Domal Stabilization Suture in Tip Rhinoplasty

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Objective: To investigate use of the domal stabilization suture as a complementary suture modification technique for refining and securing the nasal tip.

Methods: A single permanent or absorbable suture is placed via an open or cartilage delivery approach. The suture is placed along the cephalic borders of the domes at the medial third of the lateral crura bilaterally just posterior to the junction of the intermediate and lateral crura as a final step in tip rhinoplasty.

Results: The domal stabilization suture provided a means to help maintain dome symmetry in the setting of variable healing and scarring forces with no complications and no effect on tip rotation or projection.

Conclusion: Use of the domal stabilization suture enables correction of subtle changes in mild tip asymmetry and irregularities in domal height and provides subtle narrowing of the interdomal distance.

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TIP REFINING TECHNIQUES represent an evolving subject in rhinoplastic surgery. Earlier techniques were based on principles of cartilage removal or disruption and relied on destabilization of the intrinsic nasal framework, disrupting the support mechanisms of the nasal tip complex.[1,2] Over the decades, philosophies about rhinoplastic surgery have changed.[1-8] Radical cartilage resection and disruption of tip support mechanisms have been replaced by techniques that emphasize preservation and reorientation of nasal tip cartilage while maintaining or restoring intrinsic tip support mechanisms.[1,4-6] Modern tenets of tip rhinoplasty stress reshaping and reorienting of the nasal tip components.[1]

Suture modification techniques of the nasal tip have enabled rhinoplasty surgeons to achieve these goals. These methods became increasingly popular in the 1980s. For example, in 1985, McCollough and English[9] described the double-dome unit procedure to increase tip projection and refinement using domal morselization and placement of a horizontal mattress suture through all 4 crura just beneath the domes. This provided an alternative to the Goldman tip procedure for the wide or bulbous lobule.[9] In 1987, Tardy and Cheng[6] modified this double-dome unit technique by resecting the interdomal soft tissue, scoring the domes, and positioning the knot medially deep in the interdomal space. In 1987, Daniel[8,10] described the domal creation suture, a horizontally placed mattress suture across the domal notch, which enabled each dome to be shaped separately. By adjusting suture tension, the desired degree of domal convexity and lateral crural concavity could be achieved.[8,10] In 1989, Kridel et al[11] further modified these techniques and described the lateral crural steal technique to increase tip projection and rotation. In 1994, Tebbetts[2] provided a systematic 4-stage approach to tip rhinoplasty using suture techniques. Numerous suturing techniques to address the nasal tip have been described in the English-language literature, each based on these earlier principles.

We describe the use of a domal stabilization suture, a suture technique for refinement and stabilization of the nasal tip. This technique uses a single permanent or absorbable suture placed using either the open or the cartilage delivery approach between the cephalic border of each dome (**Figure 1**) as a final step in tip rhinoplasty, enabling each dome to be unified into 1 symmetric tip complex. This suture technique also offers a means to make minor changes in mild tip asymmetry, helping to correct small irregularities in

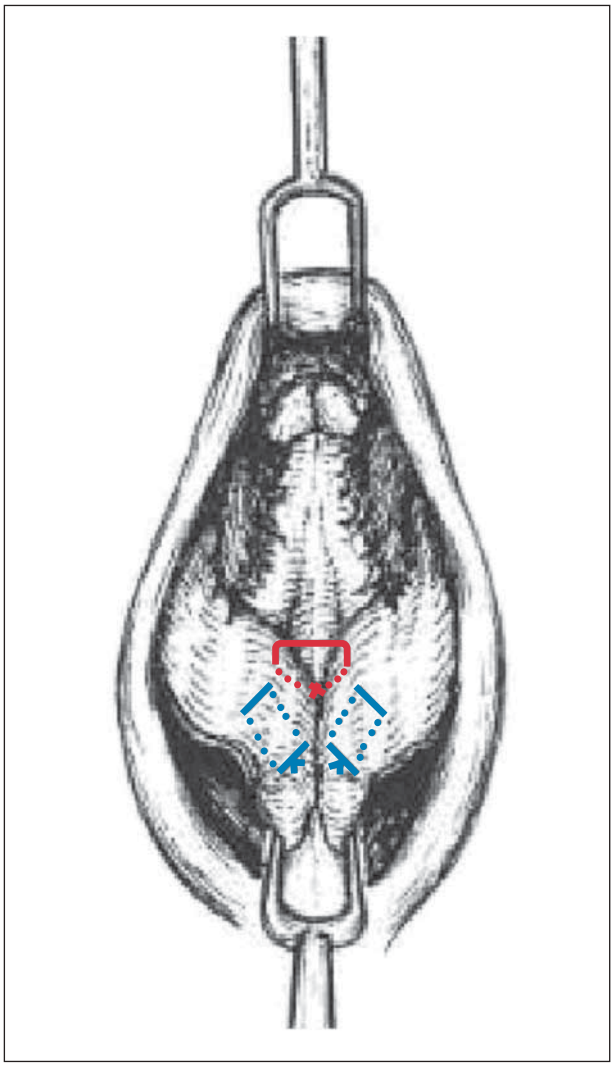

Figure 1. Positioning of the domal stabilization suture (red) in relationship to bilateral intradomal sutures (blue).

domal height or providing subtle narrowing of the interdomal distance.

METHODS

INDICATIONS FOR PLACEMENT OF THE DOMAL STABILIZATION SUTURE

In conjunction with other nasal tip modification techniques, the domal stabilization suture seems to provide a reliable, predictable, and complementary tip refinement technique for use in rhinoplasty. While we believe an open rhinoplasty approach may afford the surgeon better exposure in performing this technique, the domal stabilization suture may still be used if a cartilage delivery approach is preferred. We identified no specific contraindications to use of this suture technique. All patients provided written consent for use of their photographs in scholarly publications.

TECHNIQUE

An open rhinoplasty or cartilage delivery approach may be used, as appropriate. After all tip modification techniques and desired changes to the lower lateral cartilages have been achieved, it is appropriate to place the domal stabilization suture. A 5.0 polydioxanone suture is placed between the medial third portions of the lateral crura bilaterally just posterior to the junction of the intermediate and lateral crura along their cephalic borders (**Figure 2**). The knot is placed in a buried interrupted fashion. The suture is tightened incrementally, which enables the surgeon to set the interdomal distance or reduce it if necessary. Care is taken to pass the suture along equal points on each dome to enable proper alignment within the transverse plane (**Figure 3**). Caution is necessary so that the suture is not secured too tightly, which would result in excess lateral crural flare, an overly narrowed tip, and possible alar retraction or notching. We believe there is no need for vestibular skin dissection or hydrodissection with local anesthesia, although these can be performed without negative effects.

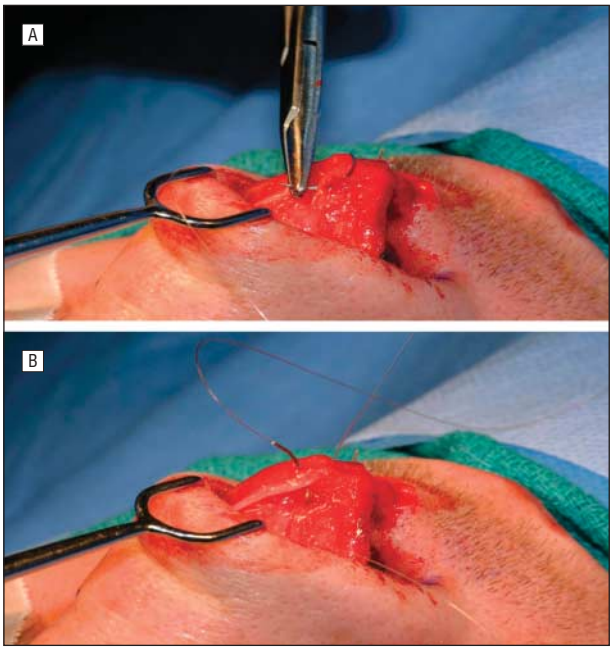

Figure 2. Placement of 5.0 polydioxanone sutures at the cephalic border of the medial third of the right (A) and left (B) lateral crura just posterior to the junction of the right intermediate and lateral crus in an inverted fashion (superior view).

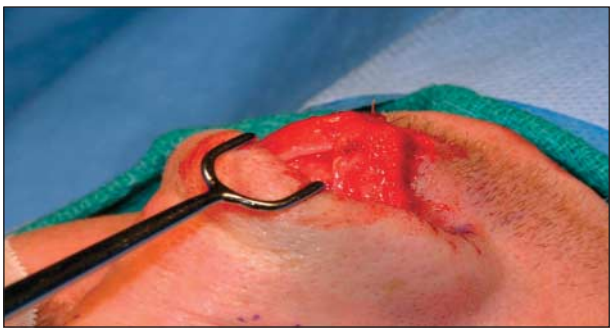

Figure 3. Final conformation of the domal stabilization suture (superior view).

RESULTS

Over 2 years (January 1, 2004, through December 31, 2006), 100 patients underwent rhinoplasty performed by

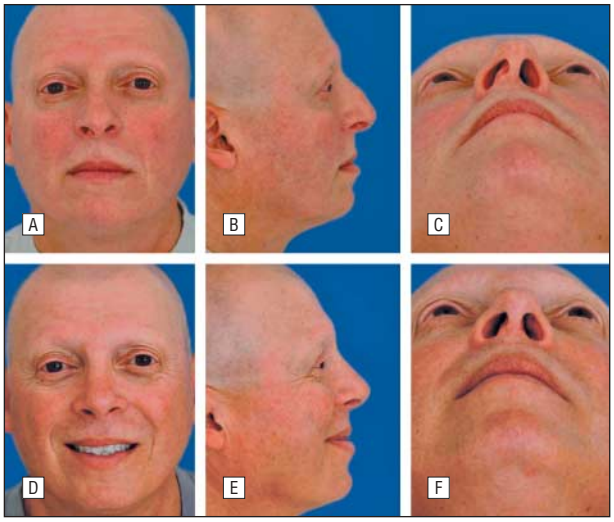

Figure 4. Preoperative (A-C) and 12-month postoperative (D-F) views of patient 1.

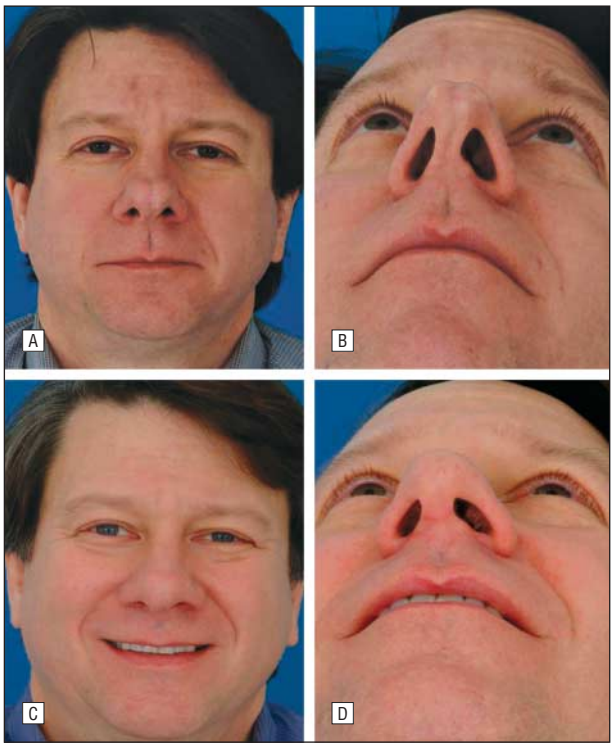

Figure 5. Preoperative (A and B) and 33-month postoperative (C and D) views of patient 2.

one of us (D.G.B.) using the described suture technique. Mean (range) follow-up was 15 (6-24) months. Of the 100 rhinoplasties, 75 were primary and 25 were revision procedures. All patients had undergone previous rhinoplasty performed by other surgeons. Complications included in the evaluation process were tip asymmetry, bossae, alar notching or retraction, abnormal tip rotation, abnormal change in tip projection, and excessive narrowing of the nasal tip. No noted complications related to the dome stabilization suture technique were observed. Although no complications were noted in our review, we realize and expect that over time minor complications may be noted, although this may be scientifically difficult to prove as a direct consequence of the suture technique alone.

REPORT OF CASES

CASE 1

A 51-year-old man underwent elective rhinoplasty. Physical examination demonstrated a bulbous tip, alar-columellar disproportion, markedly deviated caudal septum, and dorsal convexity. The surgical procedure included an external approach with correction of the caudal septum using the doorstop technique described by Pastorek and Becker.[12] The procedure included profile reduction and placement of spreader grafts and a columellar strut. In addition, he underwent cephalic resection domal sutures, an interdomal suture, and a dome stabilization suture. Preoperative and 12-month follow-up photographs are shown in **Figure 4**.

CASE 2

A 49-year-old man underwent elective rhinoplasty. Physical examination demonstrated an overprojected bulbous nasal tip. The surgical procedure included an external approach for tip rhinoplasty only, with cephalic resection, columellar strut placement, vertical dome division with resection of cartilage equally from the medial and lateral crura to deproject the nasal tip, and suture reconstitution using interrupted 5-0 clear polydioxanone sutures and a dome stabilization suture. Preoperative and 33-month follow-up photographs are shown in **Figure 5**.

COMMENT

The modern era of nasal tip surgery has introduced a philosophy of preservation and reorientation of nasal tip structures. Current methods seek to preserve and augment the existing support structures in conjunction with modifying the native cartilaginous framework. This approach seems to offer the surgeon greater control and a more predictable outcome. Nasal tip suture modification techniques provide a reliable and reversible addition to the myriad techniques that the rhinoplasty surgeon may use to achieve these goals. We present the domal stabilization suture as an addition to the various tip suture techniques.

A common goal of all suture modification techniques is precise placement and tension control.[1] The success of these techniques is a function of surgeon knowledge about the dynamics that the techniques induce.[1] Because each nasal tip anatomy is unique, the rhinoplasty surgeon must be proficient in using any number of tip modification techniques.[6] Suture techniques accomplish different effects on the nasal tip cartilages depending on how they are placed. For example, a horizontal mattress suture that takes a bigger bite of the lateral crus compared with the medial crus (lateral crural steal)

causes rotation and projection. If a similar dome-binding horizontal mattress suture is placed with equal bites of the medial and lateral crus, rotation is unaffected. The technique described herein is designed to stabilize the domal unit and has been conceived as a suture technique that does not affect rotation or projection. Our experience under direct visualization was that when placed as described, this suture does not seem to affect change in rotation or projection.

The domal stabilization suture provides a reliable and predictable complement to other nasal tip suture modification techniques. After individual domal modifications have been completed, the domal stabilization suture provides a means to unify, align, and stabilize the individual domal segments. This domal unification further augments tip support. By positioning the suture in the exact anatomical position at the cephalic border of each of the lateral crura just posterior to the junction of the intermediate and lateral crus, the domes are properly aligned within the transverse plane. We have found that the stabilization suture is effective in both cases in which the dome has or has not been divided. When dome division has been performed, suture reconstitution of the medial and lateral crura with simple interrupted sutures is undertaken in all cases. In this setting, the dome stabilization suture is placed in the same relative location to the domes, just lateral to the dome on the lateral crural aspect. Domal interruption and suture reconstitution do not seem to substantively affect the ability of this suture to provide an additional degree of stabilization to the domes.

The unpredictability of postoperative healing forces can confound the aesthetic results of many experienced rhinoplastic surgeons. The separation of the skin–soft-tissue envelope from the cartilaginous framework of the nasal tip can lead to unpredictable soft-tissue contracture postoperatively. This "shrink wrap" effect can cause aesthetic asymmetry over time if adequate support mechanisms are not maintained or added during tip rhinoplasty.[5] Suture modification techniques may help to preserve and augment these intrinsic tip support mechanisms. The domal stabilization suture provides added stabilization of the nasal tip in the early healing phase (Stephen S. Park, MD, oral communication, University of Pennsylvania Rhinoplasty Course, November 3-4, 2006). The technique provides a complementary means to maintain strength and symmetry of the domes in the setting of unpredictable healing forces postoperatively.

Risks and complications specific to the domal stabilization suture involve possible alar notching or retraction caused by excess flare of the caudal border of the lateral crura when the suture is secured too tightly. This can be averted by incrementally tightening the suture and redraping the skin–soft-tissue envelope to assess the suture effects on the nasal tip. An overly narrowed nasal tip can also result if the domal stabilization suture is secured too tightly, markedly reducing the interdomal distance. Domal asymmetry may result if the suture is not passed along the same anatomical position at the cephalic borders of the lateral crura. This technique is reversible, and if these complications are observed intraoperatively, the suture can be removed and replaced until the precise result is achieved. Complications involving the suture material can include suture extrusion, stitch abscess, and nasal tip infection.[13] We have observed none of these complications.

In conclusion, the domal stabilization suture seems to provide a safe and effective means to unify, set, and stabilize the domal complex at the completion of tip rhinoplasty. It does provide the surgeon a greater degree of control over postoperative healing forces. This technique may afford the rhinoplasty surgeon another tool in nasal tip rhinoplasty.

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Author Contributions: Dr Becker had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. *Study concept and design:* Corrado. *Acquisition of data:* Corrado. *Analysis and interpretation of data:* Corrado, Bloom, and Becker. *Drafting of the manuscript:* Corrado, Bloom, and Becker. *Critical revision of the manuscript for important intellectual content:* Bloom and Becker. *Statistical analysis:* Corrado, Bloom, and Becker. *Administrative, technical, and material support:* Corrado, Bloom, and Becker.
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