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Corresponding Author	Family Name	Rizk
	Particle	
	Given Name	**Samieh Sam**
	Suffix	
	Division	Manhattan Facial Plastic Surgery and Park Avenue Facial Plastic Surgery
	Organization	Lenox Hill Hospital
	Address	1040 Park Avenue, 10028, New York, NY, USA
	Division	Manhattan Facial Plastic Surgery and Park Avenue Facial Plastic Surgery
	Organization	Manhattan Eye, Ear, and Throat Hospital
	Address	1040 Park Avenue,, 10028, New York, NY, USA
	Email	drsamrizk@aol.com
Author	Family Name	Zimm
	Particle	
	Given Name	**A. Joshua**
	Suffix	
	Division	Department of Otolaryngology – Head and Neck Surgery, Facial Plastic Surgery
	Organization	Lenox Hill Hospital
	Address	1421 Third Avenue, 10028, New York, NY, USA
	Division	Department of Otolaryngology – Head and Neck Surgery, Facial Plastic Surgery
	Organization	Manhattan Eye, Ear, and Throat Hospital
	Address	1421 Third Avenue, 10028, New York, NY, USA
	Email	uvajosh69@yahoo.com,; drzimm@drjoshuazimm.com

Abstract	A drooping or ptotic nasal tip can be congenital, iatrogenic, or related to the changes of the aging nose. Commonly, it can be the result of an inadequately performed rhinoplasty. In addition to the unappealing cosmetic outcome, a ptotic nasal tip can also result in nasal obstruction as a consequence of compromised nasal airflow due to the dependent position of the tip. Proper alar-columellar proportion is also of paramount importance when contemplating revision rhinoplasty. A hanging columella can occur both in primary and revision rhinoplasty. Proper diagnosis of this condition requires a fundamental understanding of the normal alar-columellar relationship and being able to distinguish between a hanging columella and a retracted ala. In addition, the expert rhinoplasty surgeon must be able to diagnose the etiology of the hanging columella prior to embarking upon a treatment plan. This chapter highlights the pertinent anatomy, etiology, and treatment for both the drooping nasal tip and hanging columella specifically as it pertains to revision rhinoplasty.

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	Email	drsamrizk@aol.com
Author	Family Name	Zimm
	Particle	
	Given Name	**A. Joshua**
	Suffix	
	Division	Department of Otolaryngology – Head and Neck Surgery, Facial Plastic Surgery
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	Address	1421 Third Avenue, 10028, New York, NY, USA
	Division	Department of Otolaryngology – Head and Neck Surgery, Facial Plastic Surgery
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78 Restoring the Drooping Tip and Hanging Columella in Revision Rhinoplasty

A. Joshua Zimm and Samieh Sam Rizk

78.1 The Drooping Tip

78.1.1 Pertinent Anatomy and Etiology

The cartilaginous framework and the skin and soft tissue envelope are the primary influences of nasal tip shape, position, and definition. Tip support has been classically divided into the major and minor tip support mechanisms. The three major tip support mechanisms include the cartilage of the medial and lateral crura, the fibrous attachments of the medial crural footplates to the posterior caudal septum, and the fibrous attachments between the lateral crura to the upper lateral cartilages. Minor tip support mechanisms include the interdomal ligaments, the dorsal cartilaginous septum, the fibrous attachments of the lower lateral crura to the pyriform aperture, the attachments of the alar cartilage to the overlying skin and soft tissue envelope, the membranous septum, and the nasal spine (Figs. 78.1 and 78.2).

Primary rhinoplasty whether endonasal or external typically disrupts one or more of the tip support mechanisms. A postrhinoplasty drooping tip usually results from unanticipated or uncompensated loss of the tip support mechanisms. The rhinoplasty surgeon must be able to anticipate, plan, and compensate for the destabilized nasal tip. The standard transcolumellar, intercartilaginous, transfixion, and marginal incisions serve to interrupt tip support mechanisms and must be accounted for by the rhinoplasty surgeon. Examples of destabilizing maneuvers include aggressive resection of the lower lateral cartilage, unnecessary complete transfixion incisions, aggressive reduction of the nasal spine or anterior septal angle, and overzealous interrupted strip techniques. In addition, in accordance with the tripod theory of nasal tip position [1], failure to recognize and address excessively long lateral crura or weak and short medial crura can result in a ptotic nasal tip postoperatively if corrective measures are not implemented.

78.1.2 Surgical Evaluation and Management

Careful inspection and palpation is of paramount importance when evaluating the ptotic nasal tip.

[AU1] A.J. Zimm, M.D.
Department of Otolaryngology – Head and Neck Surgery, Facial Plastic Surgery, Lenox Hill Hospital, 1421 Third Avenue, New York, NY 10028, USA

Department of Otolaryngology – Head and Neck Surgery, Facial Plastic Surgery, Manhattan Eye, Ear, and Throat Hospital, 1421 Third Avenue, New York, NY 10028, USA
e-mail: uvajosh69@yahoo.com, drzimm@drjoshuazimm.com

S.S. Rizk, M.D. (✉)
Manhattan Facial Plastic Surgery and Park Avenue Facial Plastic Surgery, Lenox Hill Hospital, 1040 Park Avenue, New York, NY 10028, USA

Manhattan Facial Plastic Surgery and Park Avenue Facial Plastic Surgery, Manhattan Eye, Ear, and Throat Hospital, 1040 Park Avenue, New York, NY 10028, USA
e-mail: drsamrizk@aol.com

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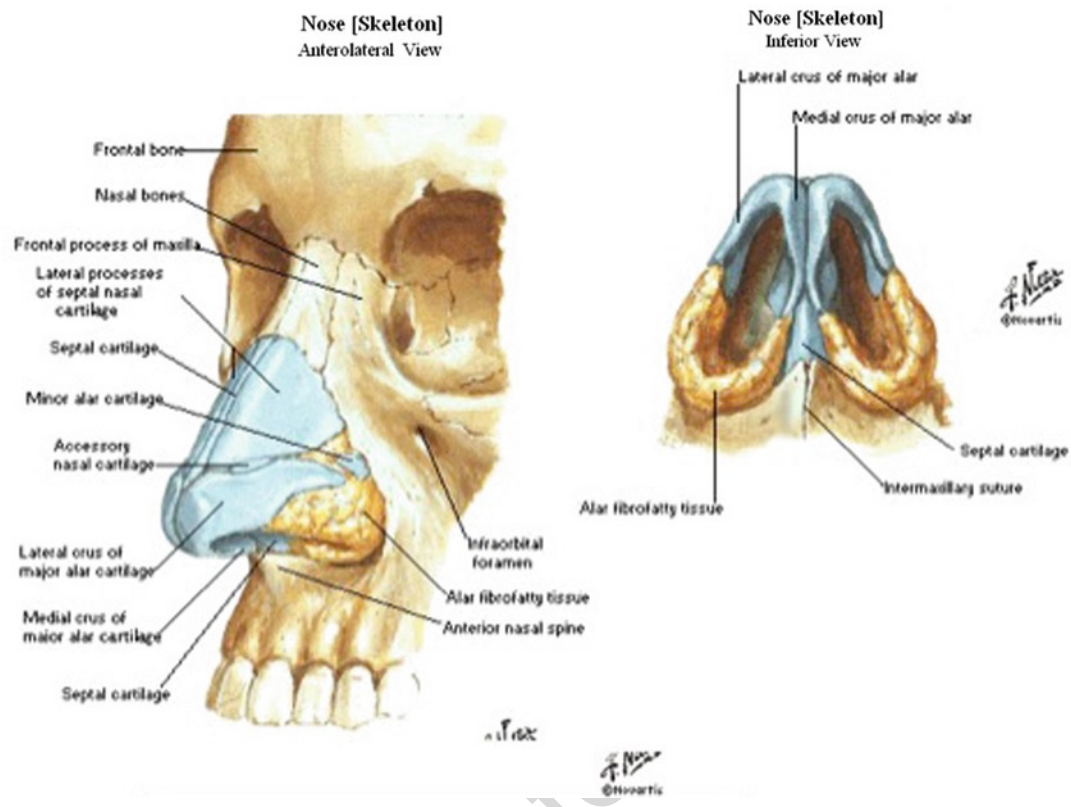

Fig. 78.1 Nasal tip anatomy

Valuable information such as the size, strength, shape, position, and integrity of the lower lateral cartilages is obtained. The surgeon will also be able to ascertain the amount of scar tissue as well. The rhinoplasty surgeon must also evaluate the projection, rotation, tip definition, and symmetry of the alar cartilages, the nasolabial angle, alar base width, and nasal length. Typically, the patient with tip ptosis after rhinoplasty will have an underprojected, underrotated tip with an acute nasolabial angle. In addition, it is not uncommon for there to be a concomitant pollybeak deformity present, either related to inadequate reduction of the cartilaginous dorsum, loss of tip projection and support, or excessive scar tissue formation. Also, excessive long lateral crura or weak and short medial crura must be recognized during the preoperative evaluation to allow for appropriate surgical planning.

The specific cause of the ptotic nasal tip will dictate the approach for management. Commonly, adjustments in projection and rotation will have to be made along with reestablishing the tip support mechanisms that have been disrupted in the previous operation. The external rhinoplasty approach is most commonly used by the senior author to address the drooping tip in revision rhinoplasty. The external approach allows for a more accurate diagnosis, excellent exposure for suturing multiple grafts including tip grafts, batten grafts, columellar struts, cap grafts, and onlay grafts. This is especially helpful in cases of tip asymmetries. One notable exception to the external approach for tip ptosis in revision rhinoplasty is in cases of a redundant anterior membranous septum with posterior maxillary recession as the etiology of the acute nasolabial angle. In that case, if tip support is adequate, an endonasal approach is used, and through the complete transfixion incision, the anterior membranous septum is resected and plumping grafts are placed followed by the placement of septocolumellar sutures to maintain tip support and position.

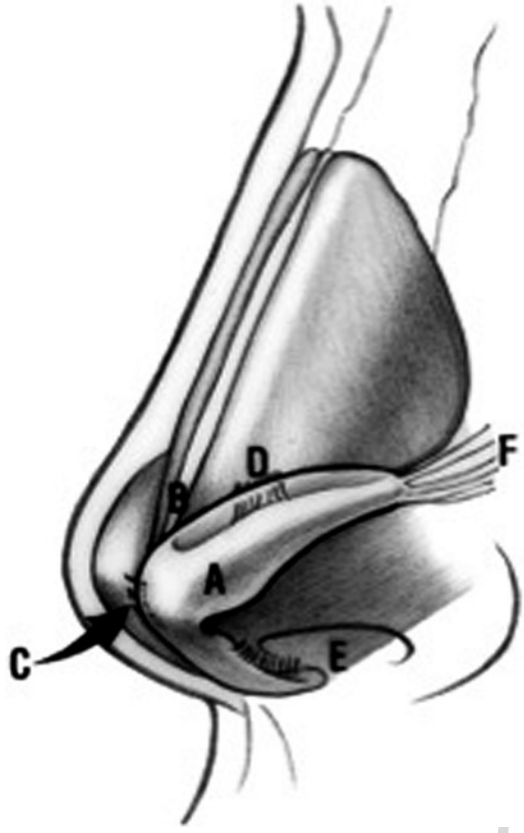

Fig. 78.2 Nasal tip support originates from (*A*) the inherent strength of the lateral crura, (*B*) the forward projection of the anterior septal angle, (*C*) the interdomal ligaments, (*D*) the fibrous connections between the upper and lower lateral cartilages, (*E*) the fibrous attachments between the medial crura and the caudal septum, and (*F*) the fibrous connections between the lower lateral cartilages and the pyriform aperture (From Konior [2], with permission from Elsevier)

That exception aside, the external approach is most commonly used. Cartilage grafts are harvested initially. Auricular cartilage, if necessary, is harvested through a posterior auricular incision. Septal cartilage, if present, is harvested usually through a hemitransfixion incision so as to not further disrupt a major tip support mechanism if possible. If there is a caudal septal deviation, it is addressed at this time, freeing it from the nasal spine, repositioning it, and suturing it to the nasal spine periosteum with a 5.0 polydioxanone (PDS) suture. At least a 1-cm caudal and dorsal septal strut is left in place, more if the cartilage is weak. Irradiated costal cartilage is utilized if the septal or auricular cartilage is insufficient.

The external approach is made by connecting bilateral marginal incisions to an inverted "v" transcolumellar incision. The dissection plane proceeds immediately superficial to the alar cartilages to avoid thinning of the skin flap or fenestration of the skin especially in cases where there is excessive scar tissue. If the dorsum needs modification, the dissection continues to the radix. Once the skin and soft tissue envelope has been elevated, a detailed analysis ensues. The lower lateral cartilages are examined for strength, integrity, symmetry, and scar tissue with specific attention to the lateral crura, domes, and medial crura. Also, the skin and soft tissue envelope is evaluated for thickness, and the anterior septal angle is evaluated for its role in tip support.

Excessive scar bands and contractures are released to allow for complete mobilization of the lower lateral cartilages. The lower lateral cartilages are then carefully inspected for integrity, symmetry, excessive resection, malposition, or cartilage splitting techniques. Displaced cartilage fragments are realigned if possible after freeing them from the vestibular skin. Excessive height of the lateral crura is managed by cephalic trim if necessary, always using care to preserve at least 7 mm of lateral crural vertical height if the cartilage is strong and 8 mm if it is weak. Overresected lateral crura often require alar batten grafts to prevent airway collapse. Septal cartilage and auricular cartilage grafts are carefully sculpted and sutured onto the remnant alar cartilages using meticulous technique to ensure symmetry with 5.0 PDS sutures. Inter- and intradomal sutures are placed as necessary using horizontal mattress sutures of 4.0 or 5.0 PDS. These are placed for increased tip definition and projection and to correct excessive dome separation or bifidity. [AU2]

Lateral crural overlay is an effective technique 2 to address the excessively long lateral crura as a cause for the drooping nasal tip (Fig. 78.3). It can result in increase rotation, deprojection, and increased tip support. The lower lateral cartilages are freed from the underlying vestibular skin in the middle of the lateral crus. Then a vertical incision is made in the lateral crus approximately 8–10 mm lateral to the dome. The tip is then [AU3]

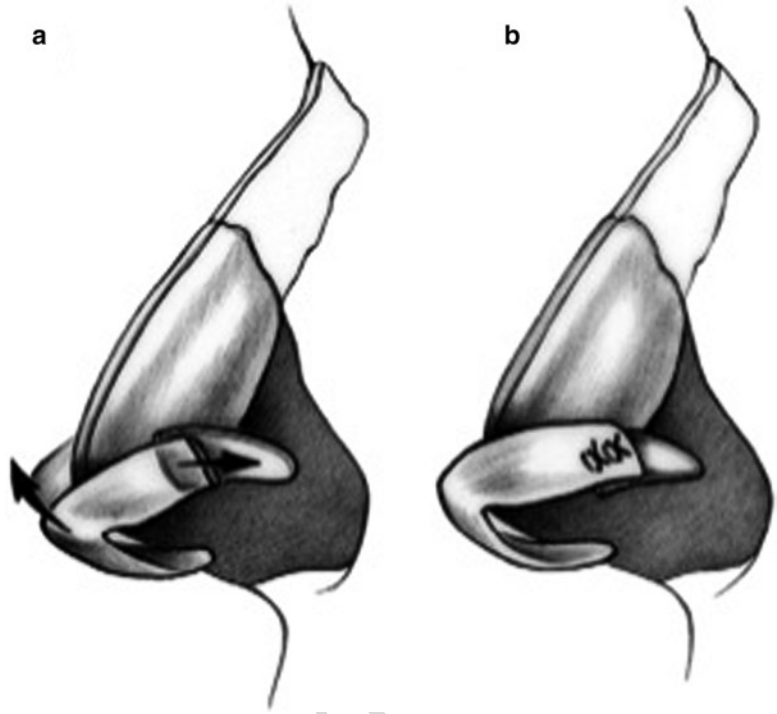

Fig. 78.3 Lateral crural overlay technique for correction of tip ptosis secondary to excessively long lateral crura. (**a**) The midsection of the lateral crus is divided after elevating it away from the underlying vestibular skin. The dome is rotated superiorly (*arrow*) to correct tip ptosis, and the transection margins are overlaid. (**b**) The nasal tip is stabilized by suturing the overlapping crural margins with side-by-side mattress sutures aperture (From Konior [2], with permission from Elsevier)

Fig. 78.4 Placement of a columellar strut

repositioned, and the overlapped margins of the lateral crura are sutured with two transcartilaginous horizontal mattress 5.0 PDS sutures.

A columellar strut is often used to reinforce the medial crural component of the nasal tripod in patients who have tip ptosis after rhinoplasty. It stabilizes weak medial crura and can straighten medial crura that are buckled. The strut is positioned between the medial crura in a precise pocket that extends from just superficial to the anterior nasal spine to the junction of the medial crura and intermediate crura. It is typically sutured to the medial crura with 2 or 3 5.0 PDS horizontal mattress sutures. It is important to preserve the natural divergence of the intermediate crura that forms the infratip break (Fig. 78.4).

Caudal septal extension grafts can be used to enhance tip support and correct a retracted columella in patients who underwent an overaggressive resection of the caudal septum. Plumping grafts are also helpful in patients with an acute nasolabial angle to augment the premaxilla.

Tip grafting is an important technique to enhance tip definition or support when there are

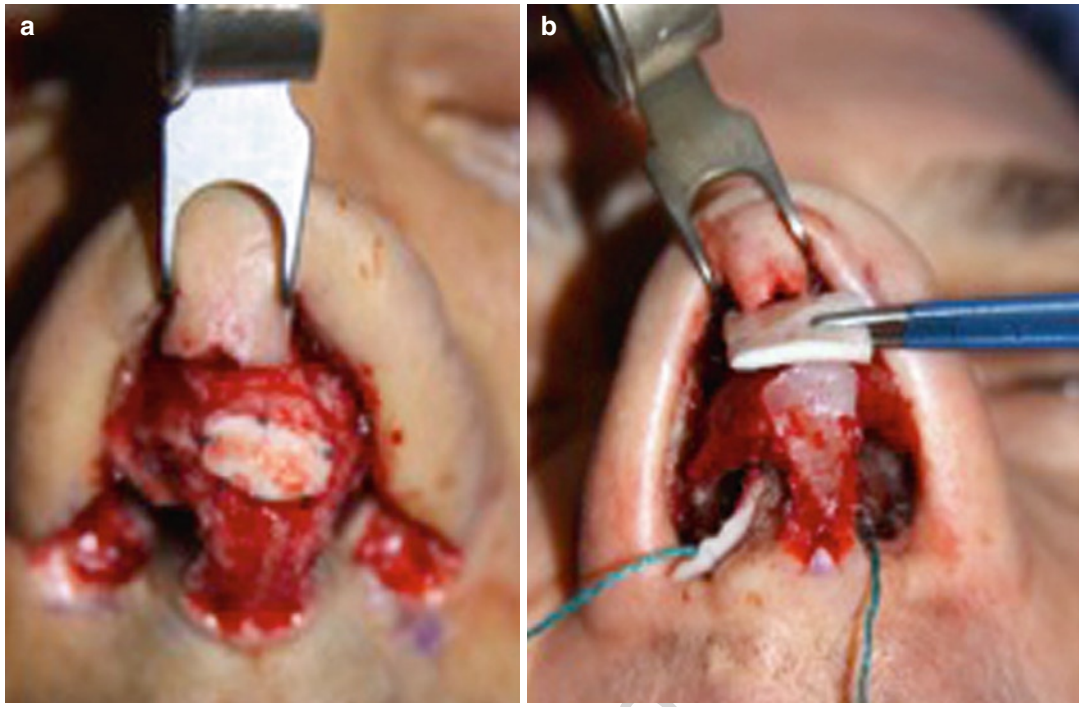

Fig. 78.5 (**a**) Onlay tip graft and columellar strut. (**b**) Shield graft

deficiencies or weaknesses in the alar cartilages (Fig. 78.5). Shield grafts can be helpful in augmenting tip projection and stabilizing the ptotic tip. The graft must be carefully beveled to avoid any visible edges especially in thin-skinned patients. The shield graft is typically placed after the suture stabilization of the columellar strut. Occasionally, the caudal margins of the medial and intermediate crura must be shaved to provide a smooth surface for the graft. Also, the graft ideally has a curvature to accommodate the transition from the medial crura to the intermediate crura so as to avoid effacement of the infratip break. The graft typically requires three sets of sutures, each to the caudal margins of the medial, intermediate, and lateral crura. If additional projection is required, the superior edge of the shield graft can project above the domes as necessary. Additional refinement can be performed with the graft in situ as necessary to correct any irregularities or asymmetries.

It is important to also address the supratip. If supratip fullness or a pollybeak persists after repositioning maneuvers to increase projection are performed, the etiology of the persistent pollybeak must be ascertained and corrected. Cartilaginous pollybeak deformities determined by palpation are addressed by incremental shaving of the dorsal septal cartilage in the supratip region (Fig. 78.6). In patients with thick skin or excessive scar tissue in the supratip after the previous rhinoplasty, scar tissue or fibro fatty tissue can be debulked albeit with great care to avoid visible cartilage graft edges [2].

78.2 The Hanging Columella

Often in revision rhinoplasty, there can be alar-columellar disproportion that persists or was created by the original surgeon. It is of paramount importance to distinguish the etiology of the disproportion. In this section, we will discuss management of the hanging columella, describe the normal anatomy of the alar-columellar relationship, illustrate how to distinguish a hanging

Fig. 78.6 (**a**) Preoperative 20-year-old female with a drooping nasal tip secondary to loss of tip support and a pollybeak deformity. (**b**) One year postoperative after a secondary rhinoplasty with an external approach. The cartilaginous pollybeak was removed, and a columellar strut was placed. A dome-binding suture in tip was placed, and the anterior caudal septum and membranous septum were reduced, and septocolumellar sutures were placed

columella from a retracted ala or pseudohanging columella, and describe how maneuvers in primary rhinoplasty can alter the normal alar-columellar relationship.

78.2.1 Pertinent Anatomy and Etiology

Classic descriptions in texts describe the normal alar-columellar relationship as being between 2 and 4 mm of visible columella below the alar margin on profile view [3]. This definition fails to describe the appropriate position of the alar margin as it pertains to the alar-columellar relationship. A retracted ala can give the appearance of a hanging columella and must therefore be differentiated from it because they are managed differently. Excessive nostril show with a droopy tip, short upper lip, long lateral crus, and strong lateral crus with no apparent notching is suggestive of a hanging columella. In contradistinction, the presence of alar notching, weak or deficient lateral crura, retraction of the alar margin, or an alar margin with excessive curvature is suggestive of alar retraction or a pseudohanging columella.

A hanging columella can be preexisting and go unrecognized by the previous surgeon, or it can be a result of previous surgery. In the evaluation of a hanging columella, the important anatomic structures to consider are the caudal cartilaginous septum, the membranous septum, and the medial and intermediate crus (Fig. 78.7). Anatomic deformities that make up the hanging columella deformity include an excessively long caudal cartilaginous septum, a redundant membranous septum, and a wide, curved, convex, or vertically oriented medial/intermediate crura. Other causes include a long medial crus with bowing or a C-shaped curvature or a broad

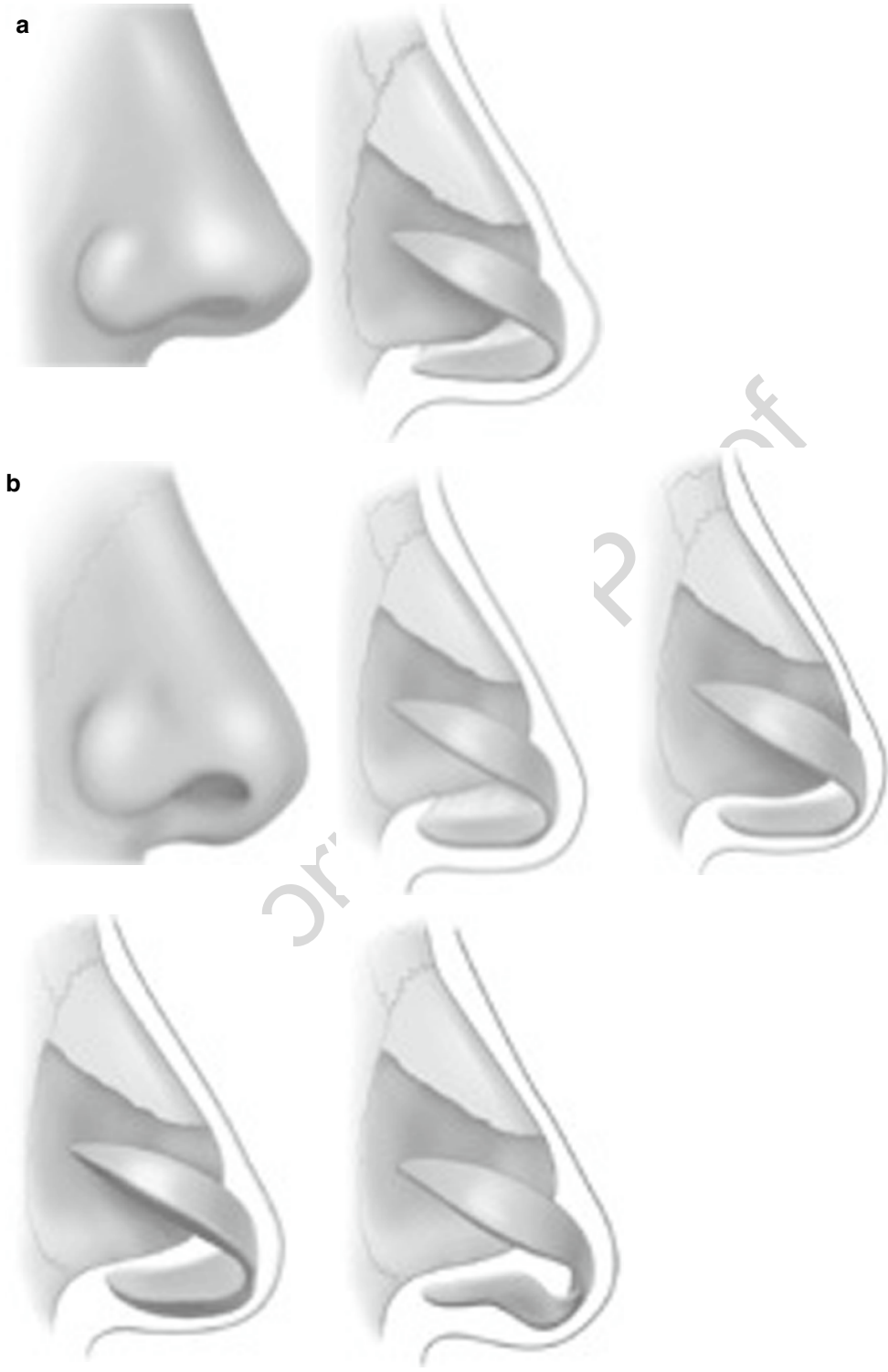

Fig. 78.7 (**a**) The appearance of a normal alar-columellar relationship, with the relevant anatomic components being the caudal septum, membranous septum, and the medial and intermediate crus. (**b**) The hanging columella deformity can be the result of excess membranous septum, prominent caudal septum, excessively wide medial and intermediate crus, downwardly curved medial crus, or overly long lower lateral cartilages (From Kridel and Chiu [4], with permission from Elsevier)

Fig. 78.8 (**a**) Preoperative 24-year-old female with drooping nasal tip and hanging columella. (**b**) Two years postoperative after an external rhinoplasty with caudal septal resection as well as a columellar strut, lateral crural steal, and a tip onlay graft

vestibular vault and medial crural ptosis [4, 5]. Other causes particular to previous rhinoplasty include a columellar strut or a caudal septal extension graft that protrudes caudally. Suturing bifid medial crura can make the columella more prominent. Also, a shield graft that is too thick or excessive plumping grafts can also contribute to the hanging columella. The loss of tip projection and rotation from previous rhinoplasty can also result in relative excessive columellar show.

78.2.2 Surgical Evaluation and Management

Management of the hanging columella, like most maneuvers in rhinoplasty, is based upon identifying the etiology. For the excessive cartilaginous caudal septum or redundant membranous septum, it is typically excised via a transfixion incision. This can be achieved entirely via an endonasal approach. If increased rotation is desired, a triangular wedge of caudal septum is removed with the base of the triangle oriented dorsally. If counterrotation is desired, the base of the triangle is oriented toward the nasal spine. If no rotation is desired, a straight piece is removed. As always, at least 1–1.5 cm of caudal septum is preserved to maintain tip support.

When excising membranous septum, an ellipse of membranous septum is removed with the widest portion of the ellipse being positioned over the area of greatest columellar protrusion [4]. The transfixion incision is then closed followed

Fig. 78.9 (**a**) Preoperative 45-year-old male who presented for secondary rhinoplasty with a drooping nasal tip, hanging columella, a pollybeak deformity, and a deviated nasal septum. (**b**) One year postoperative following external septorhinoplasty with a columellar strut, onlay tip grafts, bilateral spreader grafts, removal of pollybeak, bilateral lower lateral cartilage battens, and reduction of the redundant caudal cartilaginous septum and membranous septum

by the placement of septocolumellar sutures with 4.0 PDS to maintain tip projection and rotation (Figs. 78.8 and 78.9). On occasion, an overly prominent nasal spine will have to be reduced if it is a significant part of the hanging columella, but this is not very common.

For an overly bowed or wide medial crura, shaving of the medial crura at the junction of the medial and intermediate crura is performed, and the medial crura are then sutured together. For excessively long or curved medial crura, some have espoused a medial crural overlay technique followed by placement of a columellar strut [6, 7]. As described earlier in this chapter, with excessively long lower lateral cartilages, a lateral crural overlay technique can be used. Other options such as the tongue-in-groove technique have been advocated by Kridel to set the medial crura back over the septum. An algorithm for use of this technique in the management of the hanging columella has also been previously described by Kridel [4, 8]. Finally, in revision cases where the cause of the hanging columella is caused by previous graft placement, the responsible graft (shield graft, columellar strut, caudal septal extension graft, or plumping grafts) is removed or modified.

Conclusions

Revision rhinoplasty presents a unique challenge for the rhinoplasty surgeon. Managing nasal tip ptosis due to disruption of tip support mechanisms can be achieved by identifying the underlying etiology and restructuring and repositioning the nasal tip using a variety of tech-

niques including suturing and cartilage grafting most commonly via an external rhinoplasty approach. Management of the hanging columella is predicated upon determining the etiology of the deformity and being able to distinguish it from alar retraction. Once this has been determined, the rhinoplasty surgeon is then able to select from a variety of techniques at their disposal to restore the proper alar-columellar relationship and achieve the aesthetic goals desirable to both the patient and surgeon.

References

1. Anderson JR (1969) The dynamics of rhinoplasty. In: Proceedings of the ninth international congress of otolaryngology. Exerpta medica international congress series no. 206, Elsevier Inc., Amsterdam, pp 708–710
2. Konior RJ (2006) The droopy nasal tip. Facial Plast Surg Clin North Am 14(4):291–299
3. Powell N, Humphreys B (1984) Proportions of the aesthetic face. Thieme-Stratton Inc., New York
4. Kridel RW, Chiu RJ (2006) The management of alar columellar disproportion in revision rhinoplasty. Facial Plast Surg Clin North Am 14(4):313–329
5. Adamson PA, Tropper GJ, McGraw BL (1990) The hanging columella. J Otolaryngol 19(5):319–323
6. Adamson PA (2000) Anatomic considerations in the management of the hanging columella. Arch Facial Plast Surg 2(3):178–179
7. Joseph EM, Glasgold AI (2000) Anatomical considerations in the management of the hanging columella. Arch Facial Plast Surg 2(3):173–177
8. Kridel RW, Scott BA, Foda HM (1999) The tongue-in-groove technique in septorhinoplasty. A 10-year experience. Arch Facial Plast Surg 1(4):246–256

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