Anatomical Considerations in the Management of the Hanging Columella

Eric M. Joseph, MD; Alvin I. Glasgold, MD

Objectives: To review the anatomy and dynamics of the hanging columella and to describe a technique to correct the causative anatomical deformity.

Design: Case series.

Setting: A facial plastic surgery private practice in Highland Park, NJ.

Patients: Consecutive sample of 10 patients (6 women and 4 men), aged from 27 to 52 years (mean age, 32 years).

Interventions: Through an external approach, the principal method of repair used in all cases involved transecting the medial and lateral crura at their angles to allow straightening of the medial crura.

Main Outcome Measures: Comparative, standardized measurements of the alar-columellar complex in preoperative and postoperative photographs.

Results: Angle transection changed the spatial relation of the medial and lateral crura to each other resulting in straightening of the excessively curved medial crura. All patients had successful correction of the hanging columella.

Conclusions: In our prospective study of 10 patients who required correction of hanging columellas, we have found the primary cause to be C-shaped curvature of the medial crura and their relation to the lateral crura. We observed long medial crura that were excessively curved, of normal width, and held in place by their continuity with the lateral crura. Dividing the alar cartilages at the angle of the medial and lateral crura released the connection of these structures allowing the medial crura to assume a straighter configuration. Tailoring of the feet of the medial crura and minimal septal shortening were occasionally used. Columellar struts, which were often used for other reasons, also provided additional medial crural straightening.

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The alar-columellar relation was assessed using the model proposed by Gunter et al.1 When viewing the nasal base in profile, the long axis of the nostril is used as a line of reference (Figure 1). The high point of the alar rim and the most inferior aspect of the columella should each be less than 2 mm from the reference line. A hanging columella exists when the most inferior aspect of the nostril is greater than 2 mm from the reference line. Similarly, a retracted ala is when the high point of the alar rim is more than 2 mm from the reference line. Excessive visibility of membranous septum or “columella show” results when there is more than 4 mm between the alar margin and columella at their greatest distance.

Analysis and correction of the deformity has been previously described.2-7 Traditionally, the origin of the hanging columella has been thought to be due to an increased width of the medial crura, to an excessive caudal descent of the medial crura, or to a very prominent caudal end of the septum. The surgical techniques for correction have been classified as either indirect or direct depending on their focus. The indirect repairs referred to trimming of the caudal septum or the adjacent cephalic edges of the medial crura, or elliptical excision of the membranous septum. The direct repairs required excision of a composite piece of skin and cartilage from the caudal margin of the medial crura.

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When intermediate crura are noted to be vertically oriented, Gunter et al1 suggested resection of a portion of intermediate crura with reapproximation. Adamson et al8 stated a broad vestibular vault, ptosis of the medial crura, and inappropriate placement of a columellar strut were additional causes to consider.

We propose that the primary anomaly seen in the hanging columella are long C-shaped medial crura that are fixed...
PATIENTS AND METHODS

PATIENTS

Our study is a consecutive sample of 10 patients (6 women and 4 men) who were seen for treatment at the private practice of one of us (A.I.G.) in Highland Park, NJ, from August 1, 1998, to January 31, 1999. The patients were aged from 27 to 52 years, with a mean age of 32 years (Table). The primary cause in each of these patients was excessive columellar show, which was due to columellar hang and not alar retraction. Measurement of the alar-columellar complex was facilitated using computer-assisted photography (Mirror Image Co.). Photographs in the Frankfort horizontal position excluded patients with alar retraction. Photographic measurements were obtained 3 months postoperatively from images superimposed on the preoperative pictures. This ensured identical sizing and position of anatomical structures to accurately measure the correction of the columellar deformity. Age, sex, previous nasal surgery, and the patient’s awareness of the condition were noted. Intraoperative findings such as the use of columellar struts, septal shortening, or medial crural tailoring were recorded. All surgery was performed through an external approach. Permission for preoperative, intraoperative, and postoperative photography was obtained.

OPERATIVE TECHNIQUE

A trans columellar incision was carried into marginal incisions, followed by sharp dissection of the soft tissues overlying the nasal skeleton in the subperichondrial and subperiosteal planes. The medial crural curvature and width were assessed as well as their relation to the caudal septum. When indicated, the soft tissue flap was retracted superiorly, the medial crura were separated, and mucosal flaps were elevated over the length of the septum to allow for repositioning of the medial crura without bunching or resection of the membranous septum. If septrhinoplasty or septal shortening was indicated, it was performed at this time. (Figure 3)

The angle between the medial and the lateral crura was identified by the internal soft tissue triangle. The vestibular lining was dissected from the overlying cartilage. Transection of the angles, not the domes, resulted in straightening of the medial crura that were then sutured together using a 6-0 nylon suture approximately 3 mm caudal to the cut edges. When necessary, minimal septal shortening was performed. Sutures (4-0 chromic) were used to fix the caudal end of the septum to the cephalic margin of the medial crura. When indicated, columellar struts were placed in a pocket between the medial crura extending inferior to the nasal spine and fastened with 6-0 nylon. Columellar strut dimensions were typically 2.0 to 2.5 cm long, and 2.0 to 3.0 mm wide. The width was always less than that of the medial crura and was carefully evaluated to ensure that it did not hinder adequate columellar repositioning.

The 30-year experience of one of us (A.I.G.) as a rhinoplasty surgeon represents an endonasal approach until 1988 and a transition to an external approach for the past 12 years. Until converting to the external approach, the importance of the C-shaped curvature of the medial crura was not as apparent, and traditional techniques of columellar hang correction were used. Over the past 12 years using an external approach, the importance of the curvature of the medial crura and excessive lobule protrusion has become apparent. This study was undertaken to document these findings.

RESULTS

In our 10 consecutive patients, we found the primary cause to be long and excessively curved medial crura resulting in increased alar rim to caudal columella distance. We observed C-shaped medial crura with normal width, fixed in excessive curvature by the lateral crura (Figure 4). In all cases division of the alar cartilages at the angle of the medial and lateral crura separated the connection of these structures and allowed the medial crura to be straightened, from an exaggerated C-shape to a straight line or minimally curved configuration (Figure 5).

The distance from the most caudal portion of the columella to the nostril reference line was reduced as noted in all postoperative photographs. This was paralleled by an obvious decrease in columellar show in all patients.

Eight of the 10 patients had no previous nasal surgery; 2 had undergone previous rhinoplasties.

Preoperatively, 5 patients had reported unsightly nostril show, while the other 5 reported dissatisfaction with the appearance of the nasal tip. In this group the hanging columella was noted as a component of the nasal base deformity by the surgeon (A.I.G.).

Slight septal shortening was required in 2 cases (patients 3 and 7). This was primarily done to accommodate a columellar strut with an extended shield graft in patient 3 and to assist in nasal shortening in patient 7. Tailoring of the feet of the medial crura assisted in straightening in 1 case (patient 10). Columellar struts were used in 5 patients (Table). Although these provided additional medial crural straightening, their function was mostly for tip support, rotation, and projection.

COMMENT

In evaluation of the patient seeking cosmetic rhinoplasty, it is important to note the alar-columellar relation and the presence of columellar show. The hanging columella may be seen as an isolated entity or in combination with other deformities. The use of standardized preoperative and postoperative photography with computer-assisted prints allows for proper preoperative
Occasionally a congenitally long nasal septum is associated with excessive nostril show. Preoperatively, this may be appreciated by palpating its caudal margin and its relation to the medial crura. The curvature of the medial crura and their relation to the lateral crura is also assessed.

Our direct method of repair of the hanging columella involved angle division. The angle is anatomically distinct from the dome, which is defined as “the highest part of the nasal vestibule located lateral to the angle.” We found that angle division permitted the treatment of both the medial and lateral crura as independent entities, which could be modified separately, and additionally solved the problem of excessive medial crural curvature.

<table>
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<th>Patient No./ Sex/Age, y</th>
<th>Postoperative c−r Reduction, mm</th>
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*c−r indicates the columella equals the reference line distance measured in preoperative and postoperative photographs.
†Patient underwent previous rhinoplasty.
‡Only patient for whom the surgeon trimmed the feet of the medial crura.

Figure 1. The long axis of the nostril is used as a reference line to assess the alar-columellar complex in patients with a hanging columella.

Figure 2. A. Normal medial and lateral crural orientation. B. Exaggerated curvature of the medial crura that causes a hanging columella.

Figure 3. The caudal septum is set well back from the medial crura and not contributing to the hanging columella.

Figure 4. Note the C-shaped medial cruris with excessive posterocephalic return of the foot.
Most of our cases (8 of 10 patients) had congenital hanging columellas. In the 2 patients (patients 6 and 8) who had undergone previous rhinoplasty, it remains uncertain whether their columellar show was congenital or iatrogenic; however, in both cases the medial and lateral crura had not been transected. We believe that in 1 case (patient 8) excessive cephalic retraction of the lateral crura may have resulted in an exaggerated curvature of the medial crura. In another case (patient 6), aside from the curvature of the medial crura, there were no other identifiable factors as a consequence of prior surgery contributing to the hanging columella. Another potential cause of postoperative hanging columella may be loss of support of the

Figure 5. A, Preoperative view. B, Intraoperative view following the repair of the hanging columella. C, The external approach demonstrates excessively curved medial crura. D, Repair was performed with angle transection, columellar strut, and tailoring of the medial crural feet.

Figure 6. Example of a congenital hanging columella (A) repaired by angle transection and straightening of the medial crura (B).

Figure 7. A, Preoperative view. B, Surgery done elsewhere producing a hanging columella. C, Correction of deformity with angle division.
medial crural feet at the posterior septal angle owing to septal angle resection or a full transfixion incision (Figure 7).

The external approach has provided direct visual assessment of the medial crura–lateral crura relation, which is an important anatomical consideration in the repair of the hanging columella. The columellar struts were used, when necessary, for tip support, projection, and rotation, rather than their ability to straighten the medial crura, although they made some contribution. When using a columellar strut, its width, which must be narrower than the medial crura, and its possible effect on nasal length, must be considered, and, if necessary, septal shortening is performed to accommodate it.

This article reviewed the anatomy, dynamics, and pertinent causative anomaly of the alar cartilages that we believe are primarily responsible for the hanging columella. We demonstrated a surgical option that directly addressed the cause and led to correction of the hanging columella in all patients, and verified the experience of one of us (A.I.G.) with this technique over the past 12 years.

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Dr. Joseph is a fellow of the American Academy of Facial Plastic and Reconstructive Surgery.

Reprints: Alvin I. Glasgold, MD, 31 River Rd, Highland Park, NJ 08904.

REFERENCES