

The Tongue-in-Groove Technique in Septorhinoplasty

A 10-Year Experience

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Background: Correction of the lower third of the nose is perhaps the most challenging component of performing a rhinoplasty. The tongue-in-groove (TIG) technique provides a method for correcting excess columellar show and maintaining correction of caudal deviation. It is also indicated for controlling nasal tip rotation and projection while preserving the integrity of the lobular cartilaginous complex and may be combined with either the external or endonasal rhinoplasty. It is typically used in combination with other septorhinoplasty maneuvers. The TIG technique consists of a method by which the medial crura are advanced cephaloposteriorly onto the caudal septum into a surgically created space between them.

Objective: To determine the effectiveness of the TIG technique to aid in correction of columellar show, a deviated caudal septum, and various tip rotation and projection problems.

Setting: Private practices of 2 authors (R.W.H.K., Houston, Tex, and H.M.T.F., Alexandria, Egypt).

Patients: The records of 287 patients who underwent TIG rhinoplasties in one private practice from 1989 through early 1999 (n = 203) and in another practice from 1994 through early 1999 (n = 84) were reviewed.

Main Outcome Measures: Physician judgment of outcome was based on reduction of columellar show, change in tip rotation or projection, narrowing of the columella, and straightening of a deviated caudal septum as indicated in preoperative and postoperative photographs taken of all but 4 of the 287 patients. Patient judgment of outcome was measured by patient requests for revision and patient comments made during follow-up visits.

Results: Of 287 patients, 278 (97%) had satisfactory to excellent results. Only 9 (3%) required revisions related to the TIG technique. Eight of these 9 did not achieve enough reduction of columellar show or adequate rotation or projection. A repeated TIG technique was used in these 8 patients with satisfactory revision results. One of the 9 was overprojected and required revision. Of the 108 patients who had preoperative caudal septal deviation, none needed further surgery.

Conclusions: The TIG technique provides a direct, effective solution to columellar show and is a reliable, reproducible method for achieving predictable tip rotation and projection. Furthermore, when used in conjunction with septoplasty techniques, it helps maintain the correction of a deviated caudal septum.

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SURGICAL AESTHETIC mastery of the lower third of the nose has long been recognized as the most challenging component of performing a rhinoplasty. In response to this challenge, surgeons over the years have tried a variety of techniques to rotate, refine, and project the nose. Most successful surgeons today use a variety of methods to obtain the desired correction. The tongue-in-groove (TIG) technique is designed to be used in combination with other surgical maneuvers. Specifically this technique is useful to obtain nasal tip rotation, to predictably adjust tip position, to correct excess columellar show, and to straighten caudal septal deviation.

Nasal tip rotation is defined as movement of the nasal tip along an arc with con-

stant distance from the facial plane.¹ Nasal tip projection is the height or length from the alar crease to the nasal tip as seen on the profile view, or the posterior-to-anterior distance that the nasal tip extends in front of the facial plane as seen on base view.² Rotation has typically been achieved through a variety of cartilage-modifying maneuvers based on incising or

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excising cartilaginous structures.³⁻⁵ Often these techniques rely on unpredictable healing and scar contraction of soft tissue to obtain the desired degree of rotation. In addition, techniques that disrupt the integrity of the nasal tip cartilage

METHODS AND TECHNIQUES

To determine the appropriateness of the TIG technique, the nose is analyzed for projection, acuity of the nasolabial angle, degree of columellar show, and amount of deviation of the columella and caudal septum. A full transfixion incision is created and the mucoperichondrium is elevated from the septum bilaterally in a posterior direction for at least 4 mm to expose both sides of the caudal end of the cartilaginous septum (**Figure 2**). If septal deviations are present, the elevation of the mucoperichondrial flap is continued back to the bony cartilaginous junction on one or both sides. The deviated portion of the cartilaginous septum is then incised with the Cottle elevator, and the contralateral mucoperichondrial flap is elevated in the area overlying the section of cartilage to be removed. Efforts are made to preserve at least a 1-cm strut of dorsal and caudal cartilaginous septum to maintain nasal support. Any bony septal deviations are removed with the Becker scissors and polyp forceps. Nasal crest deviations are removed using the curved chisel and mallet after the laterally overlying mucosa has been elevated. A portion of the removed cartilage is crushed, replaced between the mucoperichondrial flaps, and secured in this position with a series of 4-0 chromic mattress sutures.

Caudal septal deviations often require partial separation of the posterior junction of the cartilaginous septum and the bony vomer; or a minimal resection of cartilage along the nasal floor at the maxillary crest to allow the septum to swing back to a midline position (**Figure 3**). To complete this horizontal "swinging door" maneuver (not to be confused with Metzenbaum's¹⁰ vertical swinging door maneuver), a suture is usually placed between the straightened caudal septum and the soft tissue or the periosteum overlying the nasal spine (**Figure 4**).

At the completion of any required septoplasty techniques, retrograde dissection is performed between the medial crura using fine forceps and tenotomy scissors to create a pocket (**Figure 5** and **Figure 6**). The medial crura are then advanced cephaloposteriorly, placing the denuded caudal septum into the potential space created between them. If there was excessive width to the columella preoperatively, soft tissue from the dissected pocket may be removed to help in the narrowing. The results of the initial trial placement will determine if any caudal septal cartilage excision is necessary (**Figure 7**). Because of the space created between the medial crura, caudal-septum trimming is not usually indicated. Once any required cartilage trimming is completed, the caudal septum is again placed into the groove between the medial crura, and the nose is examined while the columella is gently held in place (**Figure 8**). Once the precise desired relationship of the medial crura to the septum is obtained, these structures are fixed with a series of sutures between the medial crura and the caudal septum (**Figure 9**). Typically 3 or 4 chromic sutures are placed in a through-and-through fashion using a straight needle. Alternatively, permanent (Prolene polypropylene; Ethicon Inc, Somerville, NJ) or semipermanent (PDS polydioxanone; Ethicon Inc) sutures may be placed in a buried fashion prior to membranous closure. An external approach with dissection between the caudal aspect of the medial crura offers more complete exposure to facilitate buried suture placement (**Figure 10**).

Bilateral membranous septum excision is almost always necessary to remove excess tissue resulting from the TIG placement. Each side of the nose should be evaluated separately to determine the amount of mucous membrane excision needed, since there may be greater excess on one side, particularly after correction of a deviated caudal septum. The membrane excision should take place posterior to the transfixion incision so that only the mucous membrane is excised and not the vestibular columellar skin, thereby reducing the risk of vestibular exposure of mucous membrane, which causes a persistently weeping nose (**Figure 11** and **Figure 12**). If a hemitransfixion incision is initially used, excess contralateral membranous septum can be trimmed with a simple fusiform excision. The incision in the membranous septum is closed with a series of interrupted absorbable sutures (**Figure 13**). This mucosal excision and the resultant healing provide extra support to the cephaloposterior advancement.

The created groove may vary in depth along the length of the medial crura. To allow a greater degree of upward nasal tip rotation, the depth of the medial crural pocket and the amount of denuded corresponding caudal septum should be greatest at the dorsal or anterior aspect. On the other hand, to inferiorly rotate the nasal tip or to correct excess columellar show in the posterior region, the deepest portion of the pocket and greatest corresponding advancement should be placed posteriorly. The caudal septum may be variably trimmed when necessary, depending on the correction required. Furthermore, once the caudal septum is placed into the groove, the medial crura may be advanced anteriorly toward the dome cartilages and fixed with sutures in this position to increase and help maintain nasal tip projection (**Figure 14**).

The TIG technique may be used in combination with other rhinoplasty techniques performed through either an external or endonasal approach to the nose. In the subset of 203 patients, 8 also required a lateral crural steal technique⁷ to increase projection and rotation; 14 also underwent a simultaneous lateral crural overlay technique⁶ for increased rotation, and 7 also had alar base reduction excisions to reduce flare and/or decrease sill width (**Table 1**). Placement of the septocolumellar sutures and closure of the transfixion incision may be delayed until after other tip techniques are performed. When caudal deviation is caused by asymmetry of the medial crura, an open approach is typically used to correct the asymmetry before final TIG positioning and placement of the septal columellar sutures. In cases of caudal septal deviation, the deviation should be corrected by freeing up the caudal attachments of the septum at the crest and spine. Once the septum has been straightened, placement of the caudal aspect between the medial crura adds further support to help maintain the septum in the straightened position.

At the conclusion of the procedure, a light, nonadherent, sterile thin pad (Telfa; Kendall Company, Mansfield, Mass) pack may be placed into each side of the nose; the nose is taped, and an external splint is positioned over the dorsum. After the packing is removed on postoperative day 1, the patient begins applying antibiotic ointment with cotton-tipped applicators twice a day to the area of the transfixion incision and into the nose. The external splint is removed after 5 to 7 days, and the nose is retaped for about 5 days to help support the nasal tip in the desired position while new fibrous attachments develop.

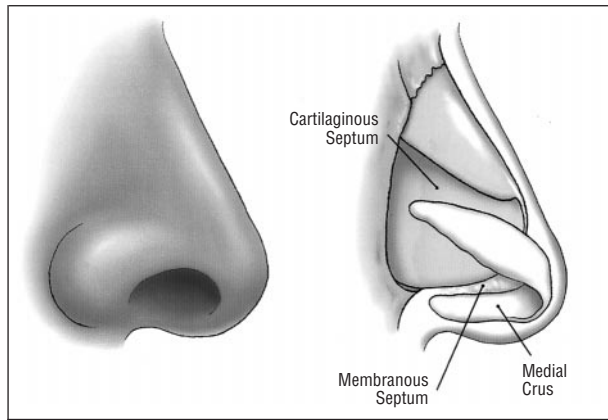


Figure 1. A hanging columella resulting from excessive membranous septum, an overly long caudal septum, or prominent, downwardly curved medial crura.

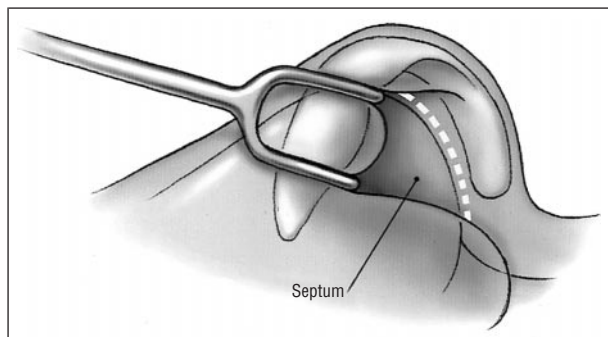


Figure 2. A full transfixion incision is made at the caudal border of the cartilaginous septum and the mucoperichondrium is elevated bilaterally to expose several millimeters of cartilaginous caudal septum.

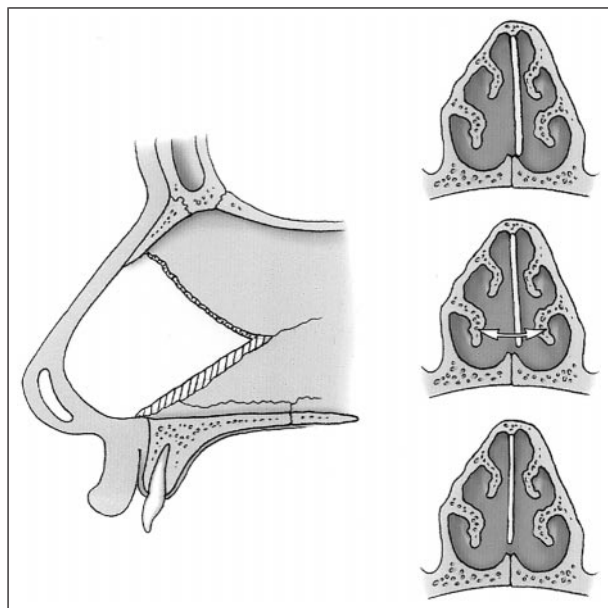


Figure 3. Caudal septal deflections often require partial separation or excision at the posterior junction of the cartilaginous and bony septum and a horizontal cartilage resection at the floor at the maxillary crest to allow the septum to swing back into the midline.

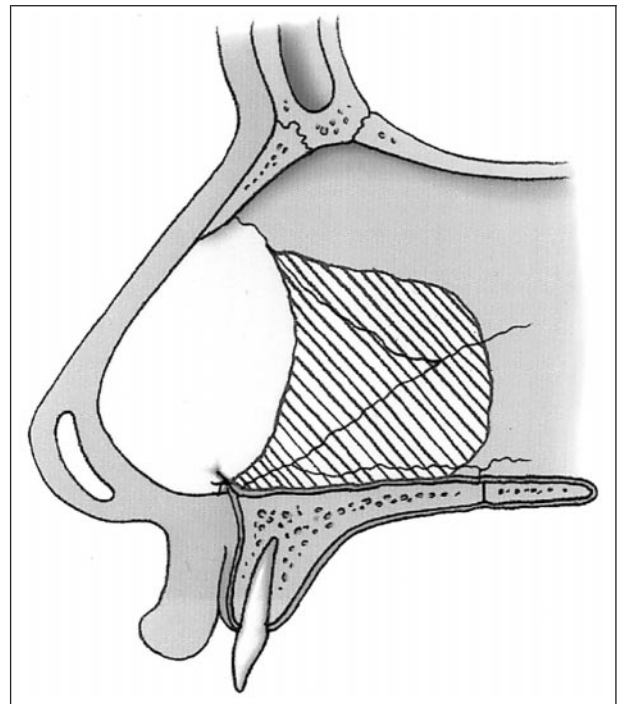


Figure 4. To complete the horizontal swinging-door maneuver, additional septal cartilage and bone are removed if crooked, and the straightened caudal end of the septum is sewn to the soft tissue or periosteum overlying the nasal spine.

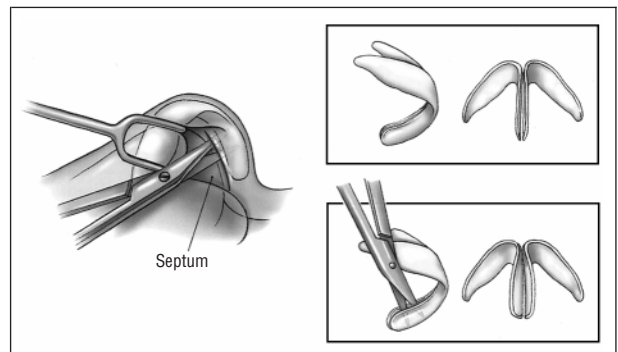


Figure 5. The transfixion incision and retrograde dissection between the medial crura. Inset, Diagrammatic display of the groove created between the medial crura.

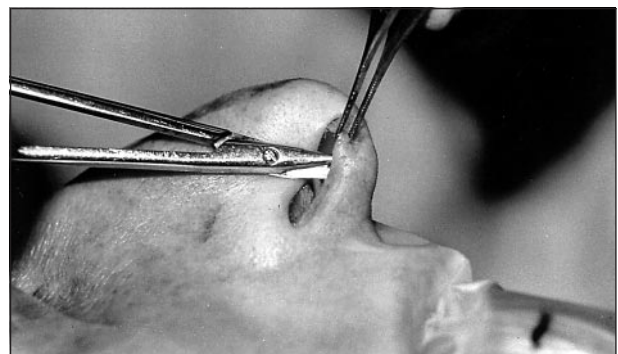


Figure 6. The dissection technique diagrammed in Figure 5 is demonstrated on a patient.

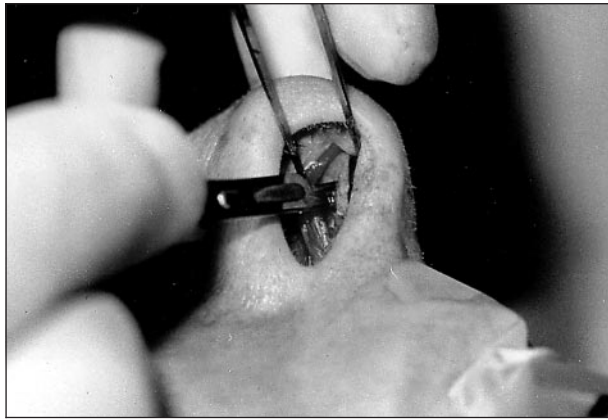


Figure 7. Caudal septal cartilage resection can be performed in addition to the tongue-in-groove technique in cases of overly long and downwardly projecting caudal septa.

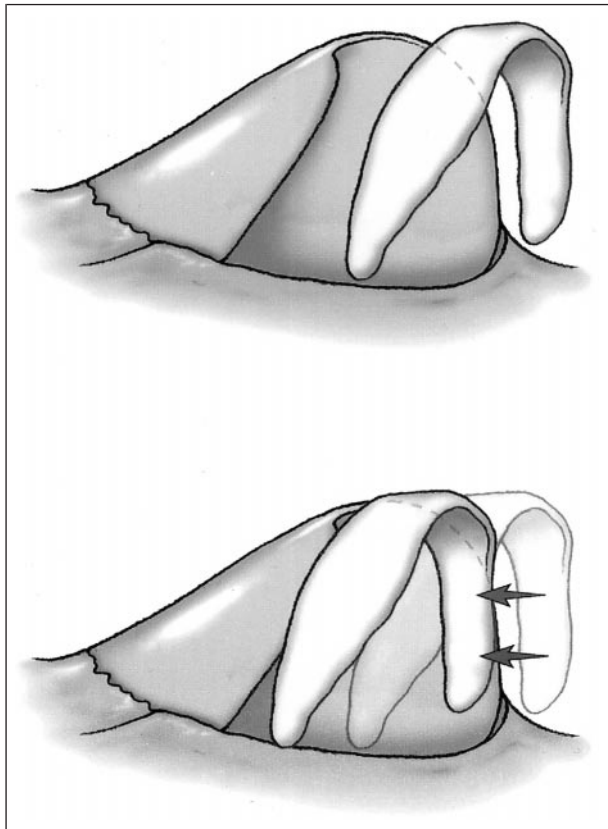


Figure 8. After the creation of the medial crural pocket, the medial crura are advanced onto the denuded caudal septum. A hanging columella is reduced by this method.

may result in long-term complications, including alar collapse, alar notching, tip bossae and asymmetry, and loss of nasal tip support. Techniques that reposition the dome cartilages with sutures and achieve rotation and projection through an alteration of tip anatomy have also been described.^{6,7} The TIG technique is a conservation technique that avoids cartilage excisions and adds support to the nasal tip. The technique can provide a predictable and adjustable degree of rotation and can increase or decrease projection while at the same time reducing the amount of columellar show.

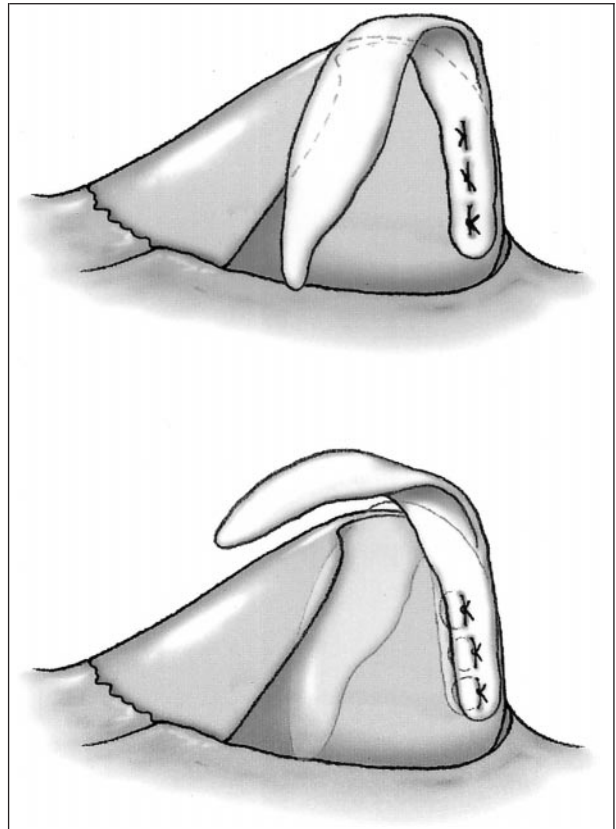


Figure 9. Once the precise desired relationship between the medial crura and the septum is obtained, suture fixation is carried out.

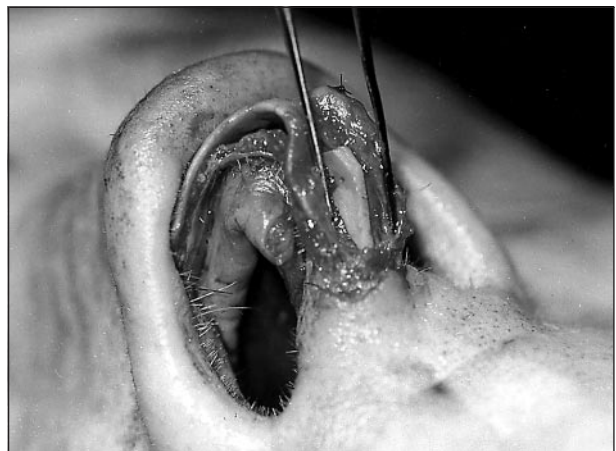


Figure 10. With the external approach, visualization of the position of the septum between the medial crura is readily appreciated. Buried suture fixation is facilitated, and the vestibular skin lining the cephalic portion of the medial crura is separated during this external rhinoplasty maneuver and not as a routine component of the tongue-in-groove technique.

Aesthetically, maximum columellar show should not exceed 4 mm, which is the width of the typical medial crus.⁸ Excess columellar show or a hanging columella may be caused by prominent medial crura, excessive membranous septal flaps, or a projecting caudal cartilaginous septum (**Figure 1**). A hanging columella needs to be distinguished from alar notching or retraction, which is often an unwanted outcome of a previous rhinoplasty in which overly aggressive resection of the lower lateral

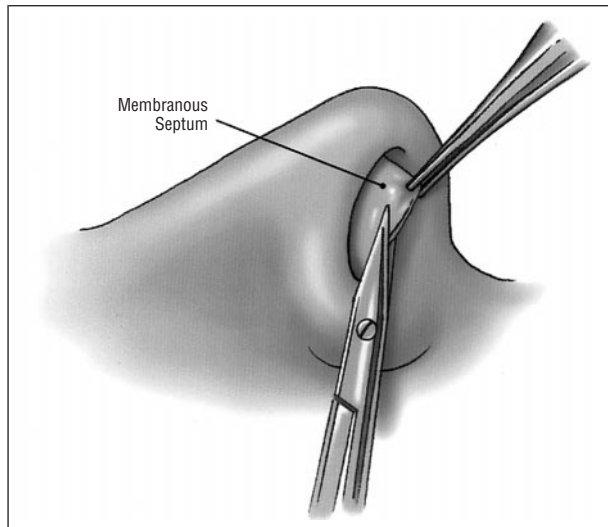


Figure 11. The excess membranous septum is trimmed bilaterally after advancing the membrane anteriorly. One must always excise the excess mucous membrane and not the more anterior vestibular columellar skin to avoid a postoperative wet nasal tip.

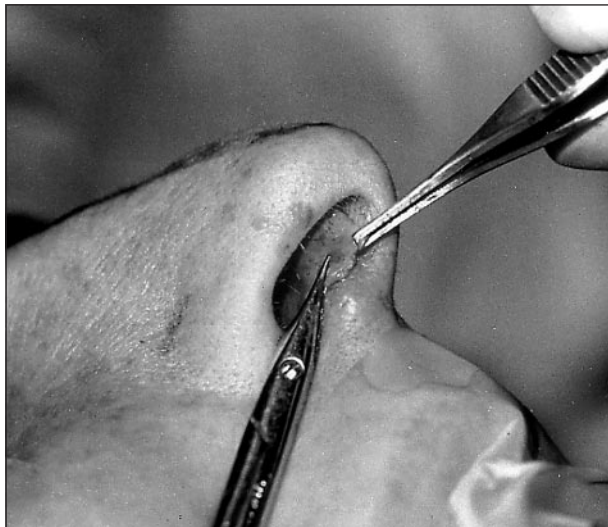


Figure 12. The procedure illustrated in Figure 11 is shown here performed on a patient.

cartilages has taken place. This sometimes-subtle deformity, if left uncorrected, can diminish an otherwise pleasing cosmetic result. Correction by other techniques often requires trimming the caudal end of the cartilaginous septum, which, if overdone, can either foreshorten the nose or, paradoxically, lead to tip drop due to a decrease in medial crura attachments.⁹ Alternatively, use of the TIG technique can reduce a hanging columella with little or no excision of the caudal septum.

Deviation of the caudal aspect of the nose may be related to a deviated caudal septum or asymmetries of the medial crura such as buckling. Correction of deviations in this area can be complex to achieve and difficult to maintain. The TIG technique, when used in combination with septoplasty and/or columellar techniques, will aid in the maintenance of long-term correction of caudal septal deviation.

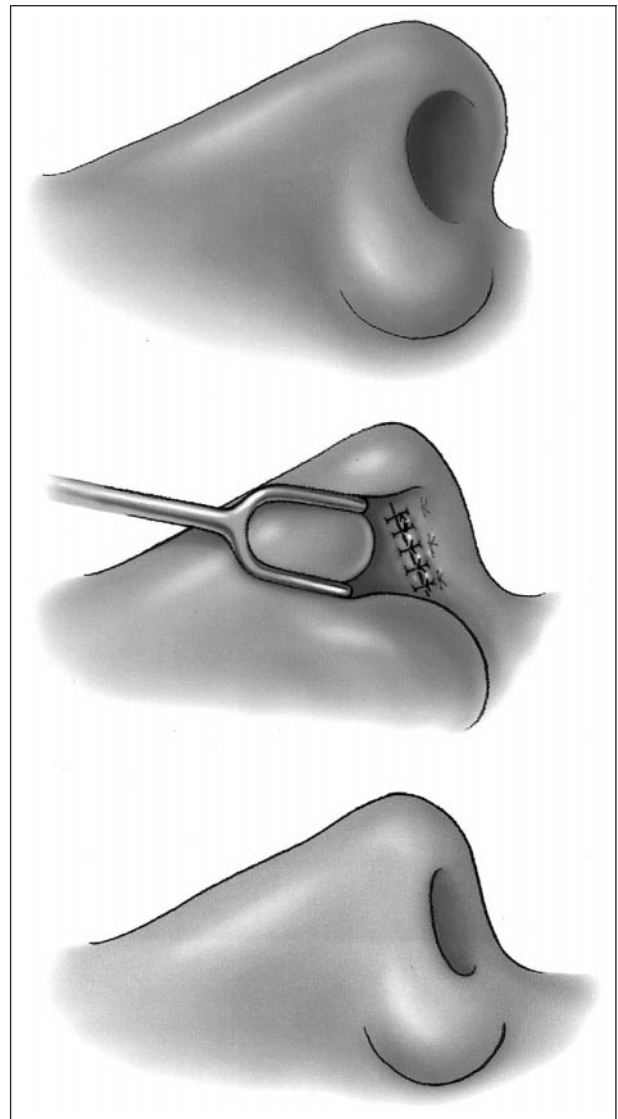


Figure 13. The transfixion incision is closed with interrupted absorbable suture.

RESULTS

The TIG technique was used in 287 patients (R.W.H.K., 203; H.M.T.F., 84). The female-male ratio was 2:1. Of the 287 patients, 159 (55.4%) had excessive columellar show, 83 (28.9%) had a droopy tip, 108 (37.6%) showed caudal septal deviation, and 27 (9.4%) had a wide columella. Forty-two (14.6%) had previously undergone rhinoplasty by other surgeons. In most cases, correction of columellar show was achieved with the TIG technique alone. Of the 159 patients with excessive columellar show, 64 (40.3%) required trimming of the caudal septum in addition to the TIG technique to correct the deformity. Data are available for the subset of the 203 patients for whom additional rhinoplasty techniques were performed in conjunction with the TIG technique. Of these 203 patients, the lateral crural overlay technique was used in 14 (6.9%), the lateral crural steal technique in 8 (3.9%), alar wedge excision in 7 (3.4%), and septal perforation repair in 7 (3.4%) (Table 1 and **Table 2**).

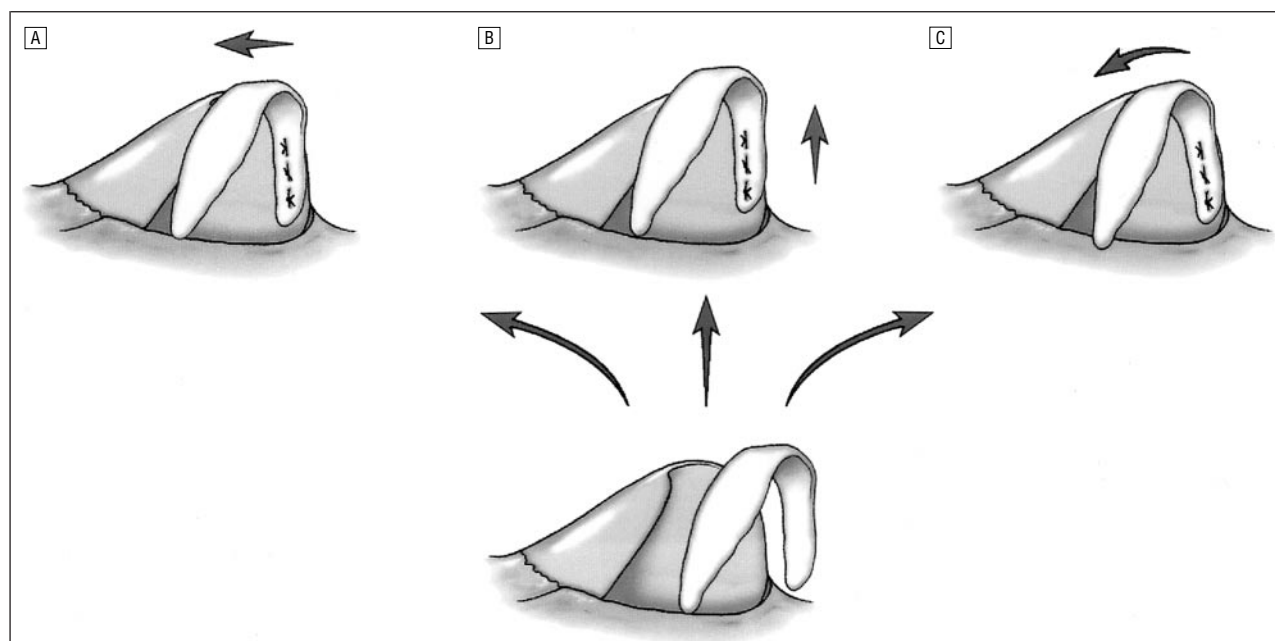


Figure 14. A, To correct a hanging columella, the medial crura are evenly advanced cephalically onto the denuded septal cartilage. B, To increase projection, the medial crura are advanced anteriorly before being sutured. C, To increase rotation, the medial crura are advanced cephalically with the more anterior portion angled further near the septal angle.

Table 1. Other Procedures Performed in Conjunction With the Tongue-in-Groove Technique*

Procedure	No. of Patients (n = 203)
Septal perforation repair	7
Lateral crural steal technique (to increase projection and rotation)	8
Lateral crural overlay technique (to increase rotation and possibly retrodisplace the tip)	14
Alar wedge excisions	7

*All patients are from the practice of one of the authors (R.W.H.K.).

Satisfactory to excellent results were reported in 278 (97%) of the patients. Only 9 (3%) of the cases required revision related to the TIG technique. Eight of these 9 required revision to further correct columellar show or to increase tip rotation or projection, and 1 required revision for overprojection. The TIG technique was repeated in these patients with satisfactory results in all cases. Revision surgery was not required for any of the 108 patients with caudal septal deviation.

CASE DESCRIPTIONS

CASE 1

This case illustrates the application of the TIG technique in a droopy nose with columellar show. Preoperatively, this 26-year-old woman (shown in **Figure 15**) had a droopy nose with an acute nasolabial angle and excess columellar show. The TIG technique achieved nasal tip rotation and reduction of the columellar show. The desired correction was obtained without excision of any cartilaginous septum. Approximately 2 mm of membranous septum was excised bilaterally. The TIG technique

Table 2. Indications for Tongue-in-Groove Surgery for 287 Cases of Correction of the Lower Third of the Nose

Indications and Requirements	No. of Patients* (n = 287)
Excessive columellar show	109 + 50 (159)
Subgroup also requiring trimming of caudal septum	46 + 18 (64)
Droopy tip	63 + 20 (83)
Caudal septal deviation	94 + 14 (108)
Wide columella	27 + 0 (27)
Patients who had rhinoplasties elsewhere	42 + 0 (42)
Female-male	2:1

*Data are number of patients from the practice of one of the authors (R.W.H.K.) + number of patients from the practice of another of the authors (H.M.T.F.) (total).

was used in combination with a conservative cephalic trim of the lower lateral cartilages, removal of a dorsal hump, and osteotomies. The patient maintained a stable degree of nasal tip rotation and a desirable amount of columellar show 3 years postoperatively.

CASE 2

This case illustrates the use of the TIG technique to help maintain the straightening of a deviated caudal septum in conjunction with a cosmetic rhinoplasty, which also required a lateral crural overlay technique and spreader grafts. This 41-year-old man presented with nasal airway obstruction as well as a desire to improve his appearance (**Figure 16**). The patient had a severely deviated caudal septum that deformed the medial crus resulting in near total airway obstruction on the right side. He underwent a swinging-door septoplasty via a full transfixion incision. A TIG technique was used with retrograde dissection between the medial crura, and the straightened caudal end of the septum was placed

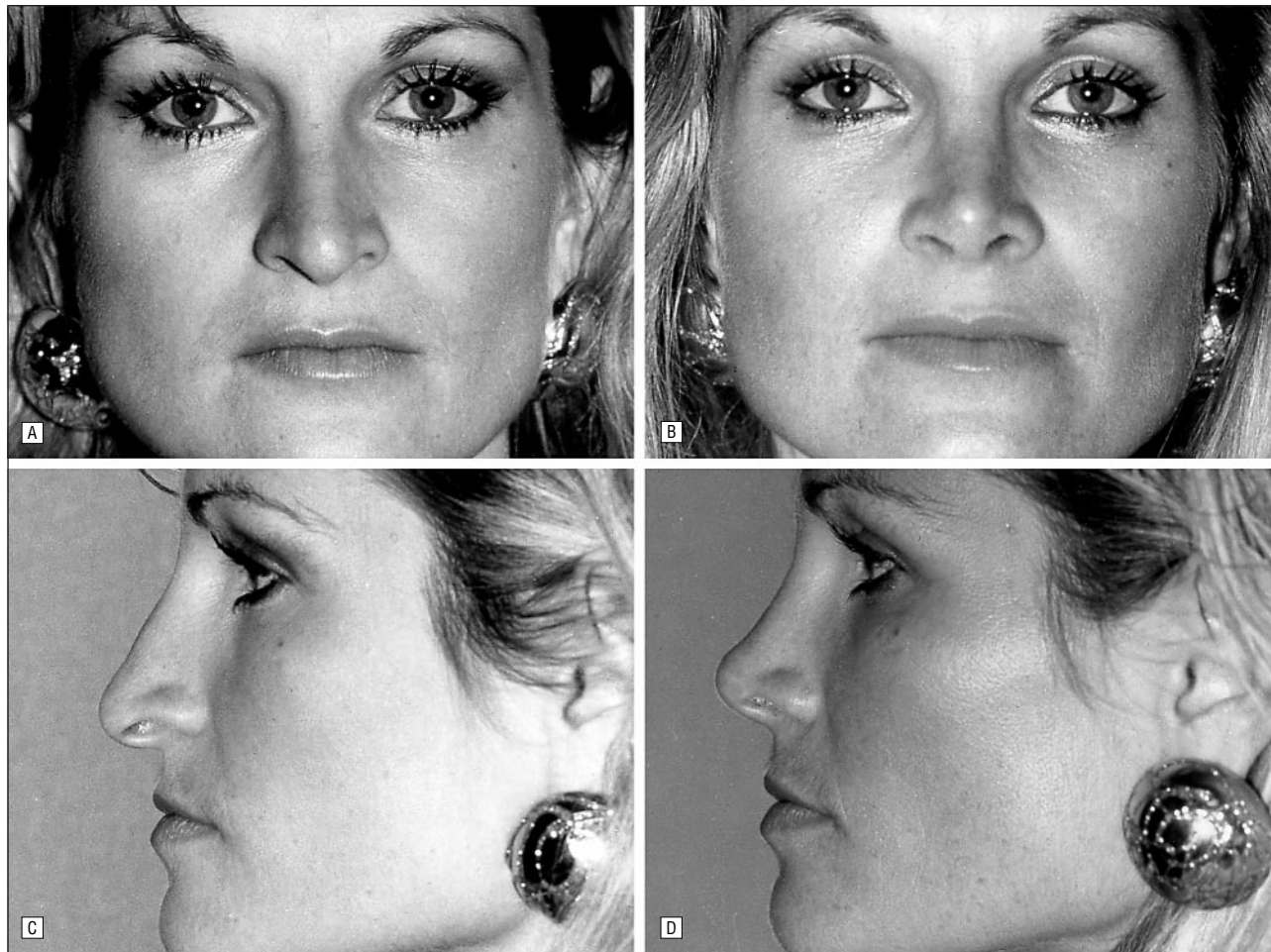


Figure 15. Case 1. A and C, The preoperative appearance of the patient with a droopy nasal tip and hanging columella. B and D, The postoperative appearance of the patient 9 months after surgery.

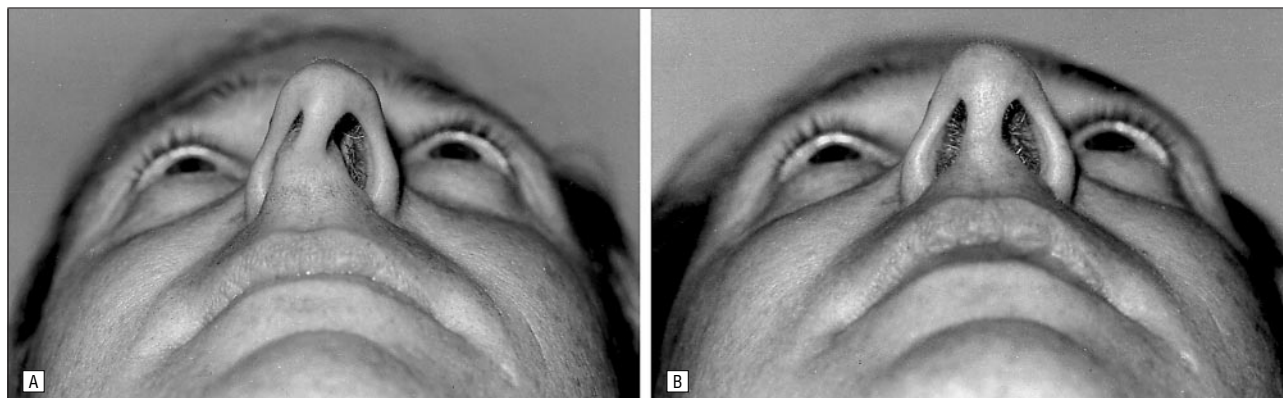


Figure 16. Case 2. A, The preoperative base view of the patient. B, The 1 1/2-year postoperative appearance of the patient's nasal base. See Figure 10 for intraoperative placement of this patient's caudal septum in the groove between the medial crura using the tongue-in-groove technique and visualized through the external approach.

between the medial crura. Preoperatively, he had a wide columella, particularly at the base. A large amount of soft tissue was excised from the area between the medial crura during the retrograde dissection. These maneuvers resulted in a straightened and thinned columella, improving both the nasal airway and the appearance of the nasal base. The patient's nose was also narrowed through the middle third, with airway obstruction necessitating bilateral spreader grafts. A lat-

eral crural overlay technique⁶ was also used to rotate and deproject the tip. At 5-year follow-up, the patient maintained a good nasal airway and a pleasing appearance of the nose.

CASE 3

This case illustrates the TIG technique used solely for correction of a hanging columella without altering the tip pro-

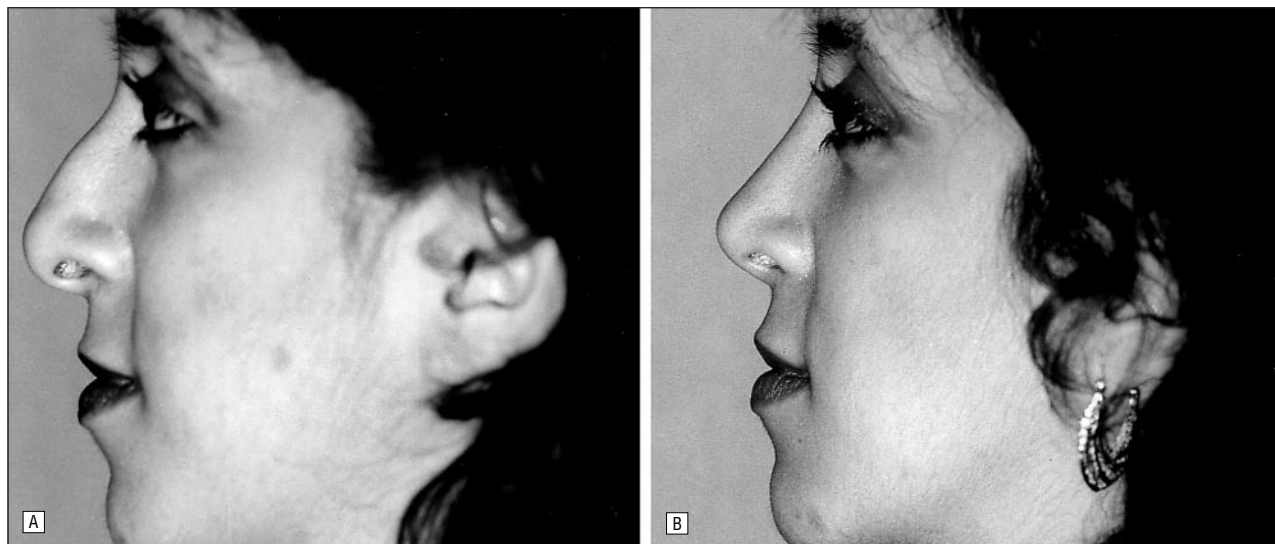


Figure 17. Case 3. Preoperative (A) and early postoperative (B) (6 weeks after surgery) views. Note that the excess columellar show has been corrected with establishment of a double break and with minimal rotation of the nasal tip.

jection or rotation. This 28-year-old woman presented with a unilateral nasal airway obstruction and a desire to improve the appearance of her nose, mainly to lower the dorsal hump to a straight line and to correct the hanging columella (**Figure 17**). The patient did not want a turned-up nose. Results of examination showed the nasal septum to be internally markedly deviated to the left side with near total obstruction on that side. The patient had excess columellar show and a convex nasal dorsum. An additional finding was a hypermobile tip, which boxed down on smiling. A septoplasty was performed via a full transfixion incision and combined with an external-approach rhinoplasty. The TIG technique was used mainly to obtain the desired degree of correction of the excessive columellar show. The groove between the medial crura was created with a constant depth anteriorly to posteriorly to allow the movement of the columella cephalically without changing much of the nasal tip rotation. Following that, excision of 3 mm of the redundant membranous septum was performed on each side. Additional maneuvers included a conservative trim of the cephalic margins of the lower lateral cartilages, suturing the anatomic domes together, excision of the dorsal hump, and narrowing of the nasal dorsum by osteotomies.

CASE 4

This case illustrates the use of the TIG technique to rotate a droopy tip and retrodisplace an overly projecting nasal tip and simultaneously reduce a small amount of columellar show (**Figure 18**). This 27-year-old woman presented for cosmetic correction of a large, droopy, overly projecting nose. She also had paranasal sinus disease with polyps that were addressed at the same surgery by another physician. At surgery, the caudal cartilaginous septum was trimmed, a medial crural pocket was developed, and the medial crura were sutured to the caudal end of the septum with permanent sutures after the medial crura were positioned on the septum so as to rotate and deproject the tip simultaneously. The excess mem-

branous septum was excised, the dorsum reduced, and osteotomies were performed.

CASE 5

This case illustrates the use of the TIG technique to narrow a wide columella and simultaneously help maintain the correction of a caudally deflected nasal septum (**Figure 19**). This 29-year-old man presented with nasal airway obstruction, a crooked nose, a caudally deflected nasal septum, and such a wide columella that his nostrils were narrow slits. At surgery, a medial crural pocket was developed and the intervening soft tissue resected. A horizontal swinging-door septoplasty was used to place the caudal septum back into the midline and between the medial crura, which were sewn to the caudal septum with septo-columellar sutures. No caudal cartilaginous septum was removed. A 3-mm section of membranous septum was excised on the left where this membrane had been stretched by the septal deflection, and 2 mm removed on the right side. By 7 years after surgery, the patient maintained correction of the septal deflection as well as satisfactory long-term narrowing of the columella.

COMMENT

The TIG technique, like most nasal techniques today, is a revisitation and modification of techniques described years ago. Motivated by a desire to prevent the tip drop that frequently resulted after rhinoplasty, Rethi¹¹ described “embracing flaps” in 1934. In his technique, he elevated the septal membranes, particularly in the area of the anterior septal angle as well as along the caudal aspect of the septum. He described placing the exposed septum between the medial crura and securing it in this position with transfixion sutures. Gustav Fred¹² described the “invaginating technique,” used to maintain nasal tip projection. Through a transfixion incision, the caudal septum was denuded and placed in a shallow groove created in the middle of the columellar tissue. He emphasized that this groove should never

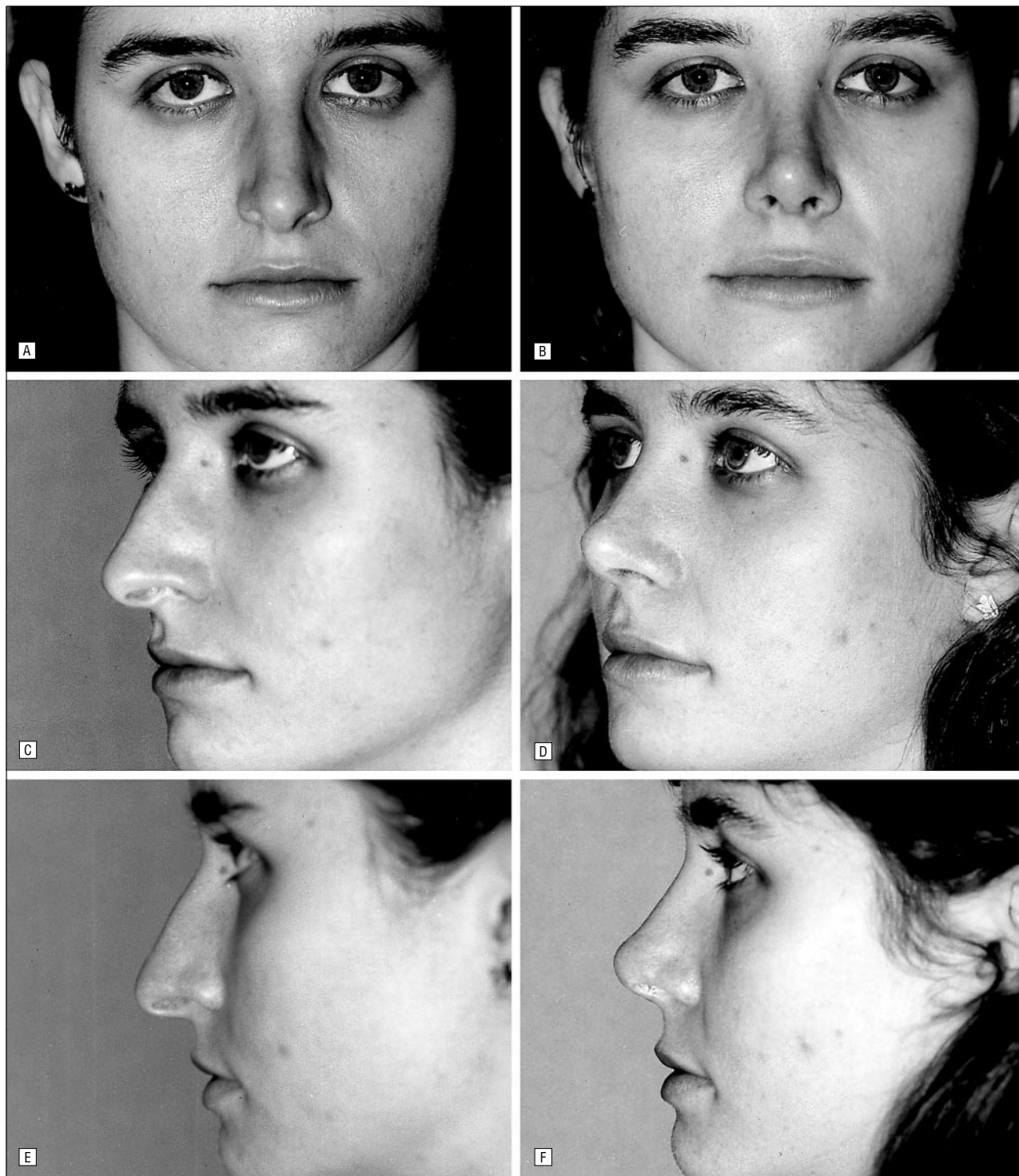


Figure 18. Case 4. The tongue-in-groove technique alone was used to rotate and deproject (retrodisplace the tip) the nose. Some trimming of the caudal septum was needed. A, C, and E are preoperative and B, D, and F, postoperative views.

be extended to the level of or between the medial crura. Jacques Joseph¹³ described the technique of changing the position of the nasal tip projection by advancing the medial crura and then placing septocolumellar sutures to maintain the new position.

Years ago, Brown and McDowell¹⁴ criticized the surgical implantation of the septal cartilage between the medial crura as being anatomically incorrect and creating

an unsightly, thick columella. The techniques of Rethi¹¹ and Fred¹² were also criticized for eliminating the flexible “buffer” that the membranous septum provides and for causing dysfunction of the depressor septi nasi muscle.^{15,16} It was a widely held opinion that partial or complete removal of the membranous septum would result in great discomfort to the patient and a displeasing appearance, particularly with changes of expression.

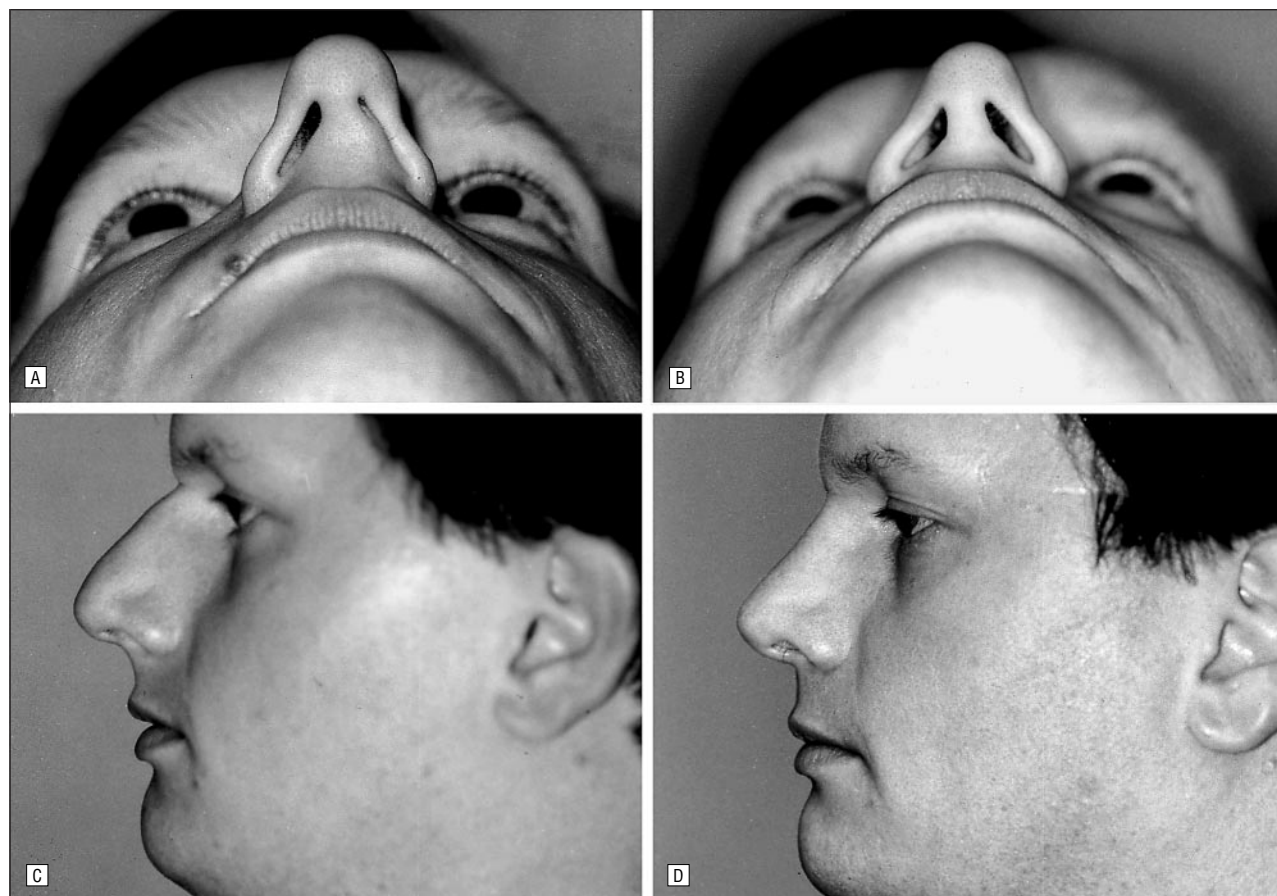


Figure 19. Case 5. The tongue-in-groove technique was used to help maintain the correction of a deviated caudal septum in the midline and to narrow a wide columella. Note the slitlike nostrils (A) and the improvement apparent in the 7-year postoperative photo (B). The profile (C) shows a slightly retracted lower columella, which was improved by sewing the feet of the medial crura more inferiorly on the straightened caudal septum (D).

Anatomically, the medial crura are loosely connected by fibrous tissue to each other and to the caudal septum. The membranous septum consists of 2 layers of loose areolar tissue transversed by the depressor septi nasi muscle. It provides a soft tissue interface between the rigid cartilaginous septum and the semirigid columella. Most septoplasty and rhinoplasty techniques include division of this muscle without reports of deleterious effects. In fact, in cases of a downwardly mobile and droopy tip, loss of this depressor function is desirable.

Many current rhinoplasty techniques rely on placement of cartilaginous grafts between the medial crura.⁷ Clinical experience does not support the criticism that placement of columellar struts results in a wide or displeasing appearance to the columella. Additionally, excision of any excess soft tissue from the area between the medial crura prior to placement of the relatively thin caudal septum into this area, combined with medial crural suture approximation, may result in reduction in the width of an abnormally thick columella (Figure 18, A-D).

Clinical experience with the technique over the past 10 years has not shown that the loss of flexibility of the membranous septum is a concern for our patients. It can be argued that the rigidity resulting in the columella is similar to that resulting from placement of plumping grafts and columellar struts, both of which techniques are widely used. With the TIG technique, our patients have not com-

plained of a bothersome sensation even with facial animation and expression. In our experience, patients in whom columellar struts and plumping grafts have been placed are more likely to report an abnormal "rigid sensation" in the upper lip. An anatomic description by Converse¹⁷ in 1955 documented that the lower end of the medial crura "embraced" the caudal septal cartilage. Bernstein⁸ confirmed this anatomic relationship 20 years later. Thus, even in normal anatomy the columellar structures and cartilaginous septum are not totally separate structures. Clinically, the degree of connection between the medial crura and the septum varies widely. Furthermore, the loss of this flexible interface can help prevent the tip drop that commonly occurs after nasal surgery. Creation of a transfixion incision, often used in standard rhinoplasty techniques, disrupts fibrous connections between the medial crura and cartilaginous septum. The TIG technique restores strength to this area by using sutures and bringing the cartilaginous structures together.

The TIG technique preserves the integrity of the cartilaginous structures and maintains projection of the nasal tip. Most tip-rotation techniques involve incising or excising the cartilaginous framework. The TIG technique provides a more controlled rotation than maneuvers that rely on unpredictable healing and contracture to obtain rotation. The surgeon can place the caudal sep-

tum into the groove between the medial crura and intraoperatively visualize the effect on the nasal appearance. Because the technique does not rely upon any cicatricial effect, the intraoperative appearance closely approximates the expected long-term result. Similarly, this technique provides a predictable and immediately visible method of correcting excess columellar show. Postoperative nasal tip drop should not occur because the technique actually increases nasal tip support.

Columellar show has been defined as the distance on lateral view between the highest point of the alar rim and the caudal aspect of the columella. Optimally, this distance should be between 2 and 4 mm.¹⁸ Extreme excess columellar show has been referred to as a hanging columella. Failure to address this sometimes-subtle deformity will substantially detract from the aesthetic balance of an otherwise successful rhinoplasty. Correction of excess columellar show is typically attempted by excising a portion of the caudal septal cartilage. More aggressive techniques directed at trimming or even completely excising the medial crura have been recommended.^{11,19} These techniques, which weaken the columellar structures, may result in undesired foreshortening of the nose, loss of nasal tip support, columellar retraction, or distortion. The TIG technique allows correction of excess columellar show while preserving the medial crus and minimizing caudal septal excision. Adamson et al²⁰ have noted that a key to successful correction of the hanging columella is maintaining support of the medial crura. Not only does the TIG technique avoid weakening the columellar structures, it actually strengthens columellar support.

Nasal surgical techniques to correct caudal septal deviation are limited by the need to maintain septal support of the nasal tip. Techniques that rely on excision or morselization of deviated septal cartilage, if applied to the caudal septum, may result in nasal tip drop. Additionally, because of the proximity to the vestibule, even minor residual deviations may be visible to the patient and physician. Long-term satisfactory correction of the deviated caudal septum is thus particularly challenging. The TIG technique, by allowing positioning of the newly straightened caudal septum between the medial crura, helps maintain this correction. This maneuver should help strengthen nasal tip support and thus may allow application of more aggressive techniques to "remove the memory" of the caudal cartilage.

In summary, the TIG technique reduces excess columellar show, provides adjustable controlled nasal tip rotation and projection, and helps maintain the correction of caudal deviation. The technique is typically used in combination with other septorhinoplasty maneuvers to achieve

the desired functional and cosmetic result. It is particularly useful in a patient who has the combined indications of excess columellar show and an acute nasolabial angle. The maneuvers described in this article may provide a particularly gratifying solution to the challenging deformities of extreme excess columellar show (hanging columella) or a greatly deviated caudal septum.

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