Correction of caudal deflections of the nasal septum with a modified Goldman septoplasty technique: How we do it

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Abstract
Correcting deviations of the caudal septum can be challenging because of cartilage memory, the need to provide adequate nasal tip and dorsal septal support, and the long-term effects of healing. The authors describe a minimally invasive, endonasal approach to the correction of caudal septal deviations. The procedure involves a hemitransfixion incision, unilateral flap elevation, and cartilage repositioning by limited dissection and excision.

Introduction
Deviation of the caudal end of the nasal septum can produce varying degrees of functional and cosmetic deficits, depending on its severity. On basal view, caudal displacement off the midline can result in asymmetric nares, distortion of the columella, and widening of the base from either (1) the deviated septal cartilage itself or (2) deflection of the medial crural tip cartilage (figure 1). On lateral view, tip ptosis or an acute nasolabial angle may occur as a result of a lack of nasal tip support from the septum. On frontal view, the tip may be asymmetric as a result of displacement of the lower lateral cartilage dome by the dorsal border of the caudal septal deformity (figure 2). If unrecognized or uncorrected, tip asymmetry or deviation may persist following rhinoplasty despite modification of the lower lateral cartilages.

Other corrective procedures
The earliest attempts to correct caudal septal deflections involved resection of the deformed segment, which resulted in columellar retraction and ptosis of the nasal tip. Recognizing these complications, surgeons subsequently began performing cartilage resection with advancement or reimplantation into the columella and the creation of swinging-door flaps of the caudal septum with transposition to the midline. These procedures were performed through hemitransfixion, full-transfixion, and transcortiaginous (high-transfixion) incisions, with unilateral or bilateral mucoperichondrial flap elevations (table). These different modifications were designed to prevent recurrence of the deviation, which was attributed to several causes—primarily, intrinsic cartilage memory, unequal tension caused by unilateral flap elevation, and tension from the upper lateral cartilages.

By resecting the caudal segment and implanting it separately in a columellar pocket, surgeons have attempted to eliminate the effects of mucosal scar contracture on the membranous septum. The swinging-door method was created to maintain closer apposition between the cartilaginous elements. This approach helped to provide greater stability and support to the external nose.

In the swinging-door method, the deflected caudal segment is detached from the floor and midline septum, left in situ, and then mobilized medially onto the maxillary crest.

Figure 1. A: Photograph demonstrates how caudal deviation to the left has caused crural asymmetry in the form of a medial crural flare (arrow). B: Three months after the modified Goldman septoplasty, significant caudal correction is evident. The flare is absent (arrow) and symmetry is restored.
The basic elements of this procedure can be traced back to Metzenbaum in 1929. Modifications were subsequently designed in which access to the caudal septum was achieved in several ways. For example, Goldman accessed the deformed caudal segment by bilateral retrograde dissection from its free border. In contradistinction, Kamer and Churukian used a high-transfixion incision to divide the cartilage and mucosa on one side, with anterograde dissection subperichondrially into the columella. In both procedures, full-thickness vertical incisions are made posterior to the point of deviation. They are carried from the floor up through the dorsal septum, creating the swinging-door caudal segment. The cartilage is then separated from its inferior attachments along the floor, and triangles of redundant cartilage are resected from either the posterior or anterocaudal edges. The remaining cartilage is then stented to the medial crural feet with septal-columellar mattress sutures.

These techniques are best suited for deformities in which the most caudal segment has a distinct point of deviation and is essentially straight. However, when extreme curvature is present, success can often be achieved by combining a swinging-door flap with other cartilage-reshaping maneuvers.

The swinging-door technique violates the principle of maintaining an intact L strut, but it does not create saddle-nose deformities. Since no cartilage deficiency exists posterior to the free caudal segment, the dorsal profile is maintained. Additionally, as healing occurs, the caudal segment is supported from below by fibrous union to the maxillary crest.

Our modified Goldman technique

The procedure employed by the authors is a modification of the technique described by Goldman. In this modified method, a hemitransfixion incision is made on the side of deviation (figure 3). A unilateral (rather than bilateral) mucosal flap is elevated to the nasal floor by incising the decussating fibers that attach it to the anterior nasal spine and the maxillary crest. It is important to leave the opposite mucosa intact because it helps maintain the vascularity and stability of the segment and facilitates its

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CORRECTION OF CAUDAL DEFLECTIONS OF THE NASAL SEPTUM
WITH A MODIFIED GOLDMAN SEPTOPLASTY TECHNIQUE: HOW WE DO IT

realignment. If no additional septal pathology exists, the extent of dissection can be limited to the caudal segment and adjacent floor.

At the point of deflection, the quadrangular plate is incised full thickness to release it from the remainder of the septum. If deformity of the external nose is present, the incision is carried to the dorsum. Inferiorly, the segment is separated completely from its attachment to the anterior nasal spine and maxilla. Key to repositioning the caudal segment is resection of the redundant inferior portion adjacent to the spine so that it can be freely moved to the midline (figure 4). Any excessive length of the septum is managed by resection of small triangles of cartilage.

Another modification is attachment of the base of the mobilized caudal segment to the spine with a figure-of-eight 5-0 polydioxanone (PDS) or Vicryl suture (figure 5). The figure-of-eight suture is critical for preventing lateral migration and resubluxation of the septum before fibrous union has occurred. The mucosal leaf is returned, and septal-columellar sutures of 3-0 chromic catgut are placed.

If a submucous resection is also required, the surgeon has two options:

- The vertical septal incision can be stopped 5 mm short of the dorsum, maintaining a dorsal attachment to the posterior segment. This may prevent complete long-term dorsal correction in a small percentage of cases.
- Alternately, a strut may be kept behind the free caudal segment, effectively creating a more posteriorly based L. If instability is a concern, a 5-0 polypropylene suture may be placed in a figure-of-eight pattern between the swinging caudal segment and the posterior quadrangular plate.

If the caudal segment itself is severely curved in either an anteroposterior or craniocaudal direction, cartilage reshaping must be performed. Through either partial- or full-thickness vertical scoring incisions, degrees of straightening can be achieved. Additional septal-columellar sutures may be indicated in this case.
Discussion
The key elements of this operation are (1) exposure and detachment of the deflected segment from the maxillary crest by separation of the decussating fibers, (2) full-thickness incision of this cartilage up to the nasal dorsum, and (3) excision of the excess cartilage inferiorly for movement onto the maxillary crest. Other septal abnormalities may be corrected through the exposure provided by a unilateral flap. The absorbable septal-columellar and anterior nasal spine sutures provide stability of the repositioned segment during the initial healing phase.

This procedure has been performed by both authors with predictable straightening of the nasal dorsum and columella with maintenance of tip support, often in conjunction with endonasal rhinoplasty. Because of the low complication rate and excellent functional and aesthetic results, we recommend this procedure as an effective method of correcting many caudal deflections of the nasal septum.

References