

39 Structural Grafting in Secondary Rhinoplasty

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Abstract

The surgical approach to secondary rhinoplasty is similar to that in a primary case, except that the former requires more of a reconstructive component. The objectives should include improvement of nasal shape and airway and establishment of a stable foundation that can withstand the forces of scar contracture and healing over time. When a prior surgery has been performed, the components of the nose can be radically altered or damaged, including the skin–soft tissue envelope and cartilaginous supporting structures. These factors need to be considered during the secondary procedure and may limit the techniques and material available to achieve the desired results.

Keywords: Revision rhinoplasty, secondary rhinoplasty, structure rhinoplasty, cartilage grafting, costal cartilage

Key Points

- Secondary rhinoplasty requires assessment of the nasal structure and function that have been altered as a result of prior surgery.
- An open rhinoplasty approach is recommended in secondary surgery because it allows full examination of the nasal structure and deficiencies to accurately determine and execute necessary changes under direct visualization.
- Autologous cartilage is the principal source of grafting material for structural reconstruction in rhinoplasty. Septal, ear, or rib cartilage is most commonly harvested. Nonautologous grafts or implants carry an unacceptable risk for inflammation, infection, extrusion, and excessive scar tissue.
- Functional nasal deficits after rhinoplasty include internal and external nasal valve collapse. Internal nasal valve collapse can be corrected by the placement of spreader grafts, lateral crural strut grafts, and/or alar batten grafts. Lateral crural strut grafts increase lateral wall support. Alar batten grafts and alar contour grafts help to correct external nasal valve collapse.
- Tip projection can be established with a columellar strut graft, caudal septal extension graft, or an extended columellar strut graft. The decision to use a specific graft is determined by the intraoperative deficits and goals of the surgery. Stabilization of the nasal base is critical to minimize postoperative loss of tip projection.

39.1 Introduction

Many plastic surgeons consider secondary rhinoplasty to be one of the most challenging procedures they perform. Suboptimal results from a primary rhinoplasty can be caused by many factors that have adversely changed the structure or function of the nose. Aggressive resection and weakening of the nasal skeleton without maintaining or rebuilding of the nasal framework can lead to deformities. The surgical approach to secondary rhinoplasty is similar to that in a primary case, except that the former requires more

of a reconstructive component. The objectives should include improvement of nasal shape and airway and establishment of a stable foundation that can withstand the forces of scar contracture and healing over time. When a prior surgery has been performed, the components of the nose can be radically altered or damaged, including the skin–soft tissue envelope and cartilaginous supporting structures. These factors need to be considered during the revision procedure and may limit the techniques and material available to achieve the desired results. This chapter discusses preoperative planning for secondary rhinoplasty, intraoperative considerations including choice of grafting material, structural grafts in the tip and midvault, and postoperative care.

39.2 Preoperative Evaluation and Planning

- Careful assessment of the nose is essential prior to secondary rhinoplasty.
- The skin–soft tissue envelope may have compromised vascular supply as a result of previous surgery. This damage can appear as cutaneous telangiectasias, blue or purple discoloration of the skin in cold temperatures, or visible irregularities.
- Assessing the inherent character of the skin–soft tissue envelope is also important; thick, sebaceous skin can camouflage grafts but redrapes poorly over an overly resected nasal framework. Conversely, thin skin will reveal minor irregularities in the underlying structural framework but more easily redrapes over a smaller framework.
- The nasal framework may be significantly compromised or missing after previous surgery. Preoperative assessment of the structural support of the nose can help prepare the surgeon for what secondary rhinoplasty may entail. If a significant amount of cartilage grafting is anticipated in a secondary rhinoplasty based on preoperative assessment of the nasal structure, it is important to discuss alternative sources of cartilage with the patient.
- Autologous rib cartilage and ear cartilage are potential sources of cartilage for grafting that should be discussed with the patient preoperatively.

39.3 Intraoperative Considerations

- The goal of secondary rhinoplasty is to reconstruct the nasal framework to produce an aesthetic and functional improvement. This is achieved by creating a more normal and balanced nasal shape, reestablishing nasal support, restoring tip projection, and maximizing the airway. A variety of structural grafts may be required to achieve these goals.
- Open rhinoplasty is preferred for patients requiring significant structural improvements as it provides wide exposure of the depleted nasal structure. With an open approach, structural grafts can be fixated with precise suture placement. A closed approach may be used for precise pocket

grafting in secondary rhinoplasty to fill defects and provide modest support.

- Scar tissue can obliterate the tissue planes of the skin–soft tissue envelope making it more difficult to open the nose. It is important to elevate the skin–soft tissue envelope in the supraperichondrial and supraperiosteal plane with extreme care to preserve the vascular integrity of the skin. If the planes are no longer present, dissection should be immediately superficial to the underlying cartilage and bone. Damaged cartilage can be reconstructed and replaced, but injury to the skin can cause irreparable damage.

Expert Tip

It is critical to avoid damage to the skin–soft tissue envelope when opening the nose. Damage to the underlying cartilages is less critical as they can be reconstructed and replaced. If scar tissue distorts tissue planes, dissecting close to the cartilage and preserving as much skin and soft tissue as possible are preferred.

39.4 Cartilage Sources for Grafting

- Autologous grafts are preferred for both primary and secondary rhinoplasties as nonautologous grafts or implants carry an unacceptable risk of inflammation, infection, extrusion, pain, and excessive scar tissue. The principal material for such grafts is cartilage.
- The three main sources of cartilage for rhinoplasty are the nasal septum, ear, and rib. The septum is the most commonly used source for structural grafting—it is easily accessible and is often partially removed to improve the nasal airway. A large portion of septal cartilage can be harvested without loss of support as long as an L-shaped caudal and dorsal septal strut of at least 15 mm remains intact. However, septal cartilage is often unavailable in secondary procedures and alternative sources are required.
- Ear cartilage can be easily harvested without significant morbidity to the patient. The cyma and cavum concha can be removed, yielding approximately 35 to 40 mm of cartilage. A posterior approach for harvesting is preferred because the scar is hidden behind the ear in the postauricular sulcus. Most ears heal with minimal to no shape alteration or visible scarring. Ear cartilage is inherently curved and thick, which may limit its utility in structural grafts. It is preferable to use rib cartilage for the structural grafting and preserve the ear cartilage for potential ear composite grafting for internal lining issues.
- If a large amount of grafting material is required, rib cartilage is often the best option. Rib cartilage is typically harvested from the 6th or 7th rib. The 6th rib has a genu that limits the length of straight cartilage available for harvest, but allows the incision to be concealed within the inframammary fold. About 3 to 4 cm of straight rib cartilage can be harvested from the 7th rib. The 7th rib also lies below the level of the diaphragm on inspiration in most individuals, which decreases the risk of injury to the pleura during harvest.
- Rib cartilage has the tendency to warp after being cut, particularly in younger patients with soft rib cartilage without calcification. Serial carving of grafts every 20 to 30 minutes can



Fig. 39.1 Combined sagittal and oblique split technique for cutting cartilage. The segment with native rib perichondrium is cut in the sagittal plane and the remaining segment is cut using an oblique split technique.

reveal cartilage warping tendency so that it can be accounted for when planning grafts. An oblique split method of carving the rib cartilage can be used if shorter grafts are needed.¹ In most cases, we will use a sagittal cutting method to maximize graft length. We will also leave native perichondrium on at least one surface of the cartilage (► Fig. 39.1).

Expert Tip

A long, straight segment of cartilage can be harvested from the 7th rib. This is our preference for cartilage grafting in secondary rhinoplasty.

39.5 Structural Grafting in the Tip

- The lower third of the nose has been compared to a tripod-like support structure. The medial crura together form one leg of the tripod, and the lateral crura make up the other two legs. The tripod should be maintained in rhinoplasty to provide tip support and normal tip shape. In secondary rhinoplasty, grafting is often performed to restore the tripod structure, which should help to resist malpositioning over time.²

- Major tip support mechanisms need to be understood and respected in both primary and secondary rhinoplasties. Components of major tip support include the length and strength of the lower lateral cartilages, the attachment of the cephalic margin of the lateral crura to the caudal margin of the upper lateral cartilages (the scroll), and the ligamentous attachments between the conjoined medial crura and the caudal septum. Interruption of one or more of these support mechanisms necessitates reinforcement of tip support.

39.5.1 Tip Projection

- The ability to control tip projection is essential to a successful rhinoplasty. When a surgeon sets the tip projection in a stable fashion, the effects of healing and scar contraction are decreased, even if major tip support mechanisms were breached intraoperatively. The final position of the nasal tip over time is determined by the strength, length, and support of the medial crura; the support from the caudal septum, anterior nasal spine, and premaxilla; the degree of depressor septi nasi muscle activity on the nasal base; and the degree of fibrous tissue reattachment of the columella to the caudal septum.
- With an increase in tip projection, a higher dorsum can be maintained, helping to create the appearance of a narrower, better proportioned nose. This technique is invaluable in patients with thick skin, in whom redraping of the skin over an overresected nasal skeleton often results in a soft tissue pollybeak and a wider-appearing nose.
- Structural grafts that allow surgeons to set tip projection through stabilization of the nasal base include a columellar strut graft, a caudal septal extension or replacement graft, and an extended columellar strut graft. These can be created from either septal or rib cartilage as both have sufficient structural support to provide long-term stability. Septal cartilage is ideal, if available, because it does not have the same warping tendency as rib cartilage, which could result in tip deviation with time. In contrast, ear cartilage is less effective for stabilizing the nasal base because of its softer composition.

Columellar Strut Graft

- A columellar strut graft is useful if the alar–columellar relationship is appropriate and the tip is already well supported. It can strengthen weak medial and middle crura. A columellar strut graft improves tip support with minimal effect on tip projection. It is a rectangular piece of cartilage that is set in a pocket between the medial crura and the middle crura. It does not sit on the anterior nasal spine, but instead it rests on soft tissue above the anterior nasal spine. These grafts typically measure 5- to 12-mm long, 3- to 6-mm wide, and 1- to 3 mm-thick.
- To place this graft, the tissue between the medial crura is sharply dissected. The rectangular columellar strut graft is placed between the medial crura, preserving a bed of soft tissue between the graft and the anterior nasal spine. If the strut is placed too close to the anterior nasal spine without fixation, the patient may note a clicking sensation when smiling. The graft is fixed to the medial crura by a 5–0 chromic gut suture. It then is stabilized with a 5–0 clear nylon suture.

Caudal Septal Extension Graft

- A caudal septal extension graft can be applied to rotate, derotate, project, and deproject the nasal tip.³ The graft is a rectangular piece of cartilage that extends off the existing caudal septum and is sutured between the medial crura. The graft can be placed end to end to prevent blocking of the nasal airway or can be overlapped on a specific side to correct tip deviation. The specific placement of the graft and sutures can stabilize the nasal base and set tip projection with a proper alar–columellar relationship.
- The graft is extended caudal to the existing caudal septum in an end-to-end orientation. In this case, the caudal extension graft is stabilized with bilateral extended spreader grafts (► Fig. 39.2a–c, ► Fig. 39.3). In addition to the extended spreader grafts, two smaller, thinner splinting grafts can be placed inferiorly to further stabilize the caudal septal extension graft. The caudal septal extension graft is typically

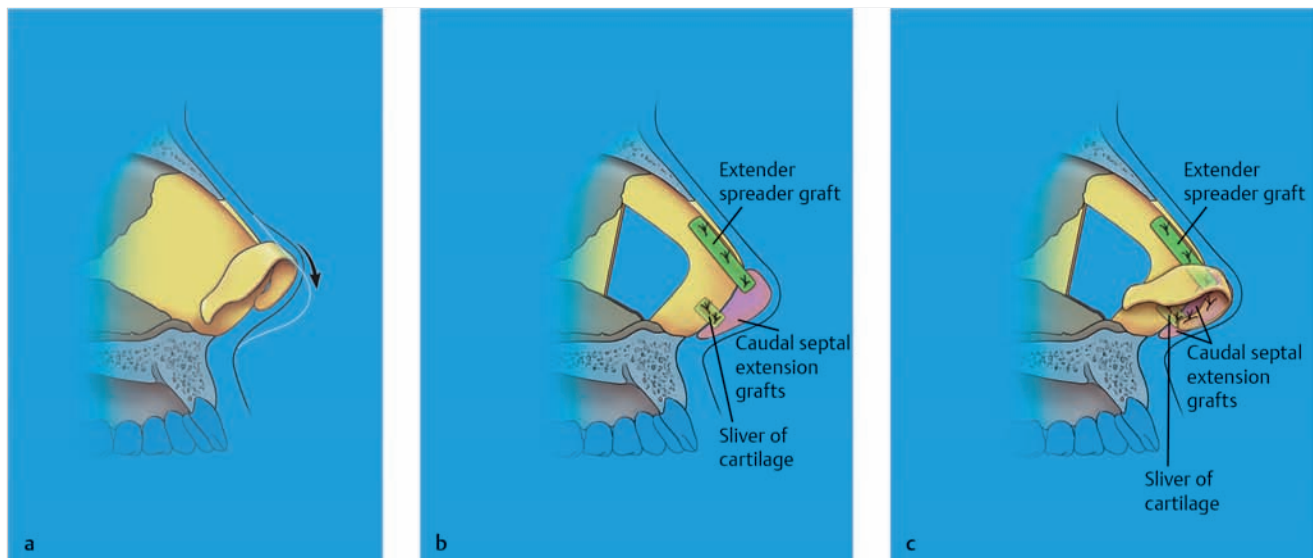


Fig. 39.2 (a–c) Caudal septal extension graft fixated end to end to existing septum and stabilized with two extended spreader grafts. Note the triangular shape with less caudal extension inferiorly to minimize pressure on the upper lip.

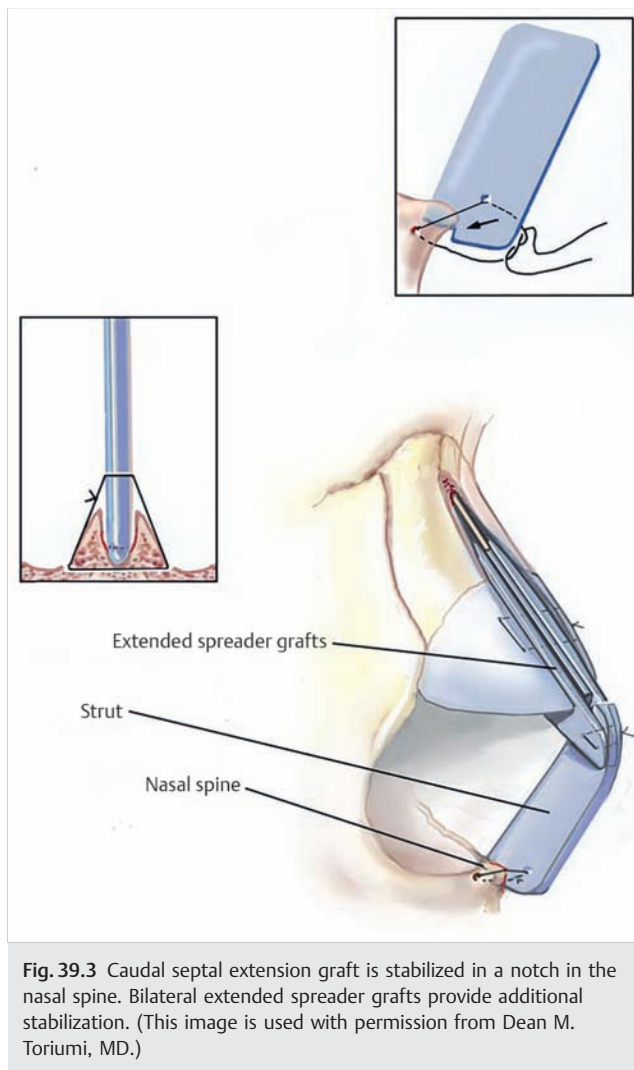


Fig. 39.3 Caudal septal extension graft is stabilized in a notch in the nasal spine. Bilateral extended spreader grafts provide additional stabilization. (This image is used with permission from Dean M. Toriumi, MD.)

triangular in shape, with less length inferiorly to limit pressure on the upper lip.

- If the caudal septum is very weak or absent, a caudal septal replacement graft can be used instead of an extension graft. The inferior portion of this graft is secured with two 4–0 PDS sutures into a notch made in the anterior nasal spine. Alternatively, the grafts can be stabilized through a hole created through the anterior nasal spine using a 16-gauge needle. The superior aspect of the graft is typically stabilized between two spreader grafts.

Expert Tip

Rib cartilage has a tendency to curve when cut. To straighten and support cartilage grafts, slivers of cartilage can be sutured to the grafts to correct the curvature.

39.5.2 Tip Definition

- Not all tip refinement is achieved through structural grafting. For example, we frequently use bilateral obliquely oriented

PDS dome sutures to narrow the domes and set tip width. In secondary rhinoplasty, however, structural grafting is usually necessary to achieve the proper tip projection and definition.

Tip Graft

- A tip graft can be helpful to increase tip projection and improve tip contour. The graft is sutured to the caudal margin of the medial and middle crura using 6–0 Monocryl sutures. Most commonly, the graft is carved into a shield-like shape and is thicker at the anterior leading edge and thinner at the posteroinferior margin. It usually measures 8- to 15-mm long, 8- to 12-mm wide, and 1- to 3-mm thick.
- A tip graft can help to set tip projection, hide tip asymmetries, reestablish nasal support mechanisms, and improve the stability of the medial crural–columellar strut graft complex.
- To reduce visibility, the edges of the graft are beveled to create a smooth transition with surrounding structures. If costal cartilage is used, a curved piece can be thinned to allow proper shaping of the infratip lobule. Perichondrium can be sutured around the superior edge of the graft for additional camouflage. Articulated alar contour grafts can be used to camouflage the lateral margins of the shield tip graft.
- Despite these modifications for decreased visibility, tip grafts are difficult to conceal in patients with thin skin and should be avoided.

Cap Graft/Buttress Graft

- A cap or buttress graft sits behind the leading edge of a tip graft. When sutured in place, it helps to better stabilize the tip graft and provide a smoother transition from the lateral aspect of the tip graft to the preexisting domes. A cap graft can be placed to provide additional support at the leading edge of a tip graft that demonstrates excessive cephalic rotation.

Lateral Crural Strut Graft

- A lateral crural strut graft is placed between the undersurface of the lateral crura and the vestibular skin. These rectangular grafts can provide additional support for weak lateral crural cartilages and flatten bulbous lateral crura. In addition, these grafts help to recreate the natural-appearing triangular shape of the nasal base and support the lateral wall of the nose. The lateral crus is dissected from the underlying vestibular skin, and the lateral crural strut graft is sutured to the undersurface of the lateral crus.
- In most secondary cases, lateral crural strut grafts are used to reinforce or support previously overresected lateral crura.⁴
- If the native lateral crura or domes are deformed to the extent that they are not salvageable, replacement lateral crura can be reconstructed using remnant lateral crura, soft fibrous cartilage, or scar tissue. These replacement lateral crura can be sutured to the caudal septal extension or replacement graft with 5–0 PDS suture at about 45-degree angle from the midline, and lateral crural strut grafts are sutured to the undersurface (► Fig. 39.4a–h).
- Lateral crural strut grafts with caudal repositioning are the most effective means for correcting alar retraction. If one

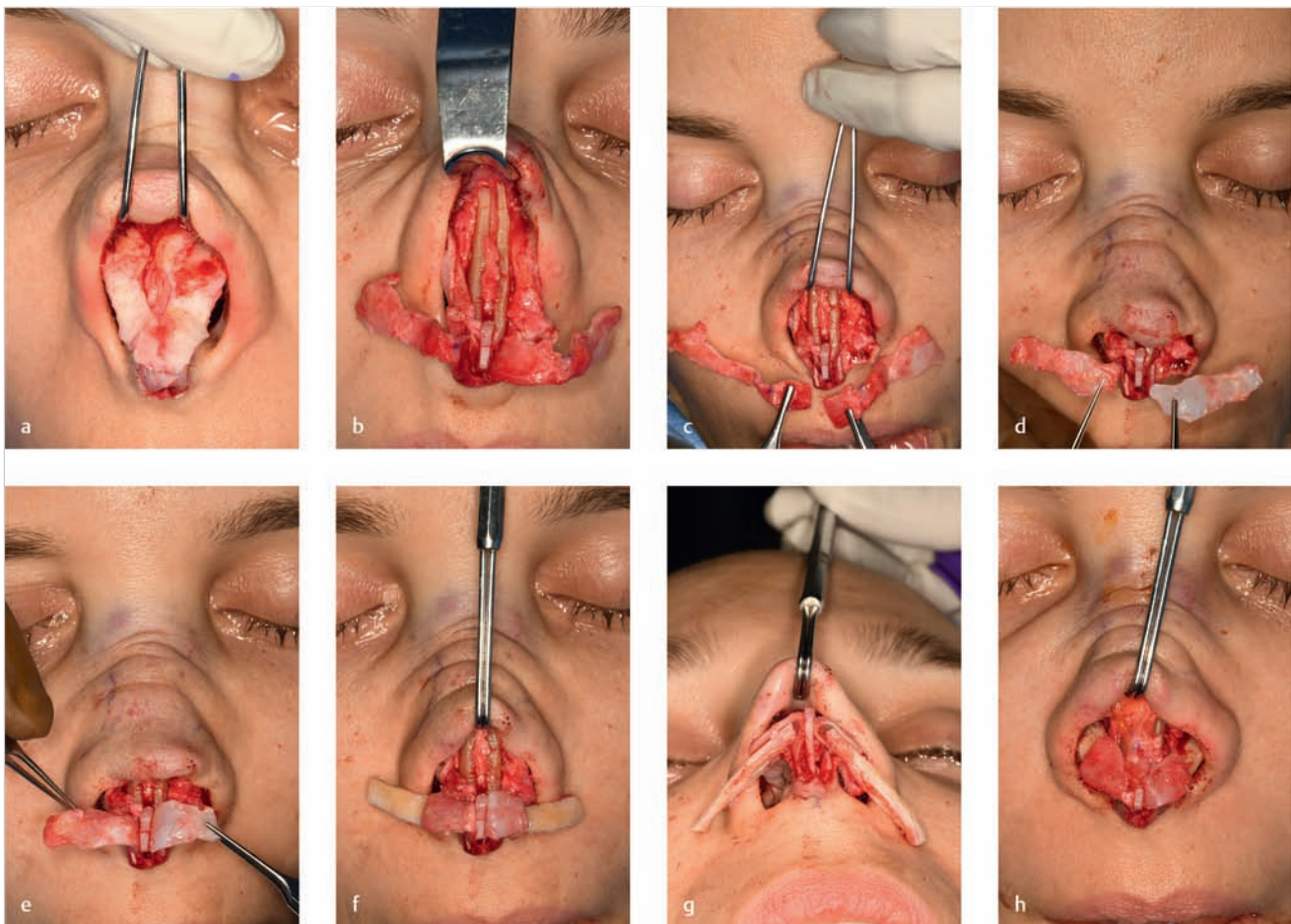


Fig. 39.4 Lateral crural replacement grafts. (a) Severely deformed cephalically malpositioned lateral crural remnants. (b) Deformed lateral crura are released. (c) Deformed lateral crura are amputated at the level of medial crura. (d) Lateral crural replacement grafts are fashioned. (e) Lateral crural replacement grafts are sutured to the caudal septal extension graft. (f) Lateral crural strut grafts are sutured to lateral crural replacement grafts. (g) The lateral crural strut grafts have native perichondrium on the undersurface to promote proper curvature. (h) The lateral crural replacement grafts with lateral crural strut grafts sutured to the undersurface.

ala is more retracted than the other, then the pocket for repositioning should be more caudally oriented on that side. Composite auricular grafts, which will be discussed later, can also be used for minor alar retraction.

Alar Contour Graft

- Alar contour grafts are invaluable in the creation of proper tip shadowing and triangularity of the nasal base.⁵ These are especially useful for improving alar rim support in patients with insufficient support along the alar margin, as seen in patients with external nasal valve collapse.
- The grafts are composed of narrow pieces of soft cartilage measuring approximately 5- to 8-mm long, 2- to 3-mm wide, and 1- to 2-mm thick. They are inserted into pockets created at the caudal margin of the infracartilaginous incision. The medial aspect of the graft can be sutured to the soft tissue or occasionally to the lateral margin of a tip graft. To reduce graft visibility, soft cartilage is preferable, and the medial margin is gently crushed once it is in position.

39.6 Structural Grafting in the Midvault

- Nasal obstruction secondary to nasal valve collapse can usually be attributed to lateral nasal wall weakness. Negative airway pressure produced by nasal airflow can collapse a poorly supported lateral nasal wall into the airway, causing obstruction.
- Internal nasal valve collapse is common after reductive rhinoplasty, usually due to medial collapse of the caudal margin of the upper lateral cartilage with inspiration. The internal nasal valve is the anatomic area bounded by the caudal margin of the upper lateral cartilage, the nasal septum, the floor of the nose, and at times an enlarged inferior turbinate. The internal angle between the septum and upper lateral cartilage should be at least 15 degrees. Supra-alar pinching warrants assessment for internal nasal valve collapse.
- Correction of internal nasal valve weakness usually involves the addition of structural support to the nasal sidewalls or repositioning the lower lateral cartilages.

- External nasal valve collapse involves collapse of the nostril margin or alar lobule during mild to moderate nasal inspiration. It is typically seen in conjunction with narrow nostrils and an overprojected nasal tip. Several methods can be used to correct this problem, including deprojection of the nasal tip, which creates a more oval-shaped nostril and a triangular nasal base, and placement of alar contour grafts into the alar lobule for additional structural support. Lateral crural strut grafts will also provide additional support to an external nasal valve.

39.6.1 Spreader Grafts

- Spreader grafts positioned between the upper lateral cartilages and the septum are invaluable in the correction of midvault insufficiency. The graft is a rectangular piece of cartilage measuring 6- to 25-mm long, 3- to 5-mm high, and 2- to 4-mm thick.
- Tall spreader grafts are spreader grafts that have larger vertical height (5–8 mm) and are typically notched cranially to integrate with the remnant nasal bones.⁶ The grafts are fixed to the nasal bones via a hole drilled across the nasal bones with a 16-gauge needle. A 4–0 PDS suture is used to fix the tall spreader grafts to the nasal bones and prevent displacement. The leading edge of the tall spreader grafts may need to be beveled and camouflaged with costal perichondrium to prevent visibility. The upper lateral cartilages can be sutured to the sides of the tall spreader grafts to provide additional camouflage. Tall spreader grafts are used to reconstruct the middle nasal vault as well as augment the nasal dorsum and provide proper dorsal contour.
- The graft can be placed in a subperichondrial tunnel created between the upper lateral cartilage and the septum, if the upper lateral cartilages are not separated from the septum, or can be sutured in between the upper lateral cartilages and the septum, if the upper lateral cartilages are separated from the septum.
- The cephalic edge of a spreader graft should be placed just under the caudal edge of the nasal bones and beveled to prevent lateralization of the nasal bone. Tall spreader grafts are notched cranially and integrated with the nasal bones.

Expert Tip

Tall spreader grafts can be used to augment the dorsum if it has been over-reduced in previous surgeries.

39.7 Correction of Vestibular Stenosis

- Sometimes nasal obstruction is the result of contracted scars in the region of the nasal valve, excessive vestibular skin resection, or strictures that form after poor reapproximation of incisions. The most common methods for correcting such problems include excision of the scar followed by reconstruction with composite grafts, local mucosal flaps, or a Z-plasty scar revision. We find that the addition of support and lining after excision of the scarred or contracted mucosal tissues provides the best improvement in nasal function.

39.7.1 Composite Graft

- Composite grafts provide additional internal lining with attached cartilaginous structural support. They are typically harvested from the cyma concha of the ear. If a large graft is needed, it can be harvested from the entire concha.
- Composite grafts can be used to replace deficient intranasal vestibular mucosa in secondary rhinoplasty patients. Those who have internal nasal vestibular stenosis require replacement of the scarred or contracted intranasal mucosa to correct the constricted airway.
- If the stenosis is located in the nasal valve region, the composite graft can be hinged to fit the defect and recreate the nasal valve opening.
- Composite grafts are sutured with 5–0 chromic gut sutures. Most are splinted to ensure proper positioning and healing.

Expert Tip

If there is tension on the marginal incision when closing, ear composite grafts can provide additional internal lining and reduce this tension to prevent alar retraction.

39.8 Postoperative Care and Follow-Up

- At the completion of surgery with an open approach, the transcolumellar incision is reapproximated using a combination of nonabsorbable and absorbable sutures. The marginal incisions are closed with absorbable suture. If the marginal incisions are unable to be closed without tension, an ear composite graft is placed as previously mentioned. An external cast is placed on the nasal dorsum over Steri-Strips.
- Lateral wall splints are placed if the vestibular skin was dissected from the undersurface of the lower lateral cartilages for placement of lateral crural strut grafts. These splints consist of thin sheets of plastic, one internal and one external, which sandwich the nasal ala and are held in place by a single 3–0 nylon mattress suture. These splints prevent excess swelling over the nasal ala and encourage the vestibular skin to heal to the underside of the cartilages without excess scar tissue formation. It is imperative that this suture is not too tight, or it can cause alar necrosis.
- The external cast, lateral wall splints, and nonabsorbable sutures are routinely removed on the seventh postoperative day.
- We routinely place antibiotic irrigation catheters under the nasal skin in all secondary rhinoplasty patients and any primary rhinoplasty patients with significant cartilage grafting.⁷ These irrigation catheters are 22-gauge angiocatheters placed under the nasal skin through the infracartilaginous incision. Patients are prescribed two 500-mg tablets of ciprofloxacin to be dissolved in 1 L of sterile saline to be used for antibiotic irrigations. Approximately 0.7 mL of this solution is irrigated through the catheters every 3 hours after surgery. These catheters are removed between 3 and 7 days postoperatively.
- We also recommend antibiotic nasal soaks. Small strips of gauze are soaked in the same antibiotic solution used for irrigations and placed in the nostrils bilaterally for 30 minutes every 3 hours postoperatively.

- Finally, we recommend hyperbaric oxygen treatment for all of our secondary rhinoplasty patients. Patients typically undergo at least five 1-hour hyperbaric sessions at 2.2 to 2.6 atm.
- Postoperative edema and erythema can occur when perichondrium has been used to camouflage the nasal skeleton and grafts. Patients are reassured that this is the expected postoperative course to prevent unrealistic expectations.
- If edema persists, approximately 0.1 to 0.4 mL of triamcinolone acetonide (10 mg/mL) can be injected into the subdermal tissue in the affected area. Repeat corticosteroid injections may be warranted, but care is required to limit their frequency to reduce the risk of dermal atrophy. Supratip taping can also help to achieve the desired postoperative nasal tip shape.
- The most essential component of postoperative care is long-term follow-up. We recommend yearly examinations at the minimum for as long as possible (decades if feasible). Graft irregularities can be corrected with nasal compression exercises. Alternatively, minor irregularities

can be corrected in a short office procedure under local anesthesia. Routine, long-term evaluation of rhinoplasty patients allows surgeons to determine whether the structural and aesthetic changes made during a revision procedure were effective in maintaining long-term function and appearance.

39.9 Case Analysis

A 22-year-old female presented with a short overrotated nose and a low dorsum after previous rhinoplasty (► Fig. 39.5a–w, ► Video 39.1).

39.10 Conclusion

Secondary rhinoplasty requires assessment of all changes in nasal structure and function that are a result of prior surgery. Preservation of the structural nasal framework is essential for successful



Fig. 39.5 A 22-year-old female presented with a short overrotated nose and a low dorsum after previous rhinoplasty (a–d). (e) She requested correction of her nasal deformities. The surgical goals included lengthening the nose, elevating the dorsum, and decreasing tip rotation using autologous rib cartilage. The patient was brought to the operating room for secondary rhinoplasty with autologous cartilage harvest. The surgical approach was as follows: (1) Rib cartilage was harvested from a 1.1-cm incision in her right chest (f). (2) Open rhinoplasty approach was used to expose the tip and dorsum. Deformed tip cartilages were noted (g). (3) The upper lateral cartilages were freed from the dorsal septum. The dorsal septum was very over-reduced and low. (4) The left nasal bone was outfractured. (5) Bilateral notched tall spreader grafts were positioned against her short nasal bones (h–j).

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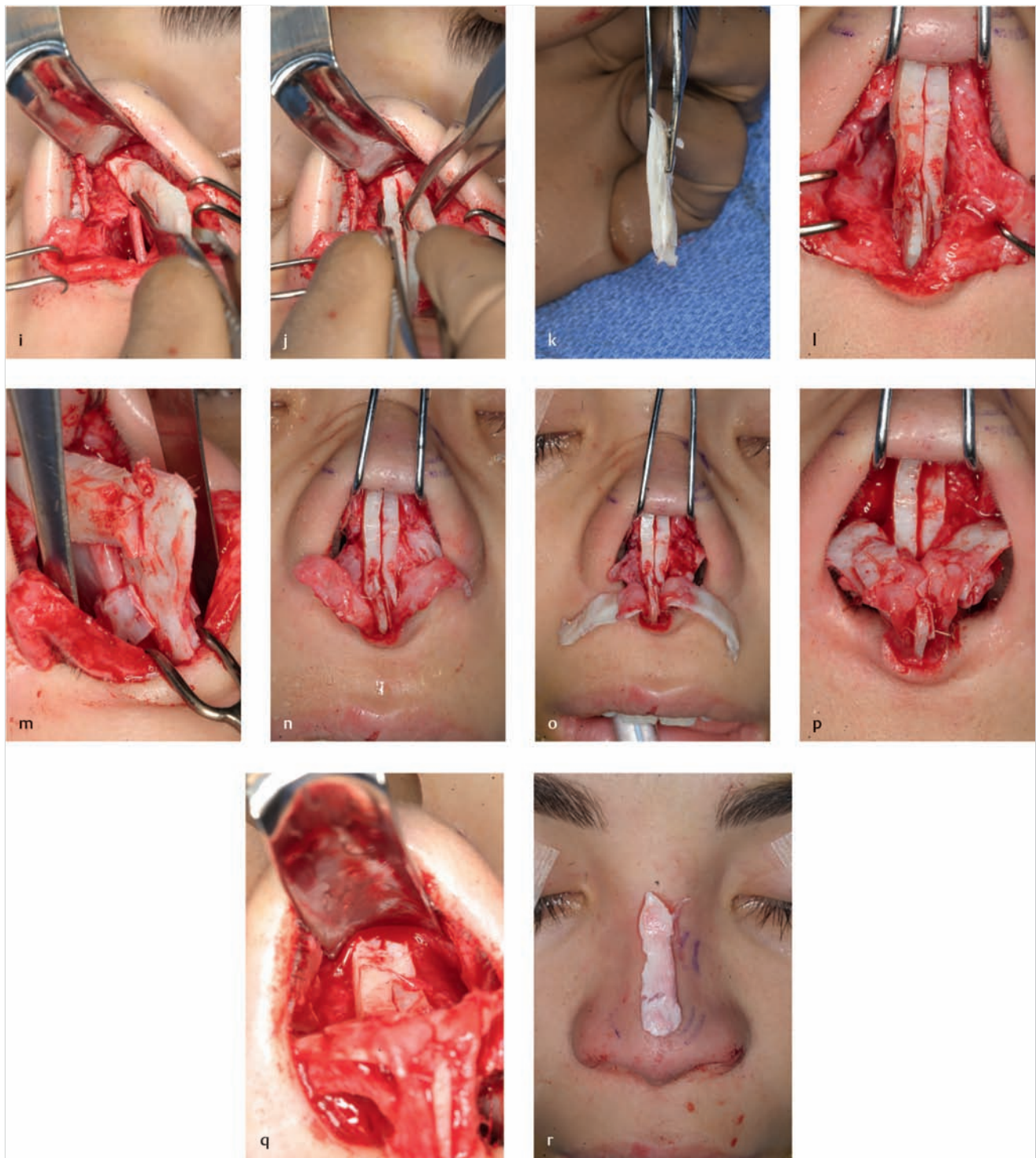


Fig. 39.5 (Continued) (6) A caudal septal extension graft was splinted with multiple slivers of rib cartilage to prevent warping of the rib cartilage (k). The caudal septal extension graft was sutured to the tall extended spreader grafts with thin slivers inferiorly (l, m). (7) The deformed lateral crural remnants were freed from the vestibular skin (n). (8) The lateral crura were supported with lateral crural strut grafts carved from rib cartilage (o). (9) The lateral crura with lateral crural strut grafts were placed into caudally positioned pockets (p). (10) The tall spreader grafts are superiorly positioned higher than the existing middle vault structure to narrow and raise the dorsum (q). A strip of rib perichondrium was placed over the tall spreader grafts for camouflage and to create a smooth dorsum (r). (11) A tip graft was placed for increased tip definition. (12) The old columellar scar was excised. The transcolumellar and infracartilaginous incisions were closed. Scars from previous alar base reduction were excised. (13) An external cast was applied.

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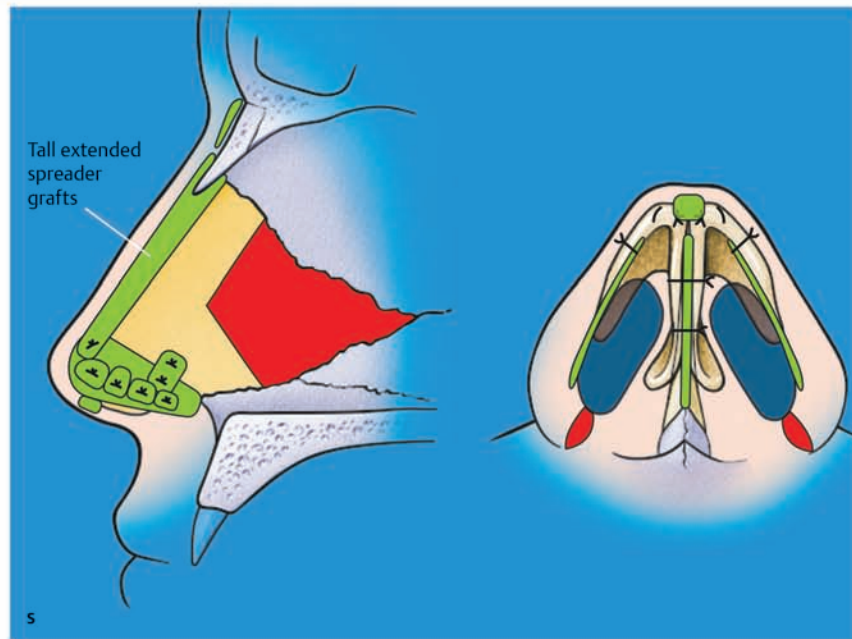
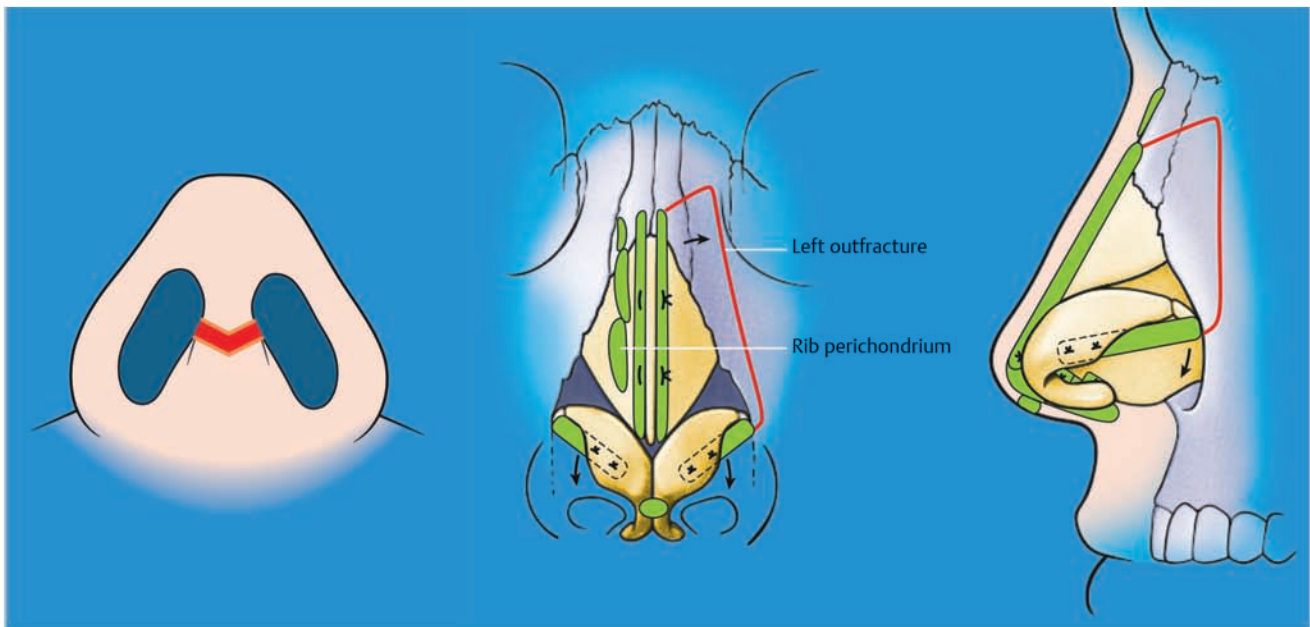


Fig. 39.5 (Continued) (s) Gunter diagrams. Analysis of result: The patient's result at 1 year postoperatively is viewed from the front (t), side (u).

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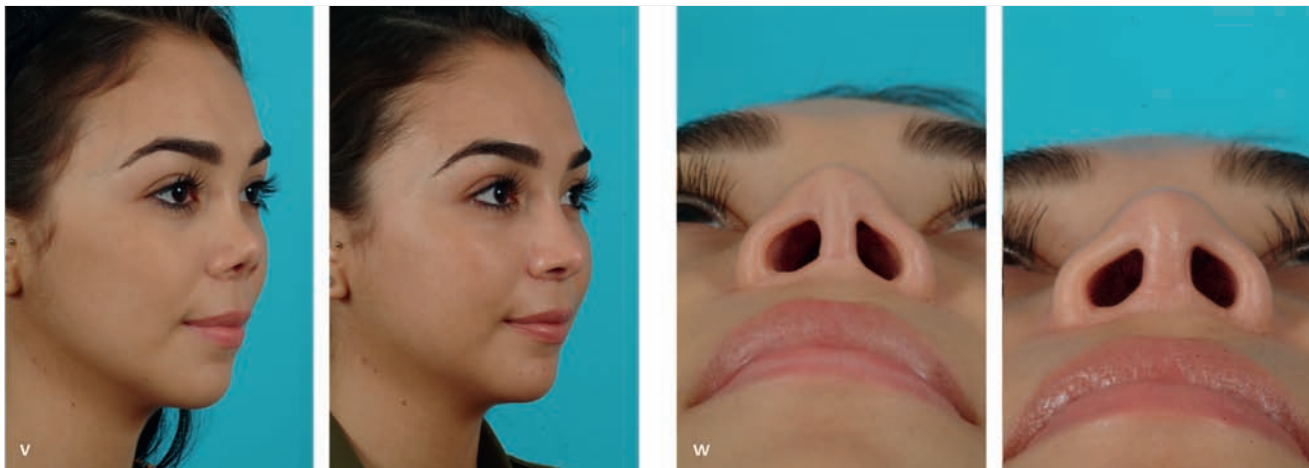


Fig. 39.5 (Continued) Oblique (v) and base views (w). On lateral view, the nose has an appropriate length, and the dorsum has been elevated to a more appropriate height. The overrotated tip has been corrected and the rotation is appropriate. The basal view reveals a well-healed columellar incision.



Video 39.1 Secondary rhinoplasty using rib cartilage: Lateral view shows over-reduced nasal dorsum and over-rotated nasal tip. Rib cartilage and perichondrium were harvested from the 7th rib. The nose is injected with 1% lidocaine with epinephrine 1:100,000. The rib cartilage is carved. A transcolumellar incision and infracartilaginous incisions are made to open the nose. The skin-soft tissue envelope is elevated off the underlying nasal cartilages. A Joseph periosteal elevator is used to continue dissection onto the nasal bones in a subperiosteal plane. After elevation of the skin, the nasal tip deformity can be appreciated. The medial crura are separated to expose the caudal septum, and the upper lateral cartilages are separated from the dorsal septum. The left nasal bone is lateralized with a Boies elevator. Tall spreader grafts are placed to correct the over-reduced dorsal septum and elevate the height of the dorsum. Lateral crural strut grafts and a caudal septal extension graft are carved from the remaining cartilage. A caudal septal extension graft is strengthened and straightened with slivers of cartilage. The spreader grafts are trimmed, and the caudal septal extension graft is placed between the spreader grafts and secured with sutures. Slivers of cartilage are used to splint the caudal septal extension graft to the existing septal cartilage for additional support. The medial crura are reattached to the caudal septal extension graft in a more anterior position to open the nasolabial angle. The vestibular skin is dissected from the undersurface of the lateral crura. The lower lateral cartilages are advanced and resecured to the caudal septal extension graft to create a new dome position. Splinting grafts are sutured to the lateral crural strut grafts to correct overcurvature. The lateral crural strut grafts are sutured to the undersurface of the lateral crura, and obliquely oriented dome sutures are placed. The lateral crural strut grafts are placed into caudally positioned pockets. The upper lateral cartilages are reattached to the tall spreader grafts—deficient areas are reconstructed with thin cartilage grafts. Perichondrium is used to camouflage the cartilage grafts and create a smooth nasal contour. A tip graft is placed for increased tip definition. The previous rhinoplasty scar is excised and the columellar and infracartilaginous incisions are closed. The scar from a previous alar base reduction is excised. The rib cartilage harvest site is closed. Lateral wall splints are placed to prevent excess thickness of the nasal ala. Steri-Strips and a thermoplastic cast are placed over the nasal dorsum.

long-term rhinoplasty results. An open rhinoplasty approach is recommended in secondary surgery. This allows the best exposure of the nasal structure and placement of grafts under direct visualization.

Autologous cartilage is the principal source of graft material for structural reconstruction in rhinoplasty. Nasal septal, ear, or rib cartilage is most commonly harvested. We prefer rib cartilage for its strength and the ability to harvest a long, straight segment.

Functional nasal defects after rhinoplasty include internal and external valve collapse. Internal nasal valve collapse can be corrected by the placement of spreader grafts, lateral crural strut grafts, and/or alar batten grafts. Stabilizing the nasal base is critical to minimize postoperative loss of tip projection. This can be done with a caudal septal extension graft or a caudal septal replacement graft. A variety of structural grafts can help to achieve a natural-appearing nasal tip lobule. A tip graft can help set projection, hide tip asymmetries, reestablish nasal support mechanisms, and improve the stability of the medial crural-columellar strut complex. Alar retraction can be corrected with lateral crural strut grafts, caudal repositioning of the lateral crura, and use of an ear composite graft, if there is tension when closing the infracartilaginous incision.

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