Alar Preservation Principles: Alar Hinge Flaps

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KEYWORDS

• Rhinoplasty • Preservation rhinoplasty • Alar preservation • Alar cartilage • Lower lateral cartilage • Upper lateral cartilage • Scroll complex • Scroll ligament

KEY POINTS

- "Preservation" encompasses not only the dorsum but also any structure, including the alar portion, that is retained to gain an advantage or prevent an undesirable outcome.
- Several ligaments in the nasal tip region maintain the symmetry of the alar cartilages and dome-defining points, while also preserving normal nasal breathing function.
- By meticulously focusing on the anatomic details of the scroll area, nasal tip refinements can be performed with predictable safety and precision.
- To properly shape the alar cartilage, surgeons must balance preserving as much cartilage as possible with reducing its volume and reshaping it through various techniques.
- Our approach offers a graduated, reproducible way to manage the scroll area, aiming to achieve optimal cartilage configuration while avoiding unintended alterations.

INTRODUCTION

Modern rhinoplasty techniques were pioneered by early surgeons such as Roe and Joseph, who initially approached nasal surgery with a focus on the reduction procedures.[1,2] However, the limitations and potential complications of excessive reduction became apparent, leading to a shift in surgical philosophy. Surgeons began to emphasize the importance of using various techniques to avoid unnecessary tissue removal and, where necessary, reconstruct reduced structures. This evolution in practice saw numerous influential figures develop methods to prevent the long-term sequelae of reduction rhinoplasty, aiming to create a robust nasal structure and restore normal anatomy beneath the skin and soft tissue envelope.

Throughout this evolution, a critical question has persisted: "How can we preserve irreplaceable anatomic elements while reshaping the nasal skeleton to achieve a desirable aesthetic outcome?" Alternatively, "Is it possible to reconstruct all anatomic elements using structural methods?"

While the principle of preserving as much of the anatomic structure as possible is not new, the recent emphasis on preservation rhinoplasty (PR)—highlighted by techniques such as dorsal preservation—has brought this approach into greater focus.[3] In particular, the preservation of the alar structures has gained recognition, albeit briefly discussed in the broader context of current trends.

Recent anatomic studies have revealed that the lower third of the nose is more complex than previously understood,[4] affirming the adage, "One who masters the tip masters the nose." These studies have demonstrated that the interaction between various ligaments, muscles, and the underlying skeletal structure is crucial not only for nasal breathing function but also for achieving long-term aesthetic results.[5,6] It is now evident that the intercartilaginous incision, a traditionally straightforward step in the endonasal rhinoplasty approach, can significantly impact long-term outcomes by disrupting the scroll ligament complex.[7] Similarly, severing elements such as Pitanguy's midline

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ligament during rhinoplasty can have important long-term consequences.[6,8]

Therefore, it is essential for surgeons to understand the potential benefits and drawbacks of each surgical approach and technique. Ideally, a surgeon should be proficient in a variety of methods and apply them judiciously, guided by the principle: "Preserve any anatomic element, especially those that cannot be reconstructed, and rebuild any element that can be restored." The most crucial anatomic components of the nasal tip are the 2 alar cartilages.[9] It is a key responsibility of the surgeon to preserve these major tip cartilages and their supporting structures while simultaneously reshaping them to achieve a natural and elegant nasal tip.

Considering that there are currently 2 well-known techniques for alar preservation, known as "complete" and "incise and slide"[3] the concept of alar preservation is not new. In the "complete" technique, the alar cartilages are shaped using various sutures without any cephalic excision of the lateral crus. There is no excision of the alar cartilages—neither cephalically nor paradomally—nor are there any transections, as commonly performed in other methods. In contrast, the "incise and slide" technique involves shaping the alar cartilages by sliding the incised portion of the cephalic lateral crus under the remaining lateral crura without disrupting the longitudinal scroll ligament. In fact, following the introduction of cephalic trimming of the lateral crus of the alar cartilage and the subsequent disruption of alar cartilage continuity, many surgeons have developed various modifications to mitigate the issues associated with these methods.

The "elliptical horizontal excision and repair of alar cartilage," reported by Massiha in 1998, may be one of the first techniques to refine the size of the alar cartilage without disrupting the cartilaginous scroll area.[10] In 1999, Regalado-Briz introduced various steps and techniques to "obtain the correct shape" of the alar cartilage while maximizing preservation.[11] Although he aimed to preserve the scroll area in most of his methods, he had to disrupt it in the "turnover of the cephalic portion of the lateral crus." We must also acknowledge the efforts of Tebbetts in "Shaping and Positioning the Nasal Tip Without Structural Disruption."[12]

To achieve the correct shape for the alar cartilage, surgeons must carefully balance the preservation of as much cartilage as possible with the need to reduce its volume and reshape it using various methods.[13] Throughout this journey, several surgeons have explored techniques that utilize the cephalic portion of the lateral crus of the alar cartilage to address this challenge. For further details, readers can refer to our article, "Value of the Cephalic Part of the Lateral Crus in Functional Rhinoplasty," which discusses these efforts in detail.[14] However, many of these methods did not consistently preserve the scroll area, a critical anatomic element. Among these techniques, the "Sliding Alar Cartilage Flap," introduced by Ozmen and colleagues, stands out.[15] This method involves fixing the cephalic island of the lateral crus under the remaining lateral crura without disrupting the longitudinal scroll ligament and reattaching the vertical scroll ligament, adhering closely to the principles of alar preservation.

The emergence of the concept of the "lateral crura resting angle" by Çakır and colleagues introduced an additional key element to nasal tip plasty.[16] This concept complements the 2 established principles: preserving the alar cartilage and scroll area as much as possible and reducing the volume and reshaping the lower lateral cartilage to achieve an attractive, natural-looking, and functional tip. According to this concept, if the angle between the upper lateral cartilage and the lower lateral crura exceeds 100°, the result will appear unnatural, and nasal breathing will be compromised.[17]

We have endeavored to adhere to these principles by introducing several surgical modifications using a hinged flap of the lateral crus of the alar cartilage.[18–20] We developed different methods to accommodate various shapes and sizes of alar cartilage. Over time, we incorporated innovations from other surgeons to refine our approach, such as improved tip suture techniques,[11,21,22] the tongue-in-groove technique with or without a septal extension graft,[23–26] and other new anatomic findings.[4–26] In this article, I will discuss these methods and compare them with other alar preservation techniques.

SURGICAL METHOD

The open approach provides exposure that allows for direct assessment of the tip cartilages in their natural, undistorted positions. A columellar incision is made in a mid-columellar inverted V or V-shaped columella-labial junction incision, with the latter chosen when an increase in tip projection is planned. The columellar skin is then elevated from the surface of the medial and lateral crura in the supraperichondrial plane. After exposing the lateral crus on each side, the Pitanguy ligament should ideally remain attached to the skin, depending on the necessary exposure or the need for cutting and further anastomosis (**Fig. 1**). Supraperichondrial dissection is completed over

Fig. 1. Intraoperative view showing the Pitanguy ligament (*asterisk*) with elevated SMAS flaps.

the entire lower lateral crus surface without crossing over the scroll interface. The scroll ligament complex, especially the longitudinal part, is left untouched (**Figs. 2** and **3**). If additional exposure is needed at this stage, the Pitanguy ligament is cut (see **Fig. 3**), and the interdomal and intercrural ligaments are lysed in preparation for the tongue-in-groove technique, with or without a septal extension graft. Occasionally, the caudal septum is exposed from above by preserving these ligaments and retracting the tip downward. When bilateral septal flaps are elevated using any of the aforementioned techniques, the septal and dorsal work can proceed with either preservation dorsal or structural techniques. Finally, after completing all other steps, including osteotomy maneuvers, the tip is addressed.

The specific goals and techniques for tip refinement depend on the patient's skin thickness, preoperative nasal tip deformity, and aesthetic objectives. Regardless of the scenario, the lateral crus and upper lateral cartilage are not separated in the scroll area. For patients with a bulbous tip, the lateral and middle crura are horizontally marked with 2 lines, ensuring at least 8 mm and 5 mm of cartilage are preserved caudally, respectively (**Fig. 4**A). Horizontal excisions are planned based on the anatomy and the degree of deformity. Typically, a 3-mm or 4-mm horizontal excision is adequate. The cartilage is incised using a no. 15 blade scalpel (**Fig. 4**B), and the cartilage between the 2 incisions is excised (**Fig. 4**C). The skin lining on the inside of the ala usually adapts readily to the new situation, making undermining or resection of this area unnecessary (**Fig. 4**D).

At this point, a hemi-transdomal or cephalically positioned transdomal suture is used on the caudal remnant of the alar cartilage to subtly narrow the dome and create a flat or slightly concave lateral crus (**Fig. 5**A). Next, the cephalic portion is partially rotated as a hinged flap and stabilized with 5-0 polydioxanone mattress sutures. Each suture is placed near the caudal margin of the remaining cephalic part of the lateral crus and directed to an exit point near the cephalic margin of the remaining caudal part of the lateral crus (**Fig. 5**B). The return bite of the suture is positioned 1 to 3 mm from the entry point, running parallel or oblique to the entry site at the cephalic part of the lateral crus. Three mattress sutures are typically sufficient to secure the hinged cephalic portion. The sutures do not involve or penetrate the mucosa (see **Fig. 5**B). The parallel or oblique orientation of the sutures is chosen based on the lateral crura resting angle required for each case. The sutures shorten the tissue between the cephalic and caudal edges, causing an inward rotation of the cephalic portion under the caudal part. This rotation improves the resting angle by exerting pressure on the caudal remnant (**Fig. 5**C).

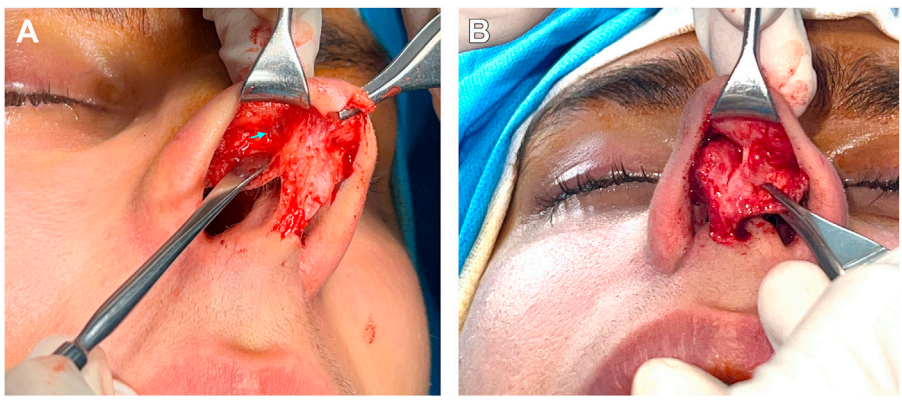

Fig. 2. Intraoperative views of (*A*) the right scroll complex during dissection, indicated by a blue arrow, and (*B*) the vertical scroll ligament (*asterisk*) in a supra-perichondrial plane following the incision of the Pitanguy ligament.

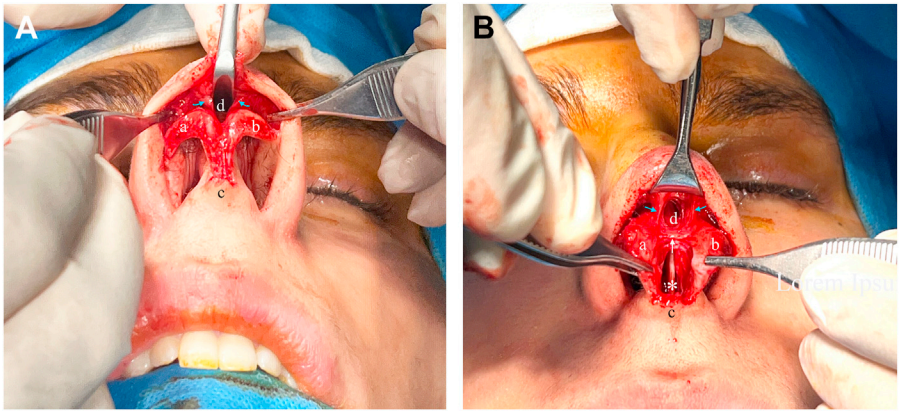

Fig. 3. Intraoperative views showing (*A*) preservation of the bilateral scroll complex and elevation of the dorsal nasal skin, with the 2 alar cartilages not yet separated at this stage in this patient. (*B*) Subperichondrial septal flaps elevated bilaterally before the transverse connections between the alar cartilages and the intercrural ligament were released (*white arrow*). Notations: Alar cartilage (a and b), mid-columellar incision (c), nasal dorsum (d), vertical scroll ligaments (*blue arrows*), caudal septum (*asterisk*).

It is important to note that, unlike turn-in and turnover flaps, the vestibular skin or mucosa is not undermined, and sutures are not placed on the caudal edge of the caudal remnants of the lateral crus to turn in or turn over the cephalic remnant 180°. A key feature of this technique is the creation of a bipedicle mucocartilaginous flap from the cephalic part, forming a hinged flap that

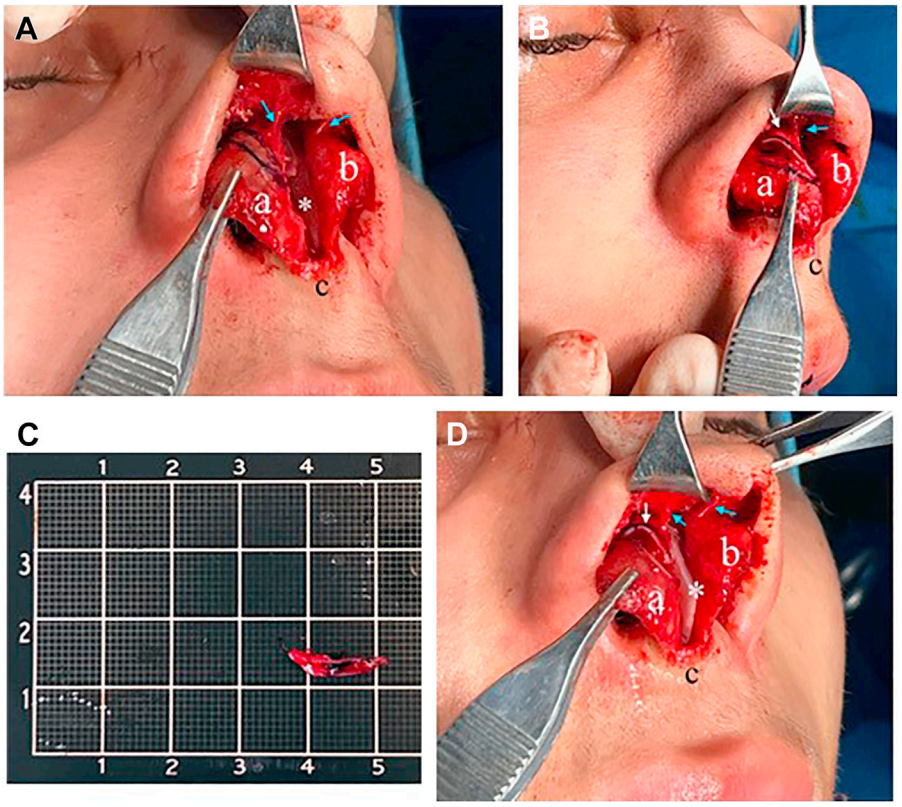

Fig. 4. Intraoperative views of (*A*) the right lateral crus marked horizontally with 2 lines; (*B*) the cartilage incised using a No. 15 blade scalpel, displaying the cephalic part (*white arrow*) and the caudal part (a) of the lateral crus of the alar cartilage; (*C*) the excised portion of the alar cartilage; and (*D*) the skin lining on the inside of the resected part of the ala, which was neither resected nor undermined. Notations: Alar cartilage (a and b), mid-columellar incision (c), vertical scroll ligaments (*blue arrows*), caudal septum (*asterisk*).

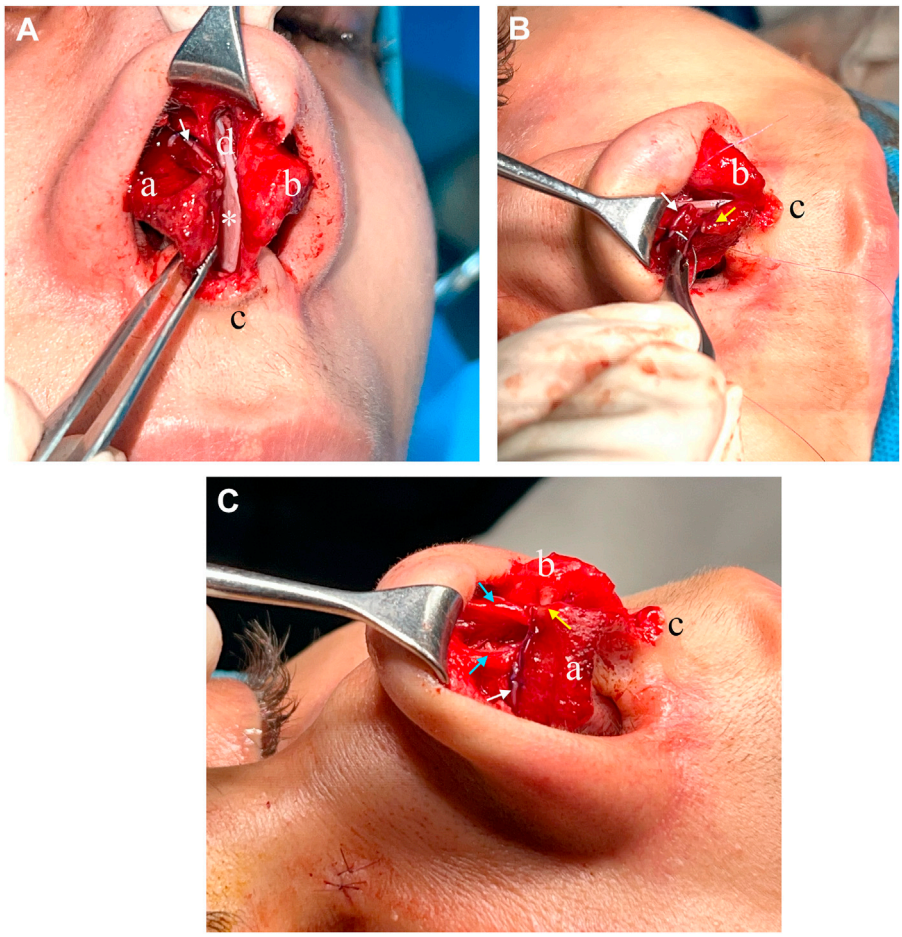

Fig. 5. Intraoperative views showing (*A*) the right alar cartilage after resecting a 4 mm wide and 12 mm long segment of cartilage and placing 2 hemi-transdomal sutures (*yellow arrow*). Observe the slightly concave lateral crus and the height difference between the cephalic part (*white arrow*) and the caudal part (a) of the lateral crus of the alar cartilage before hinged flap suturing. (*B*) The cephalic portion is partially rotated to form a hinged flap and is stabilized with 5-0 polydioxanone mattress sutures. The photograph captures the moment the needle passes back through the cartilage, across the incision, and out through the caudal portion of the alar cartilage, just before the threads are tied to secure the horizontal mattress suture. (*C*) Fixation of the hinged cephalic portion with 3 mattress sutures, highlighting the position of the hinged flap. Annotations include alar cartilage (a and b), mid-columellar incision (c), vertical scroll ligaments (*blue arrows*), and caudal septum (*asterisk*).

rotates less than 180°. The same procedure is then performed on the opposite side, but the excision of the alar cartilage can be asymmetric if necessary.

At this point, I generally use the tongue-in-groove technique, with or without placing a septal extension graft, to adjust tip rotation and projection (**Fig. 6**A). To prevent unnatural infra-domal rotation, I only suture the medial crus to the caudal septum or extension graft. In some cases, I use a columellar strut; however, I prefer a shortened, free-floating columellar strut positioned only between the middle crura (see **Fig. 6**A). Next, transseptal (quilting) and columellar base sutures are used to redrape the septal flaps and provide additional support. After placing the interdomal suture to approximate and equalize the domes (**Fig. 6**B, C), various intercrural sutures, with or without fixation to the septum, are used to narrow the columella.

Final tip refinement can be achieved by placing additional sutures or grafts alongside the hinged flap technique (**Fig. 6**D). For example, a lateral crural spanning suture, with or without passing through the septum, can be used to approximate the lateral crura for further supra-tip narrowing (**Fig. 7**). Tip and/or infra-tip grafts of various shapes can also be utilized, particularly in patients with thick skin (see **Fig. 6**D).

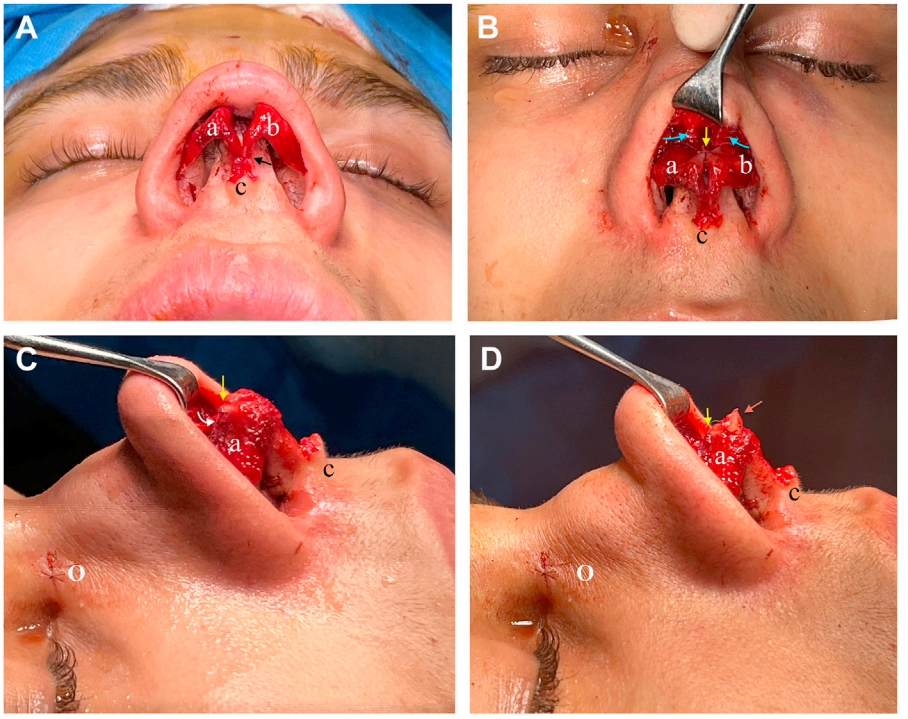

Fig. 6. Intraoperative views showing (*A*) the tongue-in-groove technique by suturing the medial crus to the caudal septum (*black arrow*). (*B*) Placement of the interdomal suture (*yellow arrow*) to approximate and equalize the domes. (*C*) Lateral view of the rotated and deprojected tip cartilage after tongue-in-groove fixation and bilateral columellar base septal suture. The curved white arrow indicates the location of the partially rotated, hidden hinged flap. (*D*) A tip graft (*orange arrow*) was placed to enhance tip definition in a patient with relatively thick skin. Annotations include alar cartilage (a and b), mid-columellar incision (c), vertical scroll ligaments (*blue arrows*), and external osteotomy incision (o).

Surgical Modifications

The hinged flap technique can be modified based on the width and length of the lateral crura. However, the fundamental principles must be maintained, including preserving the structural continuity of the alar cartilage, protecting the cartilaginous scroll area and scroll ligament complex, and repairing any transected ligaments and/or cartilages.

Type I: alar refinement using only a cephalic hinged flap

When the length and width of the alar cartilage are appropriate, but the lateral crural convexity and/or shape is undesirable, the technique can be performed by creating a hinged flap without the need for horizontal or vertical excision of the lateral crura (**Figs. 8** and **9**).

Type II: reduction of vertical height of the ala with concomitant use of a cephalic hinged flap

When the length of the alar cartilage is appropriate, but the cartilage is too wide, a horizontal excision is performed as described for a bulbous tip (see **Fig. 8**; **Fig. 10**).

Type III: crural setback using cephalic hinged flap

The use of the tongue-in-groove technique along with other sutures, such as the lateral crura-septal suture, limits the application of this technique to cases of severe droopy nose with very long, narrow lateral crura. The incisions in the cephalic part of the lateral crura are the same as those for Type I. The caudal portion of the lateral crura is marked vertically at 2 points, the distance between which determines the desired rotation. The lateral point is located at the junction of the lateral third and the medial two-thirds of the lateral crura.

After marking, the lateral crura is transected, and the cartilage between the 2 cuts is excised. Additionally, a triangular piece of cartilage is excised from the anterior portion of the cephalic part of the lateral crura. The base of this triangle corresponds to the distance between the 2 transection lines on the caudal part. The cut ends of

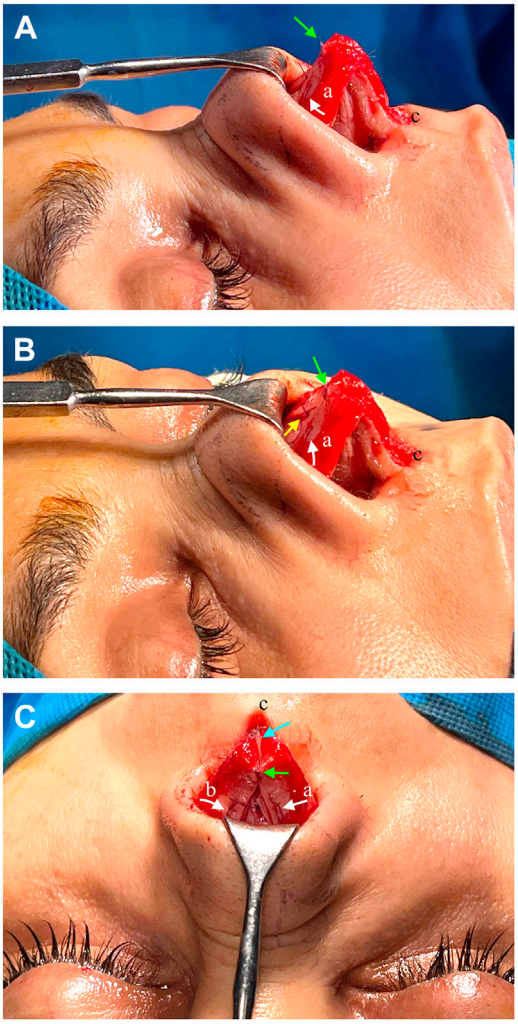

Fig. 7. Intraoperative lateral view showing (*A*) the alar cartilages after adjusting the tip position using the tongue-in-groove technique with a caudal septal extension graft and bilateral placement of hinged flaps. In this female patient, the vertical scroll ligaments were lysed, and a lateral crural spanning suture passing through the septum (*white arrow*) was placed to approximate the lateral crura. In the oblique view (*B*), the edge of the hinged flap (*yellow arrow*) is more clearly visible. The lateral crural spanning suture (*white arrow*) and interdomal suture (*green arrow*) are also shown. The intraoperative view from above the patient's head (*C*) reveals bilateral alar cartilages that were devolumized using hinged flaps and approximated using a lateral crural spanning suture (*white arrow*). Note the hemi-transdomal sutures, initially placed to create slightly concave lateral crura, were fixed together by an equalizing suture. The caudal edge of the caudal extension graft (*blue arrow*) is visible among the medial crura before the placement of deflaring sutures. Annotations include alar cartilage (a and b) and V-shaped columella-labial junction incision (c).

the caudal portion are then fixed end-to-end using two 6-0 polydioxanone mattress sutures. As the distal (anterior) part of the caudal portion is slid back, the cephalic portion moves in the opposite direction. The cephalic portion is then turned in as a hinged flap and stabilized against the caudal portion. Although the continuity of the caudal part is disrupted, the uninterrupted cephalic portion acts as a splint for the caudal part. Minor skin folding over the vestibule typically resolves shortly after the procedure (see **Fig. 8**).

Type IV: horizontal and vertical reduction of lateral crura with concomitant cephalic hinged flap

This type is reserved for exceptional cases involving very large noses and combines the principles of Type II and Type III, as described earlier. It is ideally suited for patients requiring significant deprojection, rotation, and tip refinement. The procedure begins with horizontal excisions, allowing for various shapes to be removed from the nasal tip cartilage, provided that at least 8 mm of lateral crura and approximately 5 mm medially at the domes are preserved. Vertical excision of the caudal portion of the lateral crura is performed similarly to Type III (see **Fig. 8**).

DISCUSSION

The complexity of nasal tip surgery has significantly increased with the advent of numerous techniques since the resurgence of open rhinoplasty. The continuous refinement of these procedures aims to enhance both aesthetic and functional outcomes, ensuring more precise results and greater patient satisfaction. One notable advancement in tip plasty was the introduction of tip support elements and the tripod concept.[27] According to Janeke and Wright, the conjoined medial crura form one leg of the tripod, with each lower lateral crus forming one of the other 2 legs. However, recent anatomic studies have not universally validated the tripod concept. Currently, a more dynamic understanding of the nasal tip is accepted over the static "tripod concept" of the alar cartilages.[4,28]

In this dynamic model, although the alar cartilages are interconnected by ligaments and enveloped by the nasal superficial musculoaponeurotic system (SMAS), it is the intrinsic integrity of the alar cartilages that plays the most crucial role. Therefore, the alar cartilages, influenced by the SMAS, function as dynamic structures that integrate with the cartilaginous framework.[5] Although the alar cartilage traditionally comprises 3 sections—the medial crus, the middle crus,

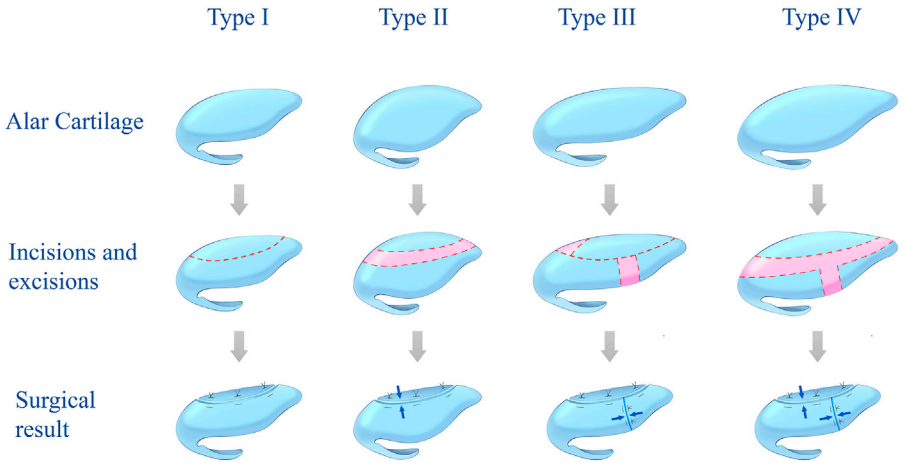

Fig. 8. Schematic diagram illustrating various types of alar preservation tip-plasty. Type 1: Only the cephalic portion is incised and used as a hinged flap. Type 2: The lateral crus is excessively large in the vertical dimension and is subsequently reduced. Type 3: The lateral crus is overly long in the horizontal dimension. Type 4: The lateral crus is oversized in both the horizontal and vertical dimensions. In each column, the first row displays the alar cartilage deformity, the second row illustrates the incision lines (*dotted red lines*) and excised cartilage (*red sections*), and the third row depicts the surgical outcome after all incisions are closed and the cephalic part is turned as a hinged flap. (Illustration by Naser Naghavi, nnaghavi.work@gmail.com; and *Modified from* [Sazgar AA, Most SP, Stabilization of Nasal Tip Support in Nasal Tip Reduction Surgery, Otolaryngology–Head and Neck Surgery (145-6) pp. 932-934. Figure 1. Copyright © [2011] (John Wiley & Sons - Books). https://doi.org/10.1177/0194599811417227] with permission.)

and the lateral crus—each contributing to the contour of the nasal tip, it is the shape, orientation, resiliency, thickness, width, varying angles with adjacent structures, and symmetry of the lateral crura that are critical for supporting, shaping, and functioning of the nasal tip.[29–32] The lateral crus supports the structural integrity of the nares. It also plays a crucial role in the structure of the internal nasal valve through its connection to the upper lateral cartilage and proximity to the septum.[33,34]

Traditionally, excision of the cephalic portion of the lateral crus was a standard procedure in rhinoplasty surgery. However, this approach inherently reduces tip support by disrupting the attachment between the upper and lower lateral cartilages, leading to various adverse consequences, both early and especially late, that every experienced surgeon has encountered.[13,14,35,36]

The objective of alar preservation is to maintain the integrity of the nasal tip ligaments with minimal resection of the alar cartilages. Daniel emphasized 2 key advancements that reflect this shift in tip surgery: cephalic alar preservation and alar tensioning.[3] Among the various efforts by researchers to achieve these goals, we have also contributed by introducing hinged flaps of the cephalic portion of the lateral crus for different tip deformities in several publications. First introduced in 2010, the hinged flap is designed to reduce nasal tip volume while maintaining support and strength.[18,19] Furthermore, we conducted 2 separate studies: one assessing the functional effects of this modification and another evaluating its anatomic alterations through cadaveric dissection.[37,38]

Alongside the scroll ligament complex, the preserved cephalic portion of the lateral crus enhances tip support when partially rotated and secured with sutures. Our cross-sectional cadaveric study revealed 2 distinct angles at the hinged flap: the first angle, at the junction of the hinged flap and the caudal part of the lateral crura, averaged 59.15° ± 2.53°; the second angle, at the junction with the upper lateral cartilage, averaged 58.22° ± 2.65°. The internal valve area on the hinged-flap side showed a mean increase of 27.6% compared with the cephalic trim side.[37] Notably, these angles may slightly change during breathing in live cases.[38] Factors influencing the angle size include the form of the cartilaginous scroll junction, the topology of the lateral crus, the positioning of suture entry and exit points, the force of suture tightening, and the effects of not undermining the vestibular skin.

In contrast to the turn-in flap, where the skin on the inner surface of the lateral crura must be undermined except at the caudal edge, the skin remains untouched in the hinged flap technique.[39–42] Some reports suggest that creating a turn-in flap requires

Fig. 9. Preoperative (*left*) and 2-year postoperative (*right*) frontal, lateral, oblique, and basal view photographs of a 42-year-old male patient who underwent rhinoplasty using the Type I alar preservation method. This technique effectively corrected deep supra-alar creases without excising any portion of the alar cartilage. In this patient, the scroll ligament complex was preserved.

disrupting the junction between the upper and alar cartilages, while others advocate for preserving the scroll area. Regardless, the turn-in flap procedure typically transforms the monolayer cartilaginous

Fig. 10. Preoperative (*left*) and 14-month postoperative (*right*) frontal, lateral, oblique, and basal view photographs of a 29-year-old female patient who underwent rhinoplasty using the Type II alar preservation method. This technique is employed to correct a bulbous tip, which results from wide and concave alar cartilages. In this patient, the scroll ligament complex was preserved.

lateral crura into 2 layers. Due to the opposing forces exerted by these segments, the lateral crus usually becomes flatter or slightly convex.[42] Similarly, in techniques such as “sliding alar cartilage flap” and “cephalic island,” the skin of the caudal

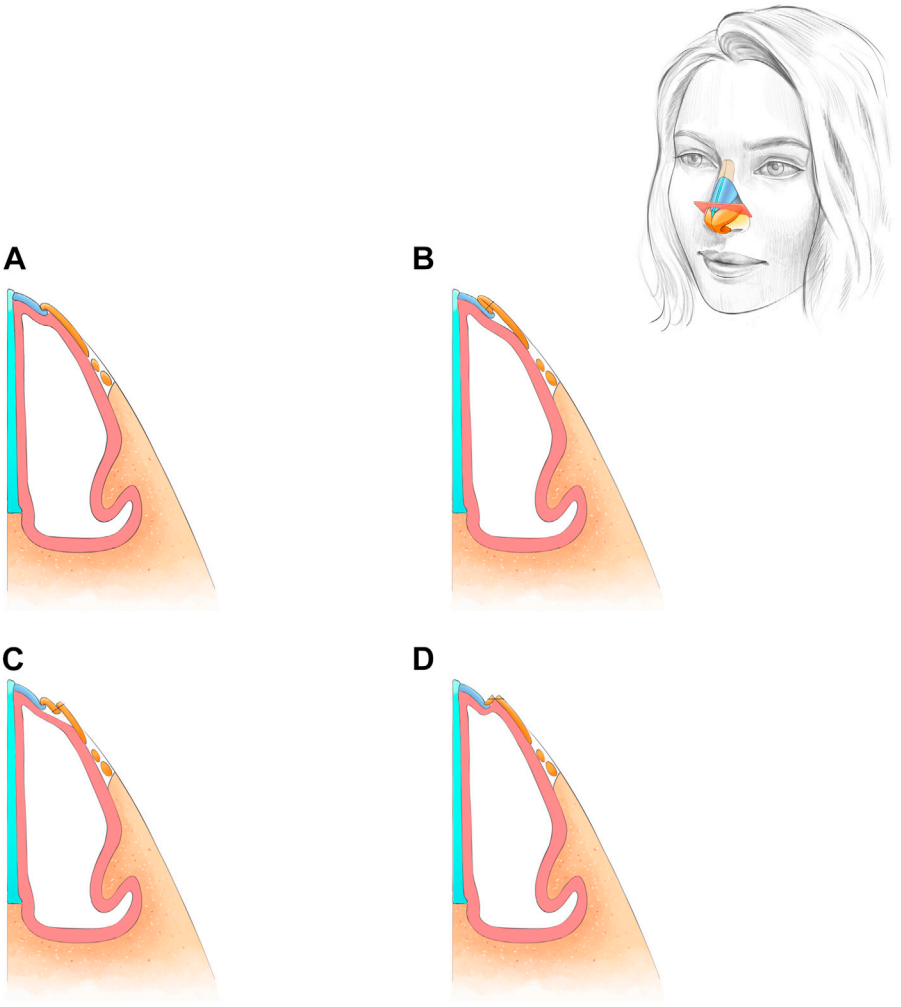

Fig. 11. Schematic postoperation cross-section of the nose demonstrating different surgical techniques: (*A*) Unoperated Case: Displays the nasal septum, upper lateral cartilage, lateral crus of the lower lateral cartilage, and scroll area. (*B*) Turn-in Flap: Depicts changes in the region postprocedure. The scroll junction is preserved in this figure, although it is typically disrupted in this method. (*C*) Advancement Sliding Flap: Illustrates adjustments following this technique, with the skin also undermined as in the turn-in flap. (*D*) Hinged Flap: Demonstrates the altered position postprocedure. Note: The position of the mucosal lining of the nasal cavity is depicted in each technique. (Illustration by Naser Naghavi, nnaghavi.work@gmail.com; and *Modified from* [Sazgar AA, Amali A, Peyvasty MN, Value of cephalic part of lateral crus in functional rhinoplasty, European Archives of Oto-Rhino- Laryngology (273-12) pp. 4053-4059. Figure 2. Copyright © [2015] (Springer Nature).doi:10.1007/s00405-015-3866-4] with permission.)

part of the alar cartilage is undermined, except at the most caudal portion.[15,43] The significance of the extent of skin undermining on the final outcome of rhinoplasty has been highlighted in modifications of the sliding technique.[44] However, rather than using the cephalic part as a rotation flap, these methods employ it as an advancement flap. This also leads to a conversion of the monolayer cartilaginous lateral crura into 2 layers, resulting in a flatter or slightly convex shape. This outcome contrasts with the goal of the alar preservation method introduced by Regalado-Briz. Akin to our use of the hinged flap with additional suture techniques, his objective was to achieve flat or slightly concave lateral crura (**Figs. 11** and **12**).[11,19]

Although Regalado-Briz strongly argued against alar excision due to its potential for causing scar formation, structural distortion, and functional sequelae, he acknowledged that other cartilage excision steps might be necessary to achieve the desired shape. These steps include using a cephalic-based wedge from the lateral crura to correct midline overlapping of the supra-domal alar cartilages and medial-based wedges to

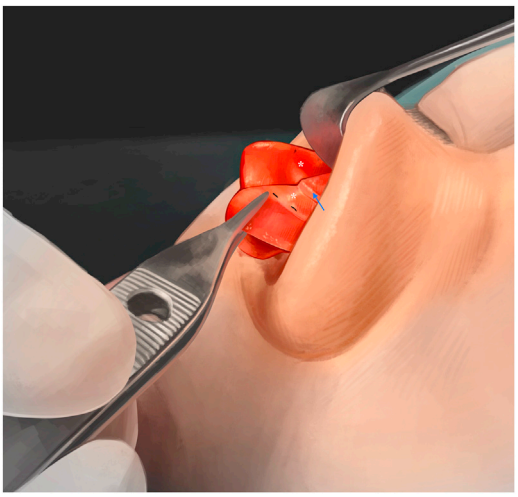

Fig. 12. Schematic intraoperative view of the nose demonstrating the hinged flap position from an oblique view from the left side: The hinged cephalic portion on the right side is fixed using 3 mattress sutures after partially rotating the cephalic part of the lateral crus of the alar cartilage. Note the position of the hinged flap (*asterisks*), which not only creates a favorable resting angle but also preserves the scroll junction (*blue arrow*). (Sazgar, A.A. Horizontal Reduction Using a Cephalic Hinged Flap of the Lateral Crura: A Method to Treat the Bulbous Nasal Tip. Aesth Plast Surg 34, 642-645 (2010). https://doi.org/10.1007/s00266-010-9523-9.)

facilitate extra rotation or a sharper unified tip complex. Similarly, we have utilized modifications involving cartilage excision to correct specific deformities. For instance, the same cephalic-based wedge excision was employed in Type III of the hinged flap technique to set back the crura in a droopy long nose.[10,17,45] However, we stress the critical importance of preserving the scroll area complex. While some authors have documented attempts to reconstruct this intricate anatomic element after separating the upper and lower lateral cartilages, achieving complete success has proven elusive.[46]

The foundational principle of alar preservation requires that the alar cartilage be preserved without disrupting its continuity, avoiding cuts to critical tip ligaments, and preventing damage to the SMAS envelope—or ensuring repair of these elements when necessary.[45] However, it is crucial to adapt techniques to various scenarios to achieve a beautiful, natural-looking nasal tip. Much like the dorsal preservation approach, a hybrid method may be necessary, but it should be guided by the understanding that every surgical maneuver—whether on skin, muscle, ligament, or cartilage in the tip region—has specific consequences that must be carefully considered.[47–50]

Nasal function is as important in alar preservation as long-term aesthetic outcomes. Our studies using acoustic rhinometry and subjective scoring on a global nasal obstruction visual analog scale (VAS) have demonstrated that the hinged flap technique can effectively reconstruct the internal nasal valve.[37] Another study on cadavers has shown that the space created beneath the hinged flap and the caudal part of the lateral crura adds to the valve area.[38] Logically, each preservation method should be validated by studies that demonstrate improvements in both functional and aesthetic outcomes.

The main limitation of the hinged flap technique is that it elevates the soft tissue envelope in the supra-perichondrial plane. Based on anatomic studies, some authors recommend elevating the envelope in the subperichondrial plane instead.[4,44,51] They suggested that dissection in the supra-perichondrial plane may detach the vertical scroll ligament from the longitudinal scroll ligament. In contrast, subperichondrial dissection splits the longitudinal scroll ligament, allowing for elevation beneath the sesamoid cartilages while preserving the integrity of the scroll ligament complex. However, subperichondrial dissection is not straightforward, and comparative studies are needed to evaluate the outcomes of these 2 methods.

CLINICS CARE POINTS

- Recent renewed interest in preservation techniques has led to some discrepancies among rhinoplasty surgeons regarding terminology, indications, classifications, and methods.
- We present various surgical methods adhering to alar preservation principles and evaluate their efficacy through anatomic and functional assessments.
- Alar preservation is not suitable for all nose types; proper patient selection is crucial for achieving optimal results.
- Outcomes following alar preservation rhinoplasty (PR) are highly stable, with both patients and surgeons experiencing high satisfaction rates.
- Despite its lower popularity compared with dorsal PR, alar preservation requires further study and experience to fully understand its benefits and drawbacks.

DECLARATION OF AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

During the preparation of this work the author(s) used AI in order to help write the article. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

DISCLOSURE

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