

# The Transvestibular Approach: A New Horizon in Rhinoplasty

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**T**he lower lateral cartilage has intricate anatomical elements that define shape, projection, and relations with other nasal tip structures. Good exposure of the lower lateral cartilages is an essential step in rhinoplasty. Conservative surgical techniques are essential to get natural long-term results. Different endonasal techniques have limitations in visualizing the lateral and intermediate crura, predisposing patients to asymmetries in reduction and rearrangement. In this article, a new endonasal rhinoplasty approach is described. Using a marginal incision, the vestibular skin is elevated and the endonasal surface of the lower lateral cartilage is exposed, permitting precise reduction, rearrangement, and placement of interdomal suspension sutures and lateral crural spanning sutures. This article discusses the surgical steps and results of my experience using this approach. This transvestibular approach is a new, dependable, and simple method that should allow rhinoplastic surgeons to perform this operation with predictable results and limited variables.

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The search for an ideal rhinoplasty approach that permits good access to and visualization of the nasal framework continues. The aesthetic requirements and deformities are different from one patient to another. A rigid approach to rhinoplasty by performing the same technique on all patients means that we have not objectively performed a decision analysis. Conservatism and predictability are essential requirements for the techniques used. Using one approach, whether external, delivery, or transcartilaginous, for all rhinoplasties predisposes patients to errors in both judgment and surgical planning. Mastering different approaches gives the rhinoplastic surgeon an essential versatility in tackling different nasal configurations and deformities. Each approach has different reflections on the outcome and final result. When looking at a nose that has been operated on, experienced surgeons are able to determine which approach was used because the way we look at the lower lateral cartilage (LLC) deter-

mines the surgical horizons and outcome, and the type of exposure dictates, to a great extent, the types of surgical techniques used. Certain techniques tend to predispose patients to an unnatural, "operated-on" look more than others.

Any rhinoplasty approach or technique should not destroy or alter but rather should preserve and enhance natural aesthetic elements already present in the nasal framework and its soft tissue envelope. The aim is to correct the deformity without increasing the chance of creating new ones. If the tip-lip aesthetic complex has a favorable appearance that coincides with the anticipated nasal and facial aesthetic result, it is prudent to avoid surgical manipulation of this area. Most primary rhinoplasty deformities can be corrected using limited dissection of the LLC, preservation of arch continuity, and conservative dorsal work without the insertion of cartilage grafts. Wider dissection and destruction of support mechanisms for the sake of exposing the framework introduce healing variables that cannot be easily controlled and will require reconstruction of these support structures to maintain definition and projection and pre-

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vent asymmetric healing. Since the original description of the transvestibular approach,<sup>1,2</sup> more maneuvers have been added to correct different deformities.

## TECHNIQUE

To perform the transvestibular approach, the vestibular skin that covers the endonasal surface of the LLC needs to be elevated. Using a 25-gauge needle, infiltration of the vestibular skin is performed using a local anes-



**Figure 1.** Local anesthesia injection with ballooning of the vestibular lining.

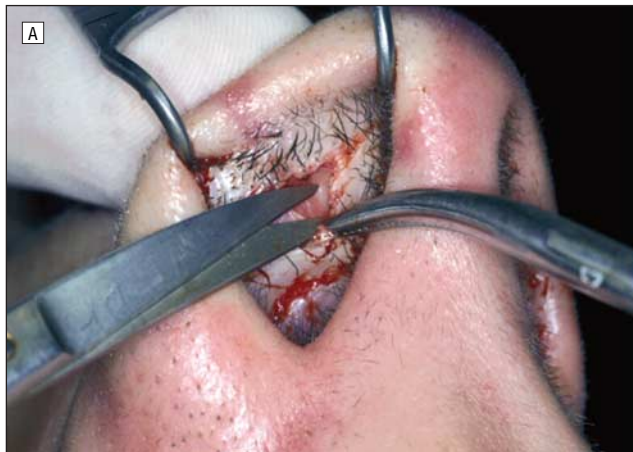


**Figure 2.** Marginal incision connected to transfixion incision with a V notch at the junction.

thetic. Ballooning of the subperichondrial layer during injection (similar to injection of the septal mucoperichondrium) facilitates dissection later (**Figure 1**). A marginal incision is made at the caudal border of the LLC (**Figure 2**). It is connected to the complete transfixion incision medially to the dome or continued along the margin to expose the endonasal surface of the medial crus (**Figure 3**). Undermining the fibers between the vestibular lining and the caudal edge of the cartilage identifies the border of the lateral crus. A distinct plane is present beneath the cartilage, allowing elevation of a vestibuloperichondrial flap in a similar fashion as during a submucous resection. This plane is more simply identified anteriorly and medially because the vestibular lining is thicker in that region (**Figure 4A**). After clear identification of the endonasal aspect of the LLC, a strabismus scissors is used to avoid any tears in the lining of the LLC. It is also essential to perform gentle sweeps and dissection to avoid a break in the LLC (**Figure 4B**). Such undermining is easily done when the right layer is reached. In cases in which rearrangement or reduction is required in the region of the intermediate or medial crus, the marginal incision is extended to their caudal border and the endonasal lining is accordingly elevated. Undermining of the vestibular skin and the mucosal lining is continued superiorly, exposing the caudal and cephalic boundaries of the lateral and intermediate crura, the scroll

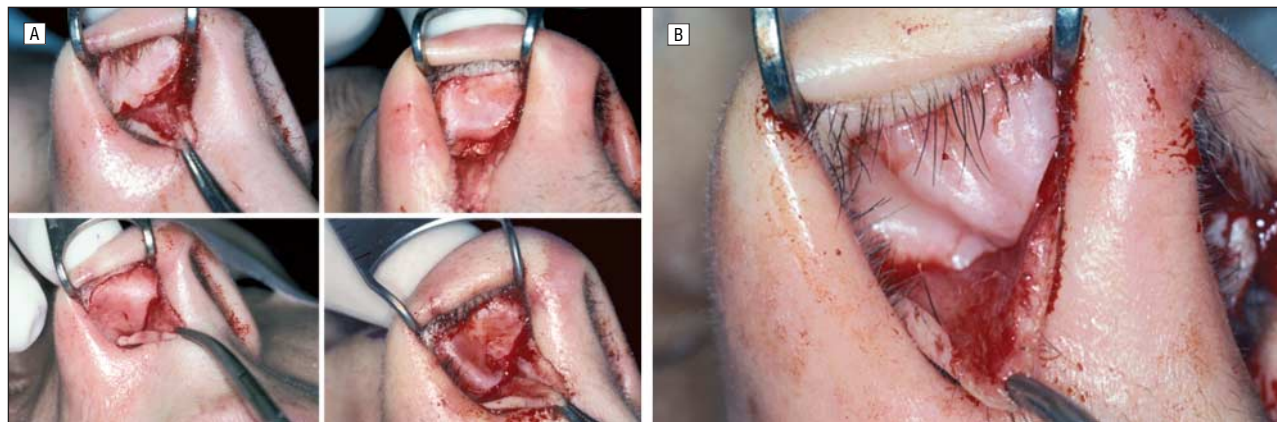


**Figure 3.** Marginal incision extended to expose more of the medial crus. Note the thickness of the vestibular lining.

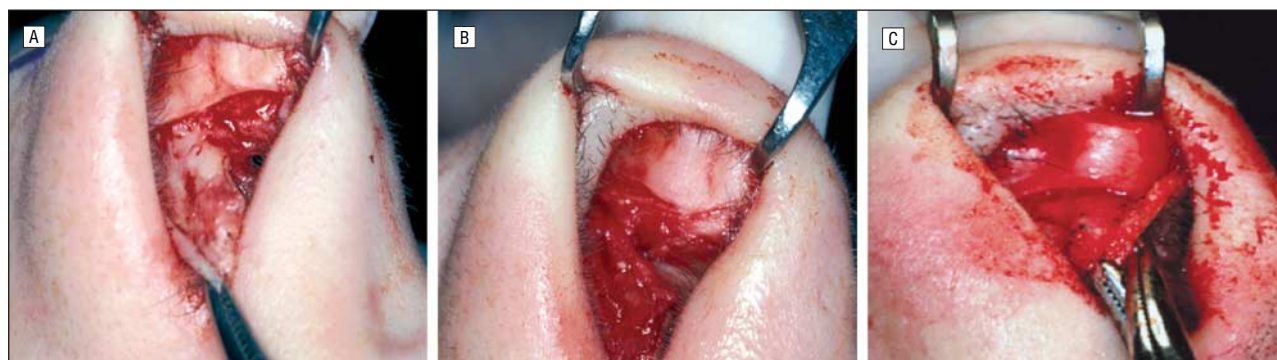


**Figure 4.** Undermining of the vestibuloperichondrial flap. A, Initial sharp elevation to expose the submucoperichondrial plane and the caudal border of the lower lateral cartilage. B, Blunt scissors elevate the vestibuloperichondrial flap.

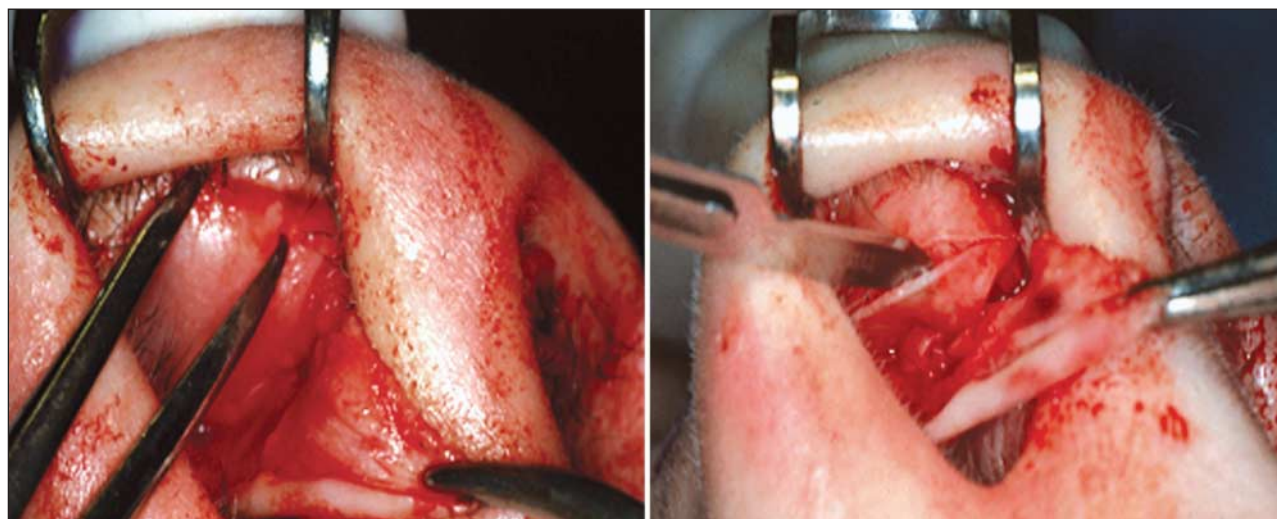




**Figure 5.** Endonasal view of the lower lateral cartilage (LLC). A, Exposed endonasal surface of the LLC in different patients. The lateral crus is seen in situ with minimal distortion. B, Endonasal view of a soft LLC.



**Figure 6.** Endonasal view of the lateral crus and intermediate crus in different patients. A, Transition between the lateral and intermediate crura. Note that the skin is retracted inferiorly. B, Endonasal view of a wide intermediate crus with interdomal fat. C, Endonasal view of the intermediate crus and part of the medial crus.



**Figure 7.** Precise reduction. A, A caliper delineates the exact dimension of the remaining segment. B, Incision completed; note the improved visualization and sculpturing of the dome region.

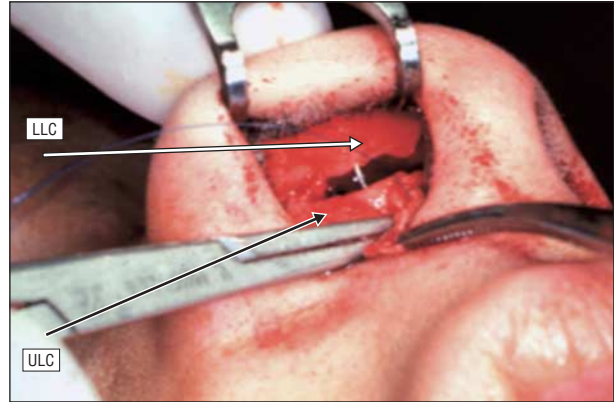
region, and the anterior septal angle. By posteroinferiorly retracting the vestibuloperichondrial flap, and stabilizing and slightly flattening the arch with your middle finger, the endonasal surface of the LLC may be seen (**Figure 5** and **Figure 6**).

Analysis of the dimensions, shape, symmetries, and causes of the deformity and a translation of the external measurements endonasally are performed. Reduction or

rearrangement of the lateral crus can be executed using complete strip, rim strip, or any modification of lateral crural flap technique. A caliper can be used to precisely measure the dimensions of both the removed segment and the remaining segment (**Figure 7**). With the remaining segment of the LLC retracted anteriorly and the vestibuloperichondrial skin flap retracted posteriorly, visualization of the junction between the upper lateral car-



**Figure 8.** Dorsal exposure. A, Exposure of the dorsum through the same incision without cutting the attachments between the upper lateral cartilage and septum. B, An example of a dorsal bony cartilaginous resection.



**Figure 10.** Suspension suture between the lower lateral cartilage (LLC) and upper lateral cartilage (ULC).



**Figure 9.** Interdomal sutures. A, The endonasal surfaces of the 2 domes are identified. A 5:0 Prolene suture (Ethicon Endo-Surgery, Inc, Cincinnati, Ohio) is inserted. B, Two simple interdomal sutures are placed. C, An example of a mattress interdomal suture positioned between the 2 endonasal surfaces of the domes.

tilage (ULC) and the LLC is achieved and undermining of the bony cartilaginous vault and anterior septal angle is done. In certain patients who have a large bony cartilaginous hump, the attachments between the ULC and the septum are released and dorsal reshaping is continued. In patients who present with a small or moderate dorsal projection, a supramucosal reduction of the bony cartilaginous vault is performed without primary release of the attachments between the ULC and septum (**Figure 8**).

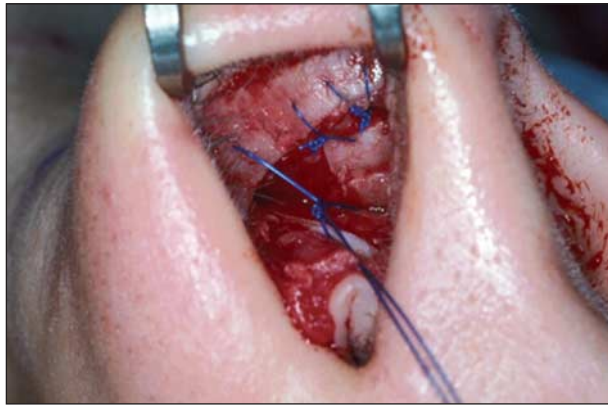
The presence of a healthy vestibulomucoperichondrial flap permits the endonasal insertion of permanent sutures. An interdomal suture can be positioned to decrease the angle of diversion of the intermediate crura and decrease the distance between tip-defining points (**Figure 9**). Interdomal fat can easily be seen and removed to facilitate narrowing of the interdomal distance. Different types of interdomal sutures can be applied: simple, mattress, or multiple. In conditions in which significant drooping of the nasal tip is present, a suspension suture between the ULC and the LLC can be used.<sup>2,3</sup> The aim of this suture is to maintain superior tip rotation without the need to depend on cartilage grafts (**Figure 10**). A suture can be inserted between the 2 ULCs to maintain projection of the ULC and avoid collapse in the region of the nasal valve.<sup>4</sup> Spanning sutures<sup>5,6</sup> can be inserted between the lateral crura (**Figure 11**). If straightening of the lateral crus is needed, batten sutures are positioned (**Figure 12**). In conditions in which a soft LLC is present, a cartilage graft or alar contour grafts<sup>7,8</sup> can be fixed to the undersurface of

the LLC in an underlay fashion, reinforcing it and minimizing the effects of scarring (**Figure 13**). Using the transvestibular approach, a cut in the posterior aspect of the lateral crura can be performed, creating a lateral crural flap (**Figure 14**). After cartilage repositioning, the 2 edges are resutured in place using permanent sutures.<sup>9-11</sup> In certain cases, the overlap is excised or transposed onto the posterior segment. Attention should be paid to avoid notching or depression at the region of the lateral incision, especially in patients who have preoperative deep alar creases. If the lateral crus is soft and needs reinforcement, a cartilage graft can be positioned in an underlay fashion and fixed in place. Similarly, a batten-type graft or alar contour grafts can be inserted and fixed. At the end of the procedure, 4.0 chromic sutures are used to close the marginal incision (**Figure 15**).

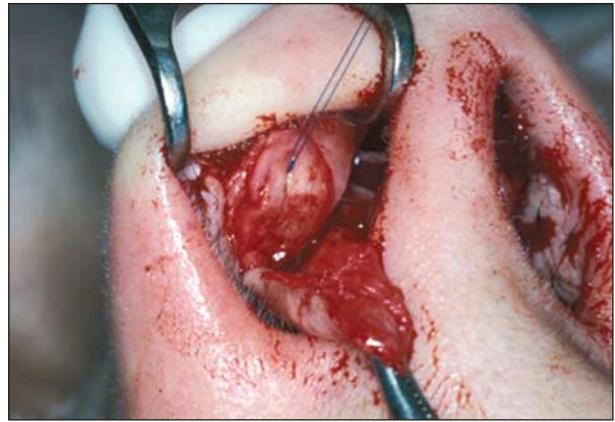
#### COMMENT

In conservative rhinoplasty, the following themes are respected: (1) limited dissection, (2) maintenance of LLC integrity, (3) protection of support elements of the LLC, and (4) limited reduction of tip and bony cartilaginous elements. Wider dissection creates variables in scarring that might in certain cases produce unfavorable results. Increased edema of dermal and subdermal elements has the potential, especially in patients with thick skin and excess subcutaneous deposits, to cause hypertrophied dermal and subdermal scarring with secondary loss of definition of tip elements or the creation of other irregulari-

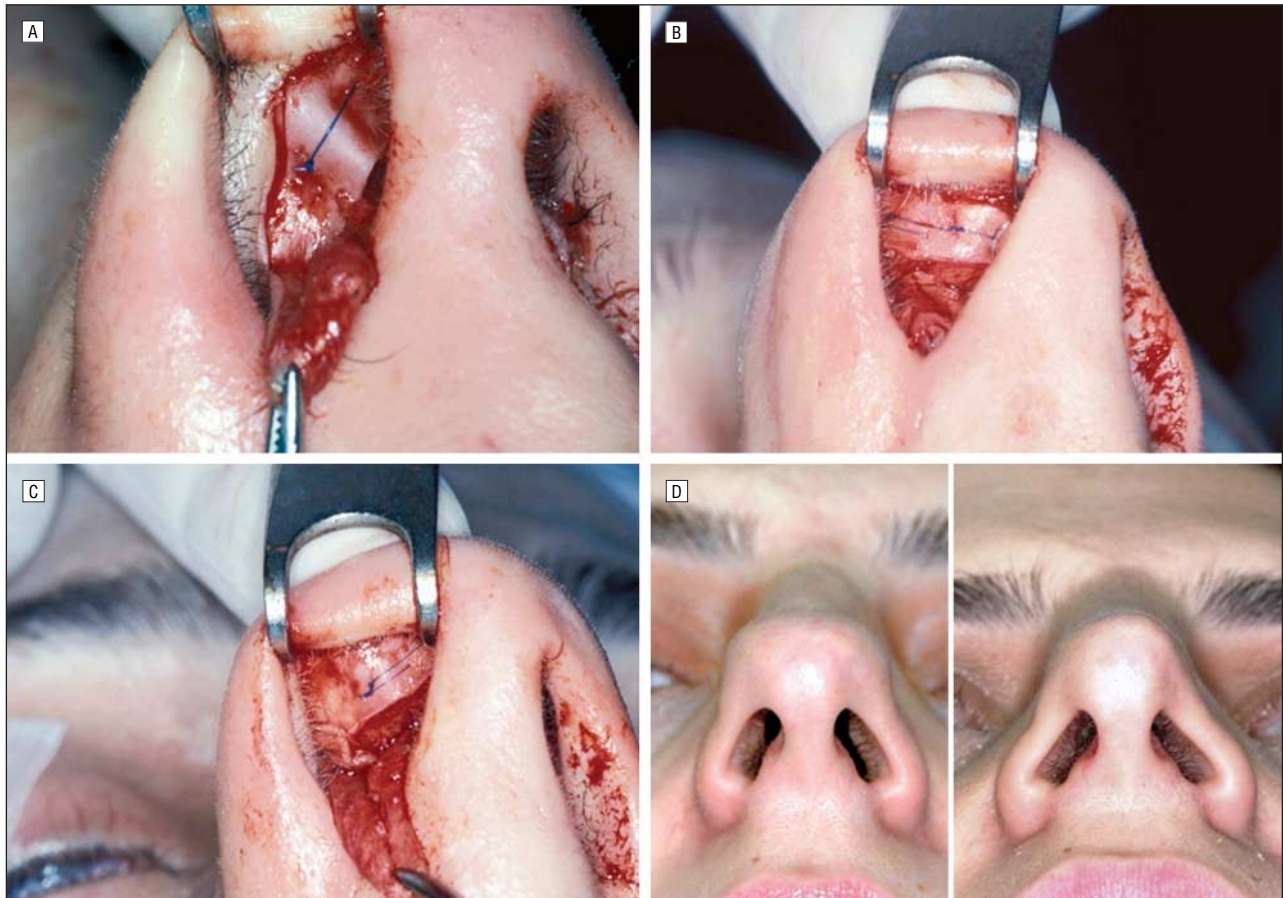




**Figure 11.** Spanning suture between the 2 lateral crura. In this case, simple spanning sutures were positioned.



**Figure 13.** Alar contour grafts positioned in an underlay fashion and fixed in place with 6.0 Prolene sutures (Ethicon Endo-Surgery, Inc, Cincinnati, Ohio).



**Figure 12.** Shaping sutures. A-C, Different types of shaping sutures put in different sites of the lateral crus to straighten convexities and decrease a bulbous appearance. D, Before and after basal views in a patient who has a wide angle of divergence and a boxy tip. Changes were achieved through interdomal and shaping sutures. Minimal cartilage reduction was performed.

ties. Excessive intraoperative edema decreases the assessment of defining results, leading to misjudgment in certain cases. The long-term effect of scar maturation on tip definition and the final shape of tip-defining elements depends on the balance among the following 3 factors: tensile strength of the resultant scar, the degree of softness of the LLC, and the degree of weakening of the integrity of the LLC and its supporting elements. Bossae represent a disruption and distortion of the position and shape of a weakened intermediate crus by the process of

healing and scarring. Tip asymmetries after delivery technique are sometimes due to a differential pull on the remaining segment of the LLC by scarring. Fixation techniques have decreased such asymmetries.

Preservation of the integrity of the LLC is essential to maintain projection and lateral support of the tip lobule and the external valve region. Tip support elements are disrupted when the continuity of the LLC is also affected, and arch continuity is essential to maintain the ellipsoid appearance of the nostrils. From a dynamic point



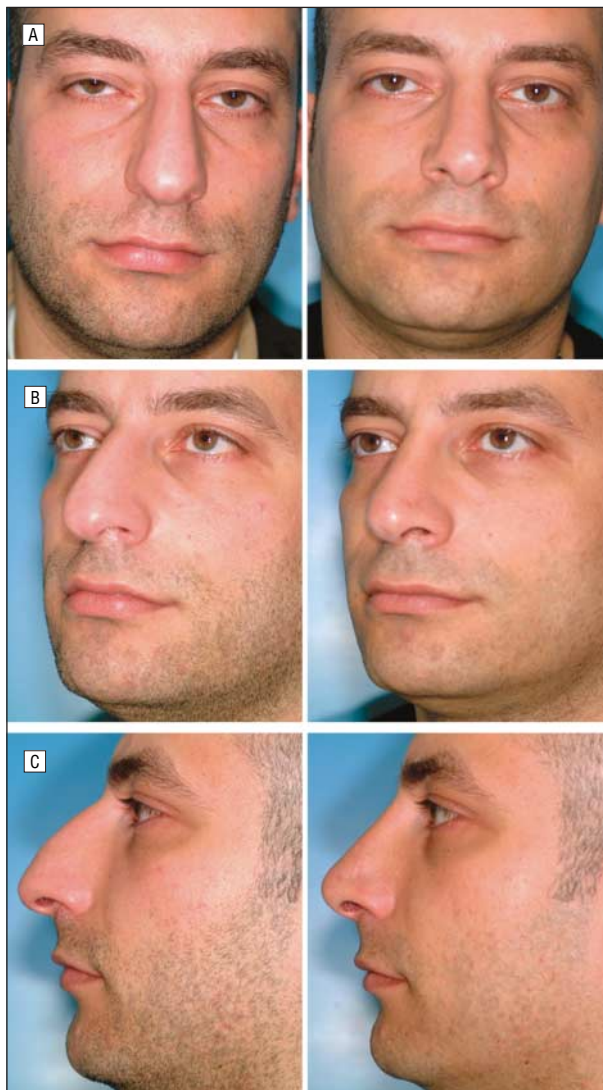
**Figure 14.** Lateral crural flap. A, Creation of the lateral crural flap. B, The 2 segments are positioned in an overlay fashion. C, The 2 segments are fixed in place with a mattress suture.



**Figure 15.** Closure of the marginal incision. Area of the internal nasal valve is intact.

of view, disruption of the arch at different points results in different effects on the final shape of the tip. The most important defining segment of the LLC is the dome. Most techniques aim at reshaping this segment or rearranging it. The medial segment has a strong connection between the medial crura, limiting the long-term effects of healing on these segments when compared with the lateral crus. The lateral crura have weaker supporting ligaments with a wider space that can be affected by healing. Weakening this segment through resection or transection without re-creating enough structural support might predispose patients to unfavorable results.

Four main approaches were previously used in rhinoplasty: (1) transcartilaginous, (2) delivery, (3) retrograde, and (4) external. In this article, a fifth one is presented. The endonasal transcartilaginous (cartilage-splitting) approach requires a good understanding of the external anatomy. Each one of these approaches has advantages and limitations.<sup>12</sup> The classic transcartilaginous approach requires the use of mucosal and intercartilaginous incisions, resulting in a narrow pedicle of mucosa with compromised blood supply and venous drainage, predisposing patients to necrosis and secondary stenosis in the valve region. In the direct transcartilaginous approach, one incision is made through the mucosa and lateral crus. In another variation, an incision is made in the mucosa, and the segment to be resected is exposed. Asymmetric resection, especially in the region of the dome, is a significant complication of this approach. Techniques such as the use of percutaneous punctures<sup>13,14</sup> or dome identifiers have been



**Figure 16.** Wide tip, poor tip support, relatively thick skin, and wide dorsum. Minimal cartilage was removed from the lower lateral cartilage. Shaping was performed using interdomal, spanning, and suspension sutures with a lateral crural flap. A, Before and after (1 year) front views. B, Before and after oblique views. C, Before and after left lateral views. Note improvement in the position of the tip and the harmony between the different elements.

used to improve the precision of this resection, especially in the region of the intermediate crus. The transcartilaginous approach has significant limitations in visualizing the dome region, achieving a precise resection, exposing the





**Figure 17.** Bulbous tip with poor definition and a bony cartilaginous hump. A, Preoperative and postoperative (1 year) front views. B, Before and after left lateral views. C, Before and after right lateral views. D, Before and after oblique views.



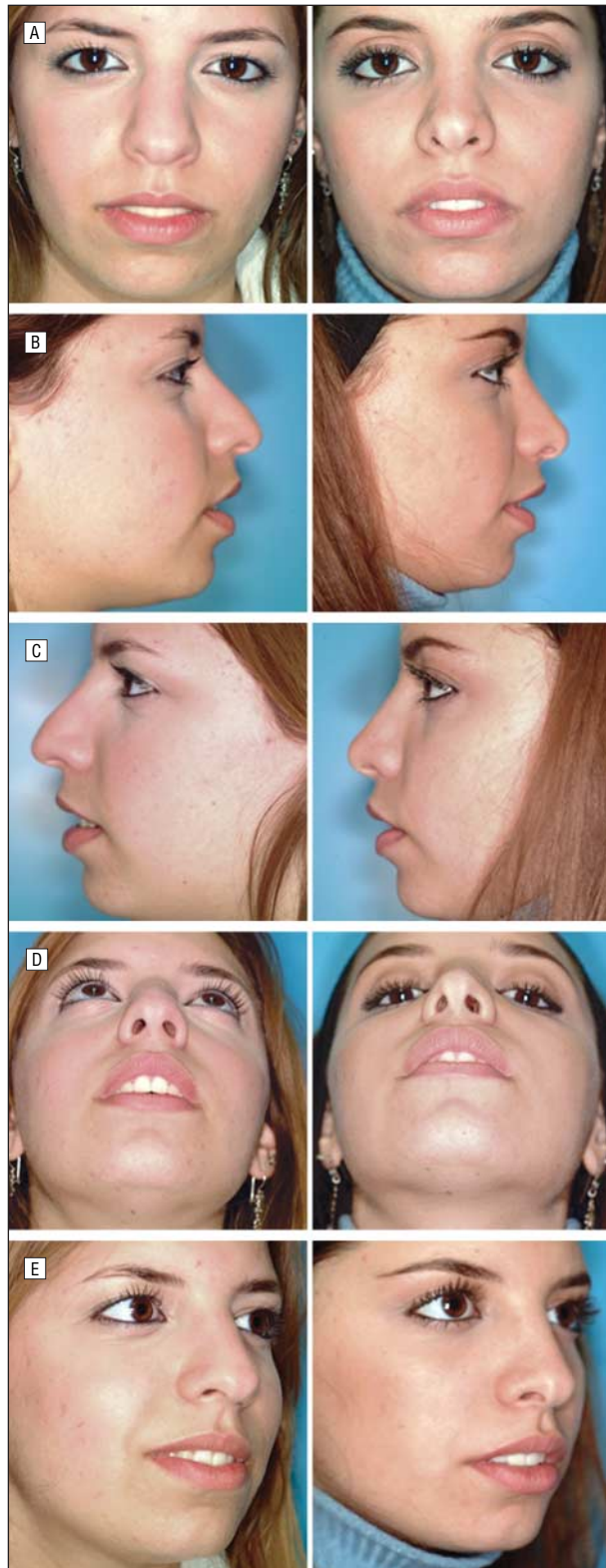
**Figure 18.** Amorphous, slightly deviated tip with a bony cartilaginous hump. A, Before and after (2 years) front views. B, Before and after right lateral views. C, Before and after left lateral views. D, Before and after basal views.

remaining segment of the LLCs, exposing the scroll region, and avoiding incisions in the region of the nasal valve.

The delivery approach requires a wide mobilization of the LLCs, causing significant interruption of the support mechanisms. The exposure of the LLC is distorted by the tension of retracting instruments. In cases in which no fixation of the LLCs is performed, a distortion in the position of the LLC due to asymmetric healing may occur. In patients with soft LLC, the combination of wide mobilization and healing will predispose patients to further distortion. The delivery approach requires an intercartilaginous incision in the region of the nasal valve, pre-

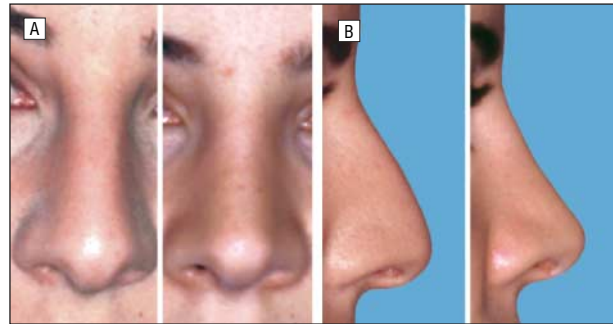
disposing patients also to a compromise in the function of the internal valve. The retrograde approach is rarely practiced because of its limitations in exposing different segments of the LLC.

The external (open) rhinoplasty approach has been widely used during the past decade. Although strong controversy still exists regarding the universal indications for this technique, most authors agree that the primary indications for the external approach are in revision cases, cleft lip noses, and difficult primary cases, especially patients needing cartilage grafts. The scope of this article is not to discuss the advantages and disadvantages of different ap-



**Figure 19.** Patient with wide amorphous tip, clefting between the domes, poor tip support, and a wide dorsum. A, Left, preoperative front view. Right, postoperative (1 year) result using the complete strip technique and interdomal sutures. B, Before and after right lateral views. C, Before and after left lateral views. D, Before and after basal views. E, Before and after right oblique views.

proaches but mainly to stress that the quest to decrease variables that might predispose patients to complications led me to develop the transvestibular approach.



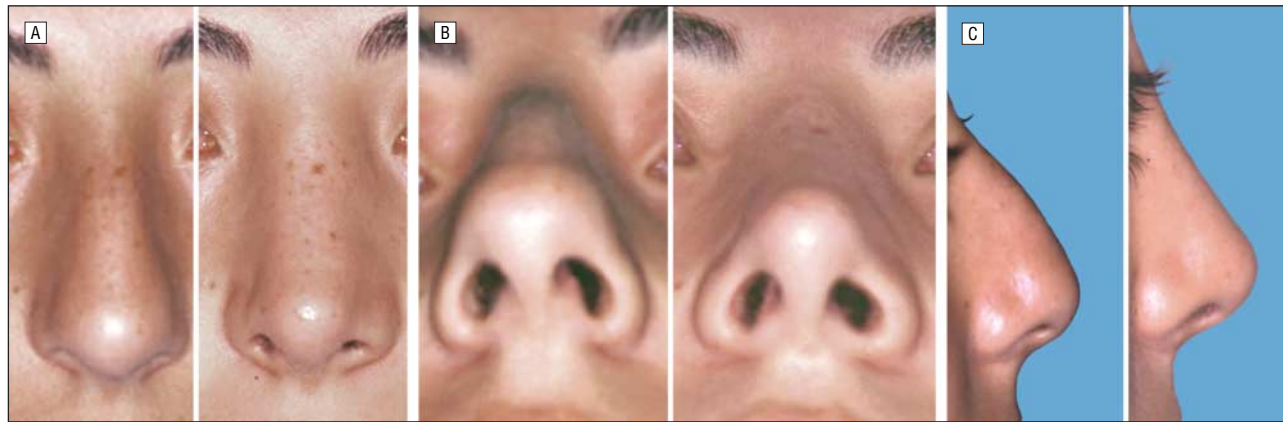
**Figure 20.** Patient with a bulbous tip. A, Before and after (1 year) front views. Note improved definition. B, Before and after right lateral views.

The aims of the transvestibular approach are to enhance the endonasal exposure and visibility in endonasal rhinoplasty and to facilitate the basic steps in rhinoplasty: reduction, rearrangement, and augmentation. Rhinoplastic surgeons previously thought that it was difficult to elevate the vestibular skin. This approach proves the simplicity of elevating such a flap and the reliability of its blood supply. In all rhinoplasties performed using this approach, no partial or complete loss of vestibular skin occurred, with no vestibular stenosis. The transvestibular approach described in this article combines significant advantages over other rhinoplasty approaches in many selected cases. It permits good visualization of the endonasal surface of the LLC without significant distortion. This improves the precision of the reduction step by permitting an exact measurement of the dimensions of the resected and remaining segments of the LLC, which is not detached from its envelope or delivered. Moreover, with such a view of the remaining segment, further reshaping of this strip can be performed using the lateral crural flap, augmentation, or other suturing techniques. These modifications in the curvature, axis of rotation, structural integrity, support mechanisms, intercrural distance, and interdomal width are performed with the cartilage in situ. This makes it easier for the surgeon to see the external reflections of the changes achieved. Since the remaining strip of the LLC is not detached from its subcutaneous connections or significantly mobilized, the long-term effects of healing and scarring are limited.

The presence of a healthy vestibulomucoperichondrial flap permits the insertion of permanent sutures in the region of the domes, in the lateral crus, and between the ULC and LLC. Interdomal sutures made with this approach are easily placed and, contrary to what is seen with the delivery or the external approaches, they are not in direct contact with the subcutaneous layer, which decreases the incidence of extrusion or overlying skin surface irregularities. When placing an interdomal suture with the transvestibular approach, the surgeon should make sure that the points of entry are symmetrical on both sides and at sites that achieve the degree of narrowing required. The illusion of narrowing is achieved not only by decreasing the angle of divergence but also by some increase in tip projection.

In the treatment of a droopy nasal tip, most of the techniques depend on supporting the caudal part of the tip with cartilage grafts and releasing the depressor septal muscle<sup>15,16</sup> and on cephalic scarring to achieve a supe-





**Figure 21.** Patient with a bulbous amorphous tip and slight tip overprojection with drooping. A, Before and after front views. Note improved definition. B, Before and after basal views. Note the degree of narrowing and improved harmony in the infratip-columella area. C, Before and after right lateral views.

rior tip rotation. Endonasal tip suspension sutures are positioned in different locations between the ULC and LLC, depending on the area that requires maximal superior rotation. Attention is paid to avoid excessive tightening of this suture, especially in the posterior aspect of the lateral crus to avoid alar notching and irregularities. The end result of this suture is a superior pull that counteracts gravity and the depressor septal muscle. In certain cases of severe tip plunging, combining this lateral crural suspension suture with a lateral crural flap decreases the resistance to cephalic rotation.

Convexities of the lateral crus that cause bulbosities can be modified by sutures rather than resection.<sup>17</sup> The transvestibular approach permits the insertion of shaping sutures. Simple or mattress sutures are applied to change the form rather than the 3-dimensional volume. Sutures between the lateral crura permit decreasing the intercrural distance and simultaneously change the shape without changing the volume, transforming a convexity into a concavity or straightening it without removing structural elements. Unless a healthy vestibular skin flap is elevated, shaping sutures have the potential of predisposing patients to infection. No endonasal extrusion or infection from the use of these sutures has yet been reported in my patients. Perhaps one of the significant advantages of this approach is the avoidance of any mucosal injury to the internal nasal valve region and the possibility of performing the entire procedure through the marginal incision as described.

This approach has been used in different types of deformities (**Figures 16, 17, 18, 19, 20, and 21**). Success is defined as achieving reliable results and avoiding steps that require external incisions, use of excessive cartilage grafts, disruption of tip support mechanisms, or use of a large number of sutures. Like other endonasal approaches, the transvestibular approach has certain limitations in major asymmetries, especially traumatic, postrhinoplasty, and cleft lip noses. The transvestibular approach has not been used in a significant number of revision rhinoplasties. Because scarring potentially limits easy undermining of vestibular skin flaps, its use in secondary cases has been limited to deformities that require minor revisions. The ability to expose the bony cartilaginous dorsum and reduce dorsal projection with-

**Table. Advantages of the Transvestibular Approach**

Good exposure of the endonasal dome region
Improved precision of cephalic strip excision of the lower lateral cartilage
Direct visualization of the remaining segment of the lower lateral cartilage
Minimization of the number of incisions
Enhancement of the natural contour of the tip
Easier and better diagnosis of primary asymmetries of the lower lateral cartilage
Easier placement of interdomal sutures
Decreased postoperative tip swelling
Direct translation of spanning or shaping sutures effects without need for redraping
Preservation of the natural contour of the infratip lobule
Avoidance of incisions in the region of the internal nasal valve

out cutting the attachments between the ULC and septum is another significant advantage of the transvestibular approach over alternate classic endonasal approaches.

## CONCLUSIONS

Rhinoplastic surgeons should have an open-minded approach when choosing techniques to correct nasal deformities. Using one approach for all rhinoplasty cases might cause limitations in achieving the ideal result. This approach, with its advantages (**Table**), represents a new, reliable, and simple way of achieving predictable results in many rhinoplasty cases. It permits good visualization of the endonasal surface of the dome, improved precision of cephalic strip excision, direct visualization of the remaining segment of the LLC, easier placement of interdomal sutures, decreased tip and infratip edema, and preservation of a natural contour. Since the way rhinoplastic surgeons view the lower cartilage changes the surgical horizons, it is prudent for us to choose conservative approaches, especially in primary deformities.

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