

Traction suture modification to tongue-in-groove caudal septoplasty

Y. A. Indeyeva¹, T. S. Lee¹,
 E. Gordin², D. Chan³, Y. Ducic⁴

¹Department of Otolaryngology — Head and Neck Surgery, Virginia Commonwealth University School of Medicine, Richmond, Virginia, USA; ²Department of Otolaryngology — Head and Neck Surgery, The State University of New York Downstate, Brooklyn, New York, USA; ³Department of Otolaryngology — Head and Neck Surgery, Indiana University School of Medicine, Indianapolis, Indiana, USA; ⁴Otolaryngology and Facial Plastic Surgery Associates, Fort Worth, Texas, USA

Y. A. Indeyeva, T. S. Lee, E. Gordin, D. Chan, Y. Ducic: Traction suture modification to tongue-in-groove caudal septoplasty. *Int. J. Oral Maxillofac. Surg.* 2017; xxx: xxx–xxx. © 2017 International Association of Oral and Maxillofacial Surgeons. Published by Elsevier Ltd. All rights reserved.

Abstract. Caudal septal deviation leads to unfavorable esthetic as well as functional effects on the nasal airway. A modification to the tongue-in-groove (TIG) technique to correct these caudal septal deformities is described. With placement of a temporary suspension suture to the caudal septum, manual traction is applied, assuring that the caudal septum remains in the midline position while it is being secured with multiple through-and-through, trans-columellar and trans-septal sutures. From 2003 to 2016, 148 patients underwent endonasal septoplasty using this modified technique, with excellent functional and cosmetic outcomes and a revision rate of 1.4%. This modified TIG technique replaces the periosteal suture that secures the caudal septum to the midline nasal crest in the original TIG technique. This simplifies the procedure and minimizes the risk of securing the caudal septum off-midline when used in endonasal septoplasty.

Key words: caudal septal deviation; tongue-in-groove; endonasal septorhinoplasty; septoplasty.

Accepted for publication

The nasal septum serves as a major contributor to the internal nasal valve¹. Aside from its functional importance, the caudal septum holds esthetic implications. Its relationship to the nasal lobule and the columella makes caudal septal deviation noticeable on both frontal and lateral facial views¹. Unrepaired caudal septal deformities may result in distortion of the lower third of the nose, imparting a twisted appearance, tip ptosis, columellar widening, excessive columellar show, or persistent nasal obstruction².

A number of surgical techniques have been proposed for correcting caudal septal

deformities, including the swinging door, the doorstep, the tongue-in-groove (TIG), and the extracorporeal septoplasty^{1,3}. In 1999, Kridel and colleagues described the most recent adaptation to the midline fixation method, coining it ‘the tongue-in-groove technique’⁴. One of the challenges of the original TIG technique involves securing the caudal septum to the nasal crest soft tissue or periosteum. Adequate placement in the midline position can be difficult while working in a relatively small space with limited exposure, as commonly seen in endonasal septoplasty. Misplacement of this suture will result in

persistent caudal septal deviation. A simplified, traction suturing technique that provides stabilization to the mobile, caudal septum until it is properly secured into midline is proposed.

Materials and methods

Patients who had undergone caudal septum repositioning during endonasal septorhinoplasty were identified and their clinical outcomes were analyzed in a retrospective fashion. Patients who had undergone open septorhinoplasty or concurrent septal

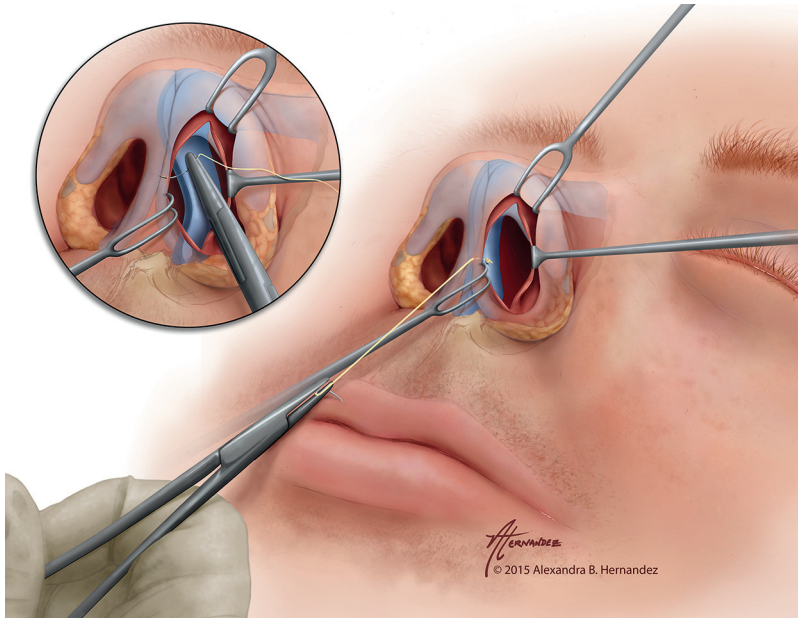


Fig. 1. An absorbable suture is secured to the caudal septum and is then passed through the columellar skin between the bilateral medial crura to be used as a traction suture.

perforation repairs were not included in the analysis.

Technique

After a standard septoplasty is performed through a hemi-transfixion incision, the caudal septum is released completely from its soft tissue attachments in the subperichondrial plane bilaterally and along the maxillary crest to allow for complete mobilization. Next, the maxillary crest is reduced, if necessary, to provide a stable flat surface on which the caudal septum can rest. Next, converse scissors are used to perform a retrograde dissection between the medial crura, and a soft tissue pocket is created to hold the repositioned caudal septum. The pocket spans the length of the columella, from the area immediately below the domes of the lower lateral cartilages down to the anterior nasal spine.

A temporary traction suture is then placed using an absorbable suture (i.e. 4-0 Vicryl), which is secured to the caudal margin of the septum at its midpoint (Fig. 1). The traction suture, with the needle still attached, is then passed between the medial crura and out through the columellar skin at the columellar midpoint, and the suture is left long (Fig. 1). By varying the location at which the suture passes through the columella, alteration in the nasal tip position is possible.

Manual traction is then applied by an assistant to pull the caudal septum in the

midline position. It is important that the vector of traction is directed midline, as pulling the suture laterally will tilt the caudal septum and the nasal tip, leading to deviation. While an assistant maintains constant tension on the traction suture, the caudal septum is visualized through the hemi-transfixion incision to ensure that it is sitting

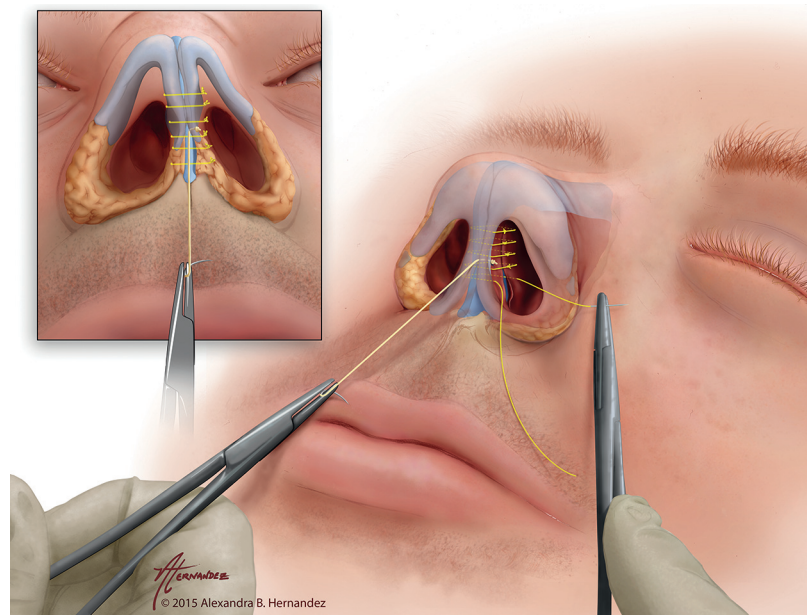


Fig. 2. An assistant applies tension with the traction suture to maintain the caudal septum in the midline position while multiple through-and-through, trans-columellar and trans-septal sutures are placed across the hemi-transfixion incision to secure the caudal septum into the midline position.

midline at its base along the nasal crest. If the caudal septum demonstrates excess vertical height, persistent deviation will be noted, and the base of the caudal septum should be appropriately trimmed. If, at this point, the posterior margin of the caudal L-strut is impinging on the nasal airway due to twisting, it can either be trimmed if there is sufficient cartilage width to avoid compromising nasal support, or corrected using a number of additional septoplasty techniques, such as scoring or grafting.

While manual traction is being applied to the suspension suture, 4-0 chromic gut suture on a straight Keith needle is used to place multiple through-and-through sutures across the hemi-transfixion incision to secure the caudal septum in the midline within its soft tissue pocket (Fig. 2). Several sutures are placed in multiple locations immediately posterior to the medial crura, in the membranous septum, and through the caudal septum. Contrary to the original TIG, the authors do not routinely suture the medial crura directly to the caudal septum. The through-and-through sutures described provide adequate structural support in securing the nasal tip to the newly positioned caudal septum with minimal to no physical overlap between the medial crura and the caudal septum. In cases of excess columellar show, the medial crura can be set back and secured directly to the caudal septum.

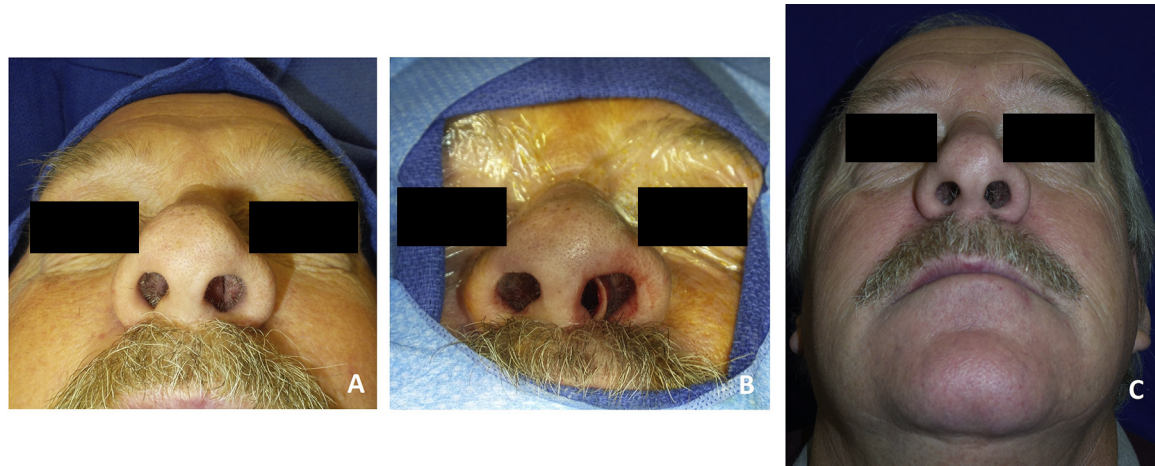


Fig. 3. (A) Basal view demonstrating a severe leftward caudal septum deviation that is contacting the left lateral nasal wall. (B) Once the caudal septum has been exposed and freed from the surrounding mucosa, one can easily see the severe deviation of the caudal septum to the left. (C) View at 1-year postoperative with the caudal septum sitting in the midline position behind the columella.

Once multiple through-and-through sutures have been placed with proper positioning of the caudal septum and the nasal tip, the traction suture is cut flush with the columellar skin.

Similar to the original TIG technique, increased tip rotation or projection can be achieved by varying the position of the medial crura relative to the caudal septum when these through-and-through sutures are being placed. Additionally, any excessive columellar width at the columellar base can be corrected with trans-columellar sutures by binding the medial crural foot-plates together.

Bilateral Doyle splints are covered in topical mupirocin or bacitracin ointment and secured with 3–0 Prolene sutures to prevent synechiae formation. It is important to avoid excessive caudal septum manipulation when the Doyle splints are being secured as it can misplace the caudal septum. The splints are left in place for 7 days.

Results

The modified technique was used in a total of 148 endonasal septoplasty patients by the senior authors (YD $n = 51$, TL $n = 97$) from 2003 through 2015 and from 2013 through 2016. The majority of them underwent concurrent bilateral alar batten graft placement and bilateral inferior turbinate submucosal reduction and outfracture. All of the patients were followed for at least 6 months, with most individuals being followed for a period of at least 1 year. One hundred and forty-six patients (98.6%) reported satisfactory functional improvement in nasal breathing. Of these, two patients required revision surgery

using an open technique due to persistent caudal septal deviation and nasal obstruction, accounting for a 1.4% revision rate (Fig. 3).

Discussion

Caudal septal deviation is a relatively common nasal deformity, occurring in up to 44% of patients presenting for rhinoplasty⁵. Patients with this deformity report more severe complaints of nasal obstruction and olfactory problems compared to control groups, and are likely to benefit significantly from corrective surgery².

The tongue-in-groove technique described by Kridel et al. allows repositioning of the caudal septum to the midline position⁴. Additional modifications to further simplify the technique are provided herein. Kridel et al. recommend using a full transfixion incision and the placement of a suture securing the caudal septal base to the soft tissue or periosteum of the nasal crest in the midline. This maneuver can be difficult to perform precisely when the TIG technique is being applied for endonasal septoplasty, sometimes necessitating multiple attempts.

The technique presented here uses a hemi-transfixion incision to minimize the risk of septal perforation, which can complicate a full-transfixion incision. Furthermore, the modified technique described herein utilizes a traction suture, which holds the caudal septum in the midline position prior to fixation, allowing the surgeon to visualize the cartilage and perform any further necessary refinements prior to fixation. In the authors' experience, this modified TIG technique is

simpler and quicker to perform than the traditional method.

Lastly, in the modified technique above, routine overlap of the medial crura with the caudal septum is not utilized, as opposed to the technique described by Kridel et al.⁴. In the modified TIG this is only employed in cases of excessive caudal septal length or for the correction of excessive columellar show. It is the authors' experience that significant overlap of the caudal septum and the medial crura may lead to deviation of the nasal tip if there is any persistent deviation of the caudal septum, however slight. Furthermore, patients may complain of an unnatural sensation, due to the inability of the nasal tip to move normally when firmly secured to the caudal septum.

The modification described above significantly increases the ease and efficiency of the TIG technique while maintaining the ability to adjust the nasal tip projection and rotation as described in the original TIG technique.

Funding

None.

Competing interests

None.

Ethical approval

Not applicable.

Patient consent

Not required.

References

1. Simon P, Sidle D. Augmenting the nasal airway: beyond septoplasty. *Am J Rhinol Allergy* 2012;**26**:326–31.
2. Liu T, Han D, Wang J, Tan J, Zang H, Wang T, Yunchuan L, Cui S. Effects of septal deviation on the airflow characteristics: using computational fluid dynamics models. *Acta Otolaryngol* 2012;**132**:290–8.
3. Haack J, Papel ID. Caudal septal deviation. *Otolaryngol Clin North Am* 2009;**42**:427–36.
4. Kridel RW, Scott BA, Foda HM. The tongue-in-groove technique in septorhinoplasty. *Arch Facial Plast Surg* 1999;**1**:246–56.
5. Constantine FC, Ahmad J, Geissler P, Rohrich RJ. Simplifying the management of caudal septal deviation in rhinoplasty. *Plast Reconstr Surg* 2014;**134**:379e–88e.

Address:
Yadranko Ducic
Otolaryngology and Facial Plastic Surgery
Associates
923 Pennsylvania Avenue
Suite 100
Fort Worth
TX 76104
USA
E-mail: yducic@sbcglobal.net