composite grafting, which can be communicated to the patient preoperatively. Additionally, the alae should be grasped on either side and pulled in a caudal direction to determine their mobility. If the alae are not mobile, then this may preclude surgical correction of their retraction. The patient with an excessively tight soft tissue skin envelope will be instructed to exercise their ala by grasping and pulling caudally for some period of time to help mobilize the soft tissues. Surgery would then be postponed until sufficient mobility is achieved. Also palpation of the skin overlying the nasal tip and middle nasal vault is assessed for its mobility. Sufficient lengthening of the nose may be achieved despite tight skin over the dorsum if dorsal reduction or tip deprojection is planned because these maneuvers will provide additional skin and soft tissue. However, it is not recommended to perform surgery on patients with significant immobility of their soft tissue skin envelope.

When analyzing patients with a short nose deformity, it is helpful to make a distinction between the short nose versus the overrotated nose. Some patients have a short nose in relation to the overall length of their face. These patients will tend to have a longer upper lip as well. Other patients have appropriate length but an overrotated nasal tip. In these cases, their nasal base is in proper position but the tip rotation is excessive (→**Fig. 1**). Distinction between the two is important as correction of the short nose frequently requires lengthening the central compartment (nasal tip and columella) and shortening the upper lip, whereas the overrotated nose requires counterrotation with no change in the upper lip length. In some patients with a tight skin envelope, the surgeon may choose to compromise on nasal length and leave the base and lip unchanged and counterrotate to give as much improvement as possible. Patients with short and overrotated noses may achieve significant improvement just by counterrotating the tip. An additional factor is the fact that extending the central compartment introduces the possibility of creating a change in the upper lip and the patient's smile with a



**Figure 1** Preoperative view of a patient with overrotated nose but with appropriate nasal length.

crease in the upper lip. Patients with an upward arch to their smile will pull the upper lip upward and increase the chance of creating a problem in their upper lip if a large graft is fixed to their nasal spine.

This analysis is critical to determining what approach to use. If the goal is counterrotation, then the surgeon can use extended spreader grafts and an extension graft without changing the nasal base, whereas lengthening the central compartment may require adding the rigid fixation at the nasal spine to provide lasting change in the central compartment.

### Operative Technique

Lengthening the nasal framework is best accomplished with grafting techniques. Both alloplastic and autogenous materials have been used for this purpose. The senior author only uses autogenous grafting material in rhinoplasty. To this end, the sources of autogenous cartilage available are septal, auricular, and costal. Septal cartilage is ideal given its inherent qualities and availability when performing a septoplasty as part of the rhinoplasty. However, inadequate septal cartilage is often encountered in revision rhinoplasty if the septum has already been harvested by the previous rhinoplasty surgeon. In revision rhinoplasty, when there is a lack of septal cartilage, costal cartilage is the preferred grafting material given its inherent strength to resist the forces of scar contracture of the soft tissue skin envelope. In the short nose deformity, there is typically a deficient cartilaginous nasal structure, thus it is especially prudent in these cases to provide good structural support.<sup>3</sup>

The sixth or seventh ribs are most often harvested. The sixth rib can be readily palpated in most individuals depending on body habitus. It is the rib in the mid chest with the most

anterior course and thus the most prominent on palpation. The 27-gauge needle used for the infiltration of local anesthetic can also be used to confirm the location of the osteocartilaginous junction, and this can then guide the proper placement of the skin incision, guarding against making it too lateral. Caution must be exercised with needle palpation prior to incision to avoid a pneumothorax. The needle must not penetrate the pleura to avoid damaging the parenchyma of the lung. A small (1.1 to 1.5 cm) skin incision is made with a No. 15 blade. A larger incision should be made (3 to 4 cm) until one feels comfortable with the dissection and is familiar with chest wall anatomy. In females, this is made at the level of the inframammary crease. Sharp dissection is then brought down to divide through the subcutaneous fat. Constant palpation is essential, ensuring that one remains over the rib and not dissecting into the intercostal space. Additionally, a 22-gauge needle can be used over the rib to identify the location of cartilage and its distinction from bone. The muscle fascia is incised and the muscle fibers are bluntly dissected. Once directly above the perichondrium of the rib, a strip of perichondrium is removed and preserved for graft coverage and camouflage. The placement of perichondrium over grafts has greatly decreased the incidence of graft palpability and visibility, particularly in thin- and medium-skinned patients. On average, a 3- to 4-cm segment of costal cartilage is harvested. At times it is prudent to perform the approach to the nose before the costal cartilage harvest. In this manner, the surgeon can gauge the length of spreader grafts needed and thus the overall length of costal cartilage required.

## The Central Compartment

### Caudal Septal Extension Grafts

When approaching the short nose, the first facet the surgeon needs to consider is lengthening the central compartment. As previously mentioned, overzealous resection of the caudal septum may lead to an overall shorter nasal length and overrotation of the tip. Septal extension grafts can be used to address these two deformities: lengthening of the central compartment and counterrotation of the tip. To address tip counterrotation, the graft can be fashioned in such a manner where it extends longer at the superior edge than the inferior edge (►Fig. 2). The caudal extension graft is used once the existing caudal edge of the septum is in the midline. The surgeon must be certain that the existing caudal septum lies in the midline before extending a graft caudally, because the entire tip complex would then be off the midline. The senior author's preference is to place the graft end-to-end off of the septum to prevent narrowing the airway if placed overlapping the side of the septum. At times, if the caudal septum is badly deviated and deficient, a caudal septal replacement graft may be necessary if one is not able to adequately fixate the septum in the midline.

The caudal septal extension graft is fixed end-to-end from the caudal septum by means of splinting grafts on either side, which are fashioned from thin shavings of cartilage or onto extended spreader grafts (►Fig. 3). The medial crura are then

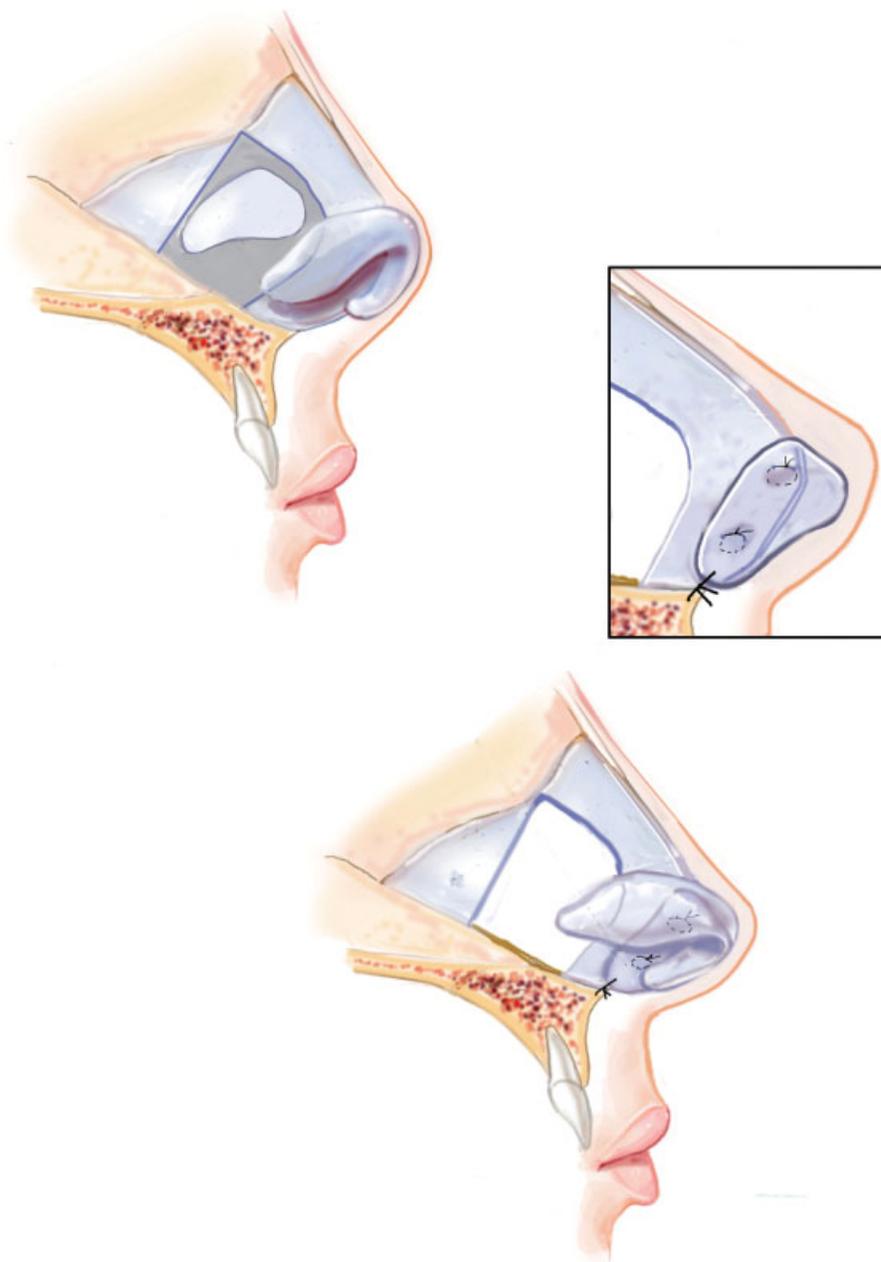
initially sutured onto the extension graft with a 5–0 plain gut suture on a straight septal needle. In this manner, the angle of tip rotation is established. Once the tip position is set, the medial crura are then fixated onto the graft with 5–0 polydioxanone (PDS) suture, burying the knot between the medial aspect of the medial crura. The caudal septal strut also provides a solid pivot point in the nasal tip for repositioning the lateral crura.

### Caudal Septal Replacement Grafts

In some cases, a caudal septal replacement graft may help to reconstitute nasal length and counterrotate the tip, particularly in patients who present with severe deficiency in tip support, a deficient premaxilla, and severely deviated caudal septum. Costal cartilage makes a very good grafting material for this strut. It is important that the graft used for the strut is perfectly straight because this graft will set tip projection and will serve as the anchor for subsequent steps. The first step is to ensure that the graft is midline. The nasal spine is palpated, and a straight 5-mm osteotome is then held vertically from this position. The surgeon can then stand at the head of the patient to assess whether it is in the midline. If it is not in the midline, then it can be adjusted accordingly. Once the midline is determined, a small V-shaped notch is made with the osteotome in the premaxilla. The graft is then placed within this notch and secured with two 4–0 PDS sutures to the surrounding soft tissue and/or periosteum. The medial crura are then fixed to the graft as described previously (►Fig. 4). If a caudal septal replacement graft is used and fixed to the nasal spine, the patient should be informed that this can change their smile or create a crease in their upper lip when they smile. This is particularly problematic in patients who have an upward arch to the corner of their mouth when they smile.

### Extended Spreader Grafts

Spreader grafts are primarily used for middle vault support; however, they can also be carved to extend beyond the caudal septal angle as extended spreader grafts. Within the middle vault, these grafts help to set the dorsal width. Spreader grafts extending beyond the caudal septal angle can be used as superior fixation points for the septal extension/ replacement grafts described. The spreader grafts secured onto to the caudal septal extension or replacement grafts will then serve as a reinforced "L" strut. The contractile healing forces of the soft tissue skin envelope in a rostral direction will then be opposed by the L strut (►Fig. 5). The extended spreader grafts are tapered at both ends to tuck the grafts under the nasal bones. The spreader grafts are placed subperichondrially between the upper lateral cartilages and the septal cartilage. The cartilages are then fixed into position with 5–0 PDS sutures in a horizontal mattress fashion. The upper lateral cartilages are then resuspended into position. The caudal edge of the grafts can then be sutured onto the septal extension graft or the caudal septal replacement graft. The spreader grafts are then tapered caudally along their thickness so that they do not add to the tip width. The spreader grafts should not extend higher than the dorsal



**Figure 2** Caudal septal extension graft designed to extend farther superiorly than inferiorly allowing for tip counterrotation while preserving nasal length along the posterior septal angle.



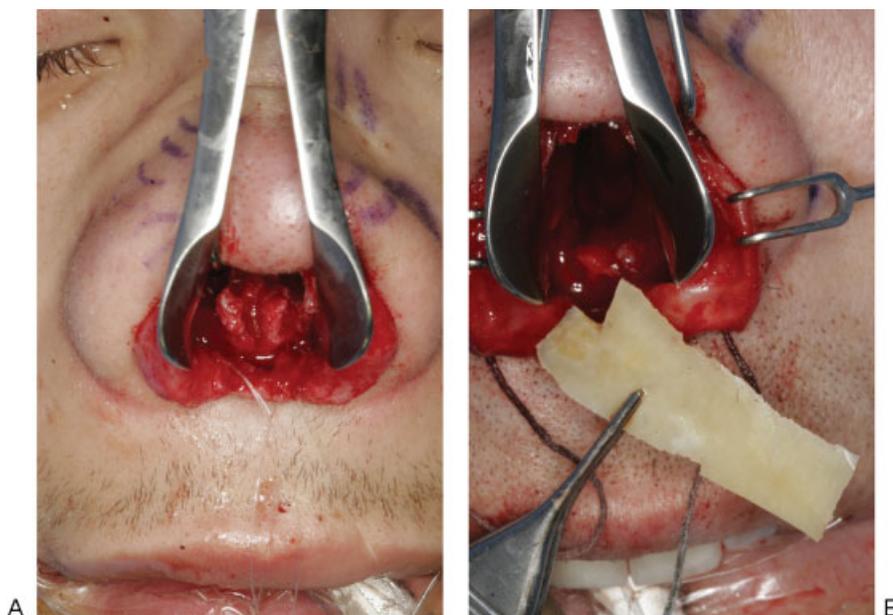
**Figure 3** Caudal septal extension grafts secured with splinting grafts.

margin of the septum to reduce the incidence of dorsal irregularities.

### Addressing Further Issues

#### Dorsal Augmentation

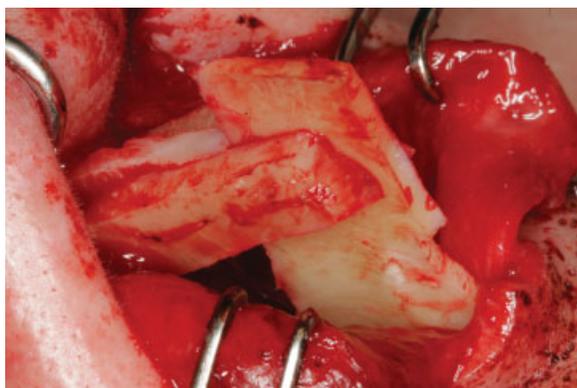
After setting the structural support of the central compartment, dorsal augmentation is often warranted in the short nose deformity. The senior author exclusively uses autologous cartilage for dorsal augmentation. The ideal autologous material for dorsal augmentation is septal cartilage; however, if more than 2 mm of dorsal height is needed, septal cartilage may be deficient in providing adequate augmentation. If



**Figure 4** (A) Notch on the anterior nasal spine with 5-mm osteotome. (B) Caudal septal replacement graft prior to placement.

septal cartilage is insufficient, the senior author uses costal cartilage for dorsal augmentation. To prevent undesired warping of the dorsal graft, the surgeon must first be cognizant of the direction the cartilage is tending to curve. That is, the graft should be placed so that the concave side is resting down onto the dorsum (→**Fig. 6**). Furthermore, the key to preventing undesired warping of costal cartilage on the dorsum is by minimizing the possibility of graft mobility. The probability of graft warping increases if the graft is not securely fixed to the dorsum. The proper fixation of the dorsal graft first starts with a very tight “pocket” over the nasal bones where the cephalic aspect of the graft is to be placed. Judicious elevation of the periosteum of the nasal bones is essential. One should limit the elevation of the periosteum to the midline and no higher than the medial canthi to preserve this tight pocket. The graft is thereby fixed in three positions:

the tight pocket cephalically over the nasal bones and caudally sutured onto the upper lateral cartilages bilaterally. By creating these three fixation points, the graft is thus maximally stabilized, fixated onto the dorsum to minimize any movement. Additionally, further refinements of the dorsal graft can be undertaken to prevent graft movement and warping. The rapid integration of the graft onto the native dorsum will work in favor of preventing graft migration and warping. This rapid integration can be promoted by rasping or perforating the bone on the dorsal aspect of the nasal bones with a 2mm osteotome to expose a rough bone surface and the placement of perichondrium on the undersurface of the graft (→**Fig. 7**). Once the graft is positioned, the perichondrium fixated to the undersurface of the dorsal graft will adhere to the roughened nasal bone to create a rigidly fixed dorsal graft that is less likely to displace or warp.



**Figure 5** The “L” strut composed of the secured caudal septal replacement and extended spreader grafts. Note that it is best to not trim the length of the replacement graft until proper tip projection has been established.



**Figure 6** Dorsal graft demonstrating the concavity placed down onto the dorsum.

### Alar Retraction

Once the central compartment has been lengthened, the alae need to be brought down to complement the central compartment's new position. In addition, the inherent weakness in the overresected lower lateral cartilage from previous rhinoplasty contributes to the retracted alae. Stabilization of the central compartment is important in that it serves as a central pivot point off which the alar cartilages can be repositioned in a more caudal position.

### Lower Lateral Cartilage Repositioning

Gunter and Friedman described repositioning of the lower lateral cartilages inferiorly with lateral crural strut grafts.<sup>4</sup> Lower lateral repositioning with the placement of lateral crural strut grafts is a surgical technique that helps support and reposition the ala. As such, the maneuver addresses both key issues: it provides a strong structural cartilaginous support of the ala and it physically repositions the ala in a more caudal position. As the lateral crura are repositioned into a more caudal orientation, they are pivoted caudally bringing the ala into a more favorable position.

The vestibular skin is dissected from the lower lateral cartilages. The senior author finds it helpful to first inject the vestibular skin underlying the alar cartilage with the local anesthetic agent; this provides a means of hydrodissection, facilitating subsequent elevation of the thin vestibular mucosa. Dissection is carried medial to the natural domes onto to the medial crura, thereby allowing for domal repositioning if needed. Lateral crural strut grafts are then sutured onto the undersurface of the ala. The grafts used are ideally either that of septal or costal cartilage. These autologous grafting materials allow for thin yet sturdy cartilaginous support. The inherent properties of costal cartilage permit thinning while still maintaining durable, strong support. It is imperative that the lateral crural strut grafts be curved so that concave surface of the lateral crura is facing the internal airway. This will ensure that the airway is maximized. The lateral crural strut grafts are then sutured using 5-0 PDS at two points to the undersurface of the alar cartilages with the knots being tied on the top of the lateral crura (►Fig. 8). Additionally, this technique also allows for complete control of dome position-

ing. Placement of the grafts lateral to the existing domes and the subsequent recreation of a new dome increases tip projection by means of lateral crural steal. The placement of the graft medial to the existing dome therefore results in the opposite effect. Caudally positioned pockets are then dissected at the lateral extent of the marginal incision caudal to the supra-alar groove. These pockets can then be dissected according to the extent of caudal repositioning needed. The grafted lateral crura are then placed into the caudal pockets. The technique also permits for "fine-tuning" of nostril positioning where preexisting nostril asymmetry can be corrected with proper placement of the pockets. If one ala needs to be moved more caudal than the other, the pocket is made more caudal to allow correction of such asymmetries. The new caudally oriented alar cartilage provides a strong structural base for the overlying soft tissue skin envelope. However, if it is noted that vestibular skin is now deficient with these newly positioned alae, auricular composite skin/cartilage grafts are then needed to fill this tissue void.

### Composite Grafts

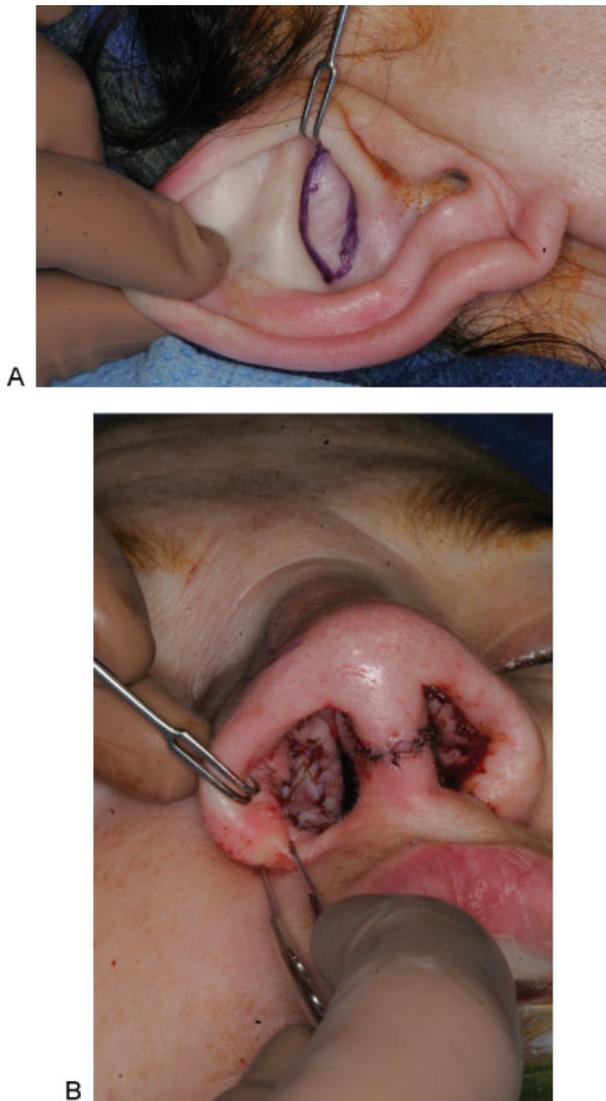
Alar deformities from vestibular skin deficiency can be repaired with an interposed composite graft harvested from the concha cymba. The area just medial and inferior to the inferior crus on the anterolateral surface of the auricle is generally used as the donor site (►Fig. 9A). This area is well camouflaged and poses little risk for auricular distortion under primary closure. If large grafts are needed precluding primary closure, a full-thickness skin graft harvested from the postauricular region is used for closure. When harvesting large grafts, it is important to leave a circumferential area of auricular cartilage that protrudes a few millimeters beyond the overlying skin island. Such a technique ensures a greater surface area of perichondrium, allowing for subsequent vascular ingrowth to the cartilage and overlying skin at the recipient site, increasing the probability of graft survival. The harvested graft is immediately transferred to the tissue gap internally and sutured in place using 5-0 chromic sutures. Composite grafts also provide structural support, pushing the vestibular skin down in a more caudal direction. However, the combination of lower lateral cartilage



**Figure 7** Perichondrium placed on the undersurface of the dorsal graft allowing for rapid graft adherence on the dorsum.



**Figure 8** Lateral crural strut grafts secured on the undersurface of the lower lateral cartilages.



**Figure 9** (A) Auricular composite graft harvested from the concha cymba. (B) Composite graft sutured in position to fill the void of the vestibular defect after lower lateral cartilage repositioning.

repositioning with lateral crural strut grafts, stabilization of the pivot point with an extension graft and extended spreader grafts, and composite grafts for internal lining address both deficiencies found in the retracted ala (►Fig. 9).

### Tip Refinement

In patients who require further tip projection and refinement, dome suturing and tip grafts may provide potential benefit. In some cases, tip grafts can be sutured in place along the superior aspect of the newly formed domes. Care must be taken with thin-skinned individuals. In these instances, it is prudent to camouflage the graft with soft tissue or perichondrium from the harvested costal cartilage. Thick-skinned patients who need further tip refinement may benefit from a shield graft placed on the caudal aspect of the medial crura. The graft should project no more than 2 mm from the superior aspect of the domes to prevent future visibility. This risk is further prevented by beveling the edges of the

graft. The cartilage used should be flexible to allow for a slight degree of cephalic rotation and a favorable double break.

### Alar Rim Grafts

Alar rim grafts provide further refinements to the alar rim and further cartilaginous support to resist alar notching. Most patients who have undergone repositioning of the lateral crura do not need alar rim grafts. After the ala have been repositioned and before the placement of the composite graft, minor refinements for persistent nostril asymmetry may be addressed with the placement of alar rim grafts. Alar rim grafts are designed from septal, auricular, or costal cartilage. Softer, more pliable septal or auricular cartilage is preferred. To place the alar rim graft, a pocket is carefully made caudal to the marginal incision. The graft is then positioned into the tunnel and sutured in place with a 6-0 Monocryl (Ethicon Inc, Sommerville, NJ). To diminish the chance of graft visibility, the medial edge of the graft is beveled and softened by morselization.

### Alar Base Reduction

Alar base reduction or alar flare reduction can be used to offset any excessive alar flaring or width. Often, it may be encountered after lower lateral cartilage repositioning, where the caudal reorientation itself may create a previously unapparent flaring. Caution must be used prior to undertaking alar base reductions because it may result in an unsightly scar. Careful placement of the incisions and meticulous closure are paramount in preventing an aesthetically displeasing scar. Wedge excision along the vestibular side of the alar rim will serve to reduce the internal circumference of the naris, and wedge excision along the outer perimeter of the ala will diminish outer alar circumference. When planning the external excision for alar flaring, the senior author consciously leaves a millimeter of alar skin at the nasofacial junction to allow for suture placement with a slight degree of skin edge eversion. Also, when performing alar excisions, particularly the external alar flare excisions, it is important to avoid the use of cautery. Cautery in this region may result in subcutaneous fat necrosis and dimpling of the overlying skin at the site. The incisions are then closed with 7-0 nylon vertical mattress sutures.

### Postoperative Care

Upon closing, nasal sidewall splints typically are sutured into position on the vestibular and external aspect of the sidewall with 3-0 nylon (►Fig. 10). The splints help to keep the repositioned lateral cartilages in their new, caudal position and to create a seamless contour between the ala and nasal sidewall. The patient is typically discharged home on the day of surgery. They are started on 14 days of oral antibiotics and nasal antibiotic soaks. Nasal antibiotic soaks are composed of broad spectrum antibiotic diluted in normal saline. The patient is instructed to place antibiotic-soaked gauze in each nostril every few hours throughout the day. Nasal packing is removed on the first postoperative day. The columellar sutures, sidewall splints, and the nasal cast are removed on postoperative day 7. The patient is closely



**Figure 10** (A) Placement of sidewall splints to secure the repositioned lower lateral cartilages. (B) The 3-0 nylon sutures are loosened to allow for expected swelling.

observed especially during the early postoperative period. Any irregularities of the grafts are attended to with nasal exercises.

### Final Comments

Lengthening the short nose is one of the most difficult tasks of the rhinoplasty surgeon. Effective lengthening requires use of strong cartilage, which in most patients requires using costal cartilage. Use of costal cartilage requires much experience to

avoid unfavorable outcomes. The primary steps in correcting the short nose require lengthening the central compartment followed by bringing down the ala to complement the position of the central compartment. Placing the ala requires repositioning the lateral crura using longer lateral crural strut grafts in caudally placed pockets.

The mobility of the skin and soft tissue envelope is frequently the limiting factor in lengthening the short nose. These limitations must be considered prior to embarking on this complex surgical technique (→**Fig. 11**).



**Figure 11** This patient presented requesting correction of her short nose deformity. She wanted to have her nose lengthened and counterrotated. (A) Preoperative frontal view. (B) Preoperative lateral view. (C) Preoperative oblique view. (D) Preoperative basal view. (E) Chest incision (1.1 cm) to harvest costal cartilage. (F) Rib cartilage next to chest incision. (G) Extended spreader grafts in place. (H) Extended spreader grafts from side view. (I) Extended spreader grafts with caudal septal extension graft. (J) Lateral crural strut grafts sutured to lateral crura. (K) Lateral crural strut grafts in place, basal view. (L) Lateral crura/lateral crural strut grafts repositioned. (M) Tip graft in place over domes. (N) Tip graft sutured over domes side view. (O) Postoperative frontal view. (P) Postoperative lateral view. (Q) Postoperative oblique view. (R) Postoperative base view.



Figure 11 Continued.



R

**Figure 11** *Continued.*

### References

- 1 Powell N, Humphreys B. Considerations and Components of the Aesthetic Face. Proportions of the Aesthetic Face. New York, NY: Thieme-Stratton;1984;20:6
- 2 Naficy S, Baker SR. Lengthening the short nose. Arch Otolaryngol Head Neck Surg 1998;124:809-813
- 3 Toriumi DM. New concepts in nasal tip contouring. Arch Facial Plast Surg 2006;8:156-185
- 4 Gunter JP, Friedman RM. Lateral crural strut graft: technique and clinical applications in rhinoplasty. Plast Reconstr Surg 1997; 99:943-952; discussion 953-955