

SURGERY OF THE RETRACTED COLUMELLA

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The retracted columella creates a poor appearance, but more important, it is an indication of poor function. Normal nasal function depends on proper anatomic relationship. It is the purpose of this paper to bring out the etiology of this deformity, the mechanism of its formation and the structures involved. With this understanding, the surgical correction is based on undoing or reversing the process of formation.

The nasal pyramid consists of four main structures — the bony pyramid, the cartilaginous vault, the lobule and the bony and cartilaginous septum. These structures are intimately associated with one another. When in proper relationship, the nose has a pleasing symmetrical appearance and is structurally adapted to its many functions. A correction of the retracted columella is much more than a localized problem. It involves not only the medial crura, but also the dome and lateral crura, the base of the nose, the spine area and the cartilaginous vault.

Since the nose is prominently placed in the center of the face, it is subject to frequent and varied types of trauma. The trauma may cause a variety of deformities and one, the subject of this paper, is the retracted columella. The retracted columella is a common deformity but often is only recognized in severe cases. Too often the cause of the deformity as well as the anatomy is not understood. The most marked retracted columella is seen in the leptorhine or cacaosoid nose where the nasal pyramid is normally narrow, the lobule projecting, pear-shaped with narrow vertical elliptical nostrils and a narrow base of the nose. When normal, the columella is visible in a true profile view.

The semi-rigid portions of the nasal pyramid are the upper lateral cartilages which are fused to the dorsum of the cartilaginous septum and are referred to as the wings of the septum. The terminal end or caudal portion of the upper lateral cartilage is not fused to the septum, but is attached only by fibrous union. It is free and movable and acts as the movable part of the valve. The septum is the fixed part of the valve. The lobular cartilages are horse-shoe-shaped and flexible, giving configuration to the nostrils. In normal position, the cephalic margin of the lobular cartilage over-rides the caudal end of the upper lateral cartilage. During inspiration, the caudal portion of the lower lateral cartilage everts outward while the cephalic portion inverts inward, creating pressure upon the caudal end of the upper lateral cartilage. In this manner, the lobular cartilage acts as an accessory part of the valve. Each cartilage that makes up the semi-rigid lower two-thirds of the nasal

pyramid is encased in its fibrous envelop. These fibers then decussate to make a fibrous band or aponeurosis which joins them together but still allows freedom of movement between the neighboring cartilages. The most distinctive of these are:

1. The fibrous band of the cleft that joins the terminal end of the upper lateral cartilage with the septum giving flexibility to the valve.
2. The fibers between the caudal margin of the upper laterals with the cephalic margin of the lower laterals in the intercartilaginous space.
3. The fibers that join the caudal end of the septum with the cartilages of the medial crura — the membranous septum.

The importance of these cartilaginous envelopes and their fibrous attachments to each other allows a flexibility that is of the utmost importance — namely, the control of velocity, resistance and direction of the inspired air currents. There may be a flattening of the bony dorsum from injury followed by dislocation of the cartilaginous septum from the chondro-osseous joint. Thus, with the loss of height of the bony and cartilaginous vaults, there will be a downward pull on the membranes between these cartilages with changed contour of the nose and altered relationship of these structures to each other. The resultant alteration of shape and contour of these cartilages alters the control over the inspiratory and expiratory air currents.

The etiology of the valve, septal and lobular deformities are:

1. Early injury to the pre-maxillary structures with poor development of the maxillary spine area, usually occurring before the third or fourth year of life.
2. Injury — post-traumatic — at any age with subluxation of the caudal end of the septum with retraction of the columella.

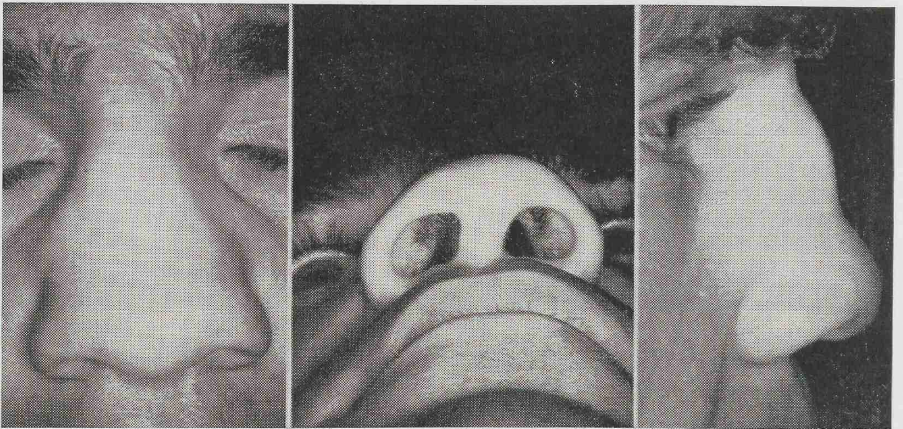


Figure 1. The entire picture of the deformity is that the retracted columella is but one facet of this deformity.

1. Retraction of the columella.
2. Shortening of the height of the columella.
3. Widening of the base of the nose.
4. Change in the shape of the nostrils from elliptical to round.
5. Depression over the middle third of the nose, or saddling of the cartilaginous vault.

3. Infection — chondritis, septal hematoma or abscess with due loss of support with characteristic saddling, sinking or sagging of the cartilaginous vault.
4. Previous surgery — over-enthusiastic removal of cartilage during a sub-mucous resection.

The deformities listed are the result of the altered shape of the nose and are influenced by excess scar tissue with the pull on the aponeuroses between the cartilages of the nose. This has previously been described by the author and is shown in Figure 2.

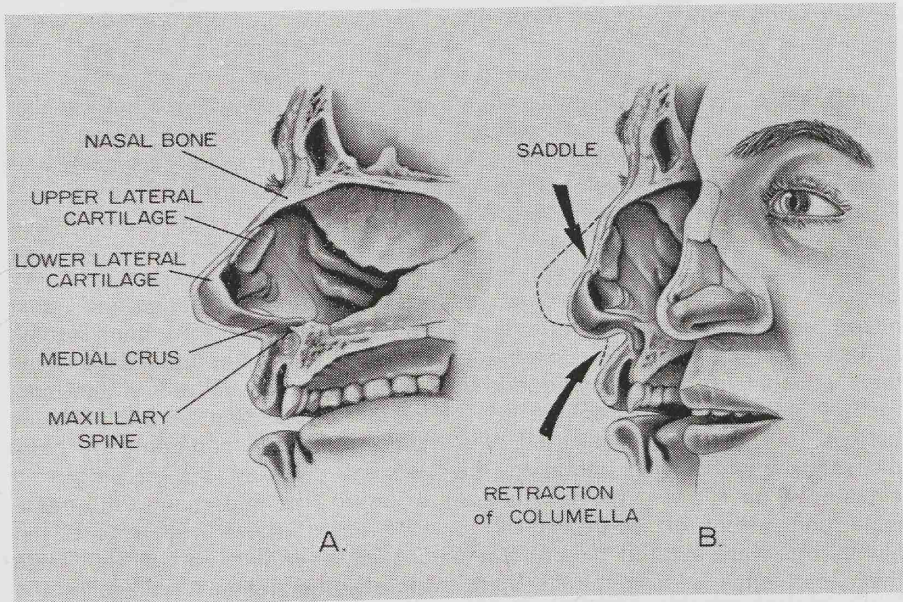


Figure 2.

- A. Represents the Interior of the Normal Nose.
- B. Represents the Change in Relationship of the Cartilaginous Structures, indicating that the columella is only one of the structures involved.

Surgical correction of the retracted columella is based on the undoing or reversing the mechanism that caused the deformity. Knowledge of the anatomy of the deformity indicates that not only is the columella involved, but also the surrounding cartilaginous structures. Therefore, surgery of this area must be combined with procedures on the columella and spine area. In so doing, two aims must be kept in mind:

1. To prevent the retracted columella in surgery of the septum.
2. To correct the retracted columella when present.

It has been common practice to insert a strut or batten of cartilage in the columella between the medial crura to correct or prevent further retraction.

1. Hinderer, K. H.: "The Wide Nose", International Rhinology, Vol. II, No. 1, pp. 33-69, July, 1964.

However, it has been my experience that the insertion of a piece of cartilage implanted in a pocket between the medial crura subjects this area to constant pull and tension. This is not the ideal habitat for implanted cartilage, and, due to constant movement of this area during talking, eating and smiling, causes absorption with further increase in retraction. This increased scarring causes reversion back to increased widening of the base of the lobule and dropping of the tip.

During the course of studies with Cottle² in the maxilla pre-maxilla approach to septal surgery, as well as during preparation of an atlas of surgical anatomy of the septum and nasal pyramid³, a very interesting fact was noted. All the textbooks on anatomy of the nose show the terminal ends of the medial crura sending at about the junction of the middle and third of the columella.

In my findings in many complete dissections, the medial crura do not end at this point. This protuberance, acting as a baffle, leads one to believe this to be the terminal ends of the medial crura. Instead, it continues downwards to the maxillary spine at which point they diverge on each side of the spine and continue laterally for several millimeters along the floor of each nostril.

To my knowledge, the length and position of the terminal end of the medial crura has not been described in the literature except in one instance. Patterson⁴ states that the base of the columella is frequently widened by the divergent feet of the medial crura of the lower lateral cartilages and interposed soft tissues. Since the length and position occurred consistently, I have found that these medial crura could be dissected free from their attachment to the spine and be used surgically to aid in the correction of the retracted columella. The need for insertion of the grafts or battens is completely eliminated. The medial crura are separated by blunt dissection and the skin lateral to the terminal ends of the cartilages is elevated, thus allowing these structures to swing free and change the nasolabial angle from 75° or 80° to 95° or 100° angle. These free ends of the medial crura are sutured by mattress sutures of 3-0 plain catgut. This seats these cartilages in front of the spine, whereby the normal cartilage of the columella is utilized to correct this deformity.

The only adequate surgical approach to the maxillary spine region, the maxilla-premaxilla area and terminal ends of the medial crura is by the hemitransfixion incision of Cottle² and his procedure for undermining the base of the nose. The details for making the incision are well discussed and illustrated in his publications.

Sequence of Steps Reversing the Process of Retraction

The hemi-transfixion incision in the retracted columella is difficult to do because there is a shortening and contraction of the membranous septum, or there may be absence of the cartilage. It may be necessary to go higher or more cephalic on the caudal end of the cartilage.

2. Cottle, M. H., et al: "The Maxilla Premaxilla", Approach to Extensive Nasal Septum Surgery, Arch. Otolaryng, 68 : 301-313, 1958.
3. Hinderer, K.H.: "Atlas of Surgical Anatomy of the Nose", (in Preparation for Publication).
4. Patterson, Carl N.: "Reconstructive Septonasoplasty", Arch. Otolaryng, 84 : 457-462, Oct. 1966.

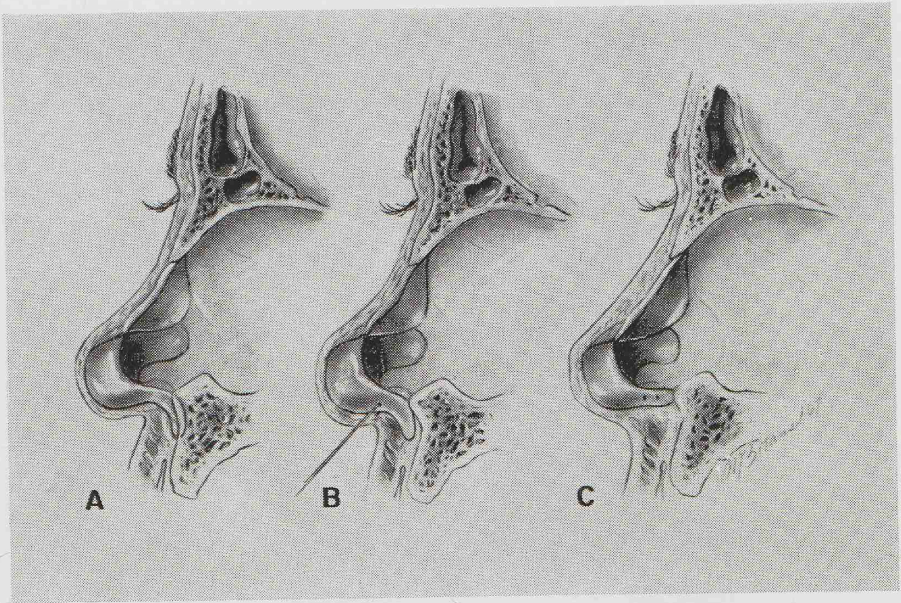


Figure 3.

- A. Indicates the deformity of the lobular cartilage, especially the terminal end of the medial crura.
- B. Indicates freeing of the medial crura by incising and releasing the prepsine fibers and scar tissue that distorts the lobular structures.
- C. Indicates the new position of the medial crura and where the mattress suture holds the medial crura in front of the maxillary spine. See Figure 5, Figure F and G.

In most cases, after the anesthesia is given, the Cottle columellar clamp is applied and with traction toward the left nostril, the incision is carefully made on the right side of the septum. The incision is made about 3 to 5 mm cephalic to the caudal end of the cartilage and the membranes with the perichondrium elevated over the end of the cartilage and carried onto the left side of the septum. Enough elevation of the membranes is made to allow for freedom and advancement of the tissues.

Mobility of the tissues of this area must be obtained by freeing the pull and contraction — by sufficient undermining of the subcutaneous layers, and the deeper tissues to free them from the spine area and the face of the maxilla. By inserting the tip of a Knapp scissors into the lower end of the hemi-transfixion incision and by small spreading movements, the membranous septum is being separated as well as the area between the terminal ends of the medial crura. The undermining is continued between the orbicularis and the buccal mucosa. This undermining is carried extensively from left to right as far as the alar folds, as shown in Figure No. 4-A. The fascial fibers that hug the maxillary spine are freed both by sharp and blunt dissection. Next, in order to get adequate freedom of tissues, undermining must be made in a second layer — that is, between the skin and the orbicularis oris, as demonstrated in Figure No. 4-B. This also must be done widely, either through the naso-alar incision, the hemi-transfixion or both.

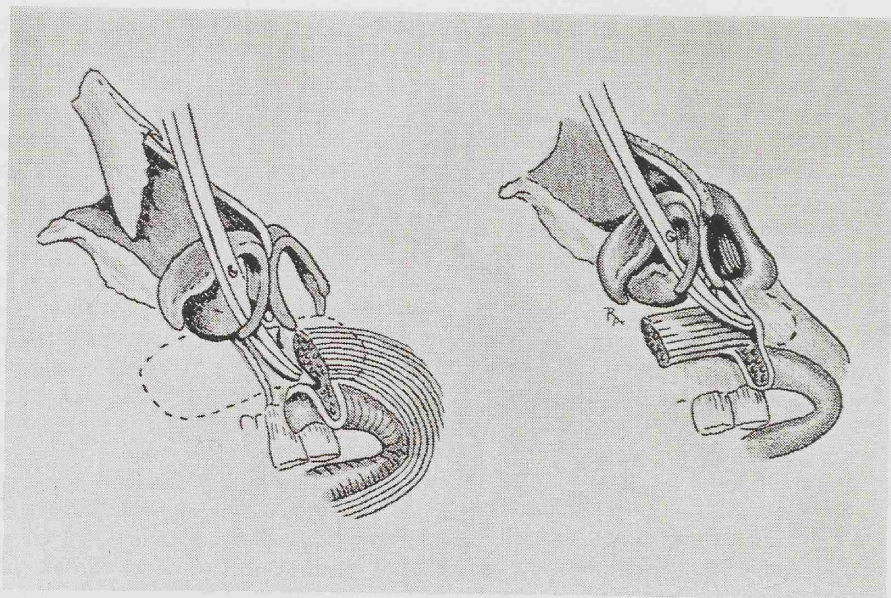


Figure 4. Demonstrates the two planes of undermining that are necessary to get adequate mobility of the structures.

A. Undermining between the oral mucosa and the orbicularis oris.

B. Undermining between the orbicularis oris and the skin of the lip.

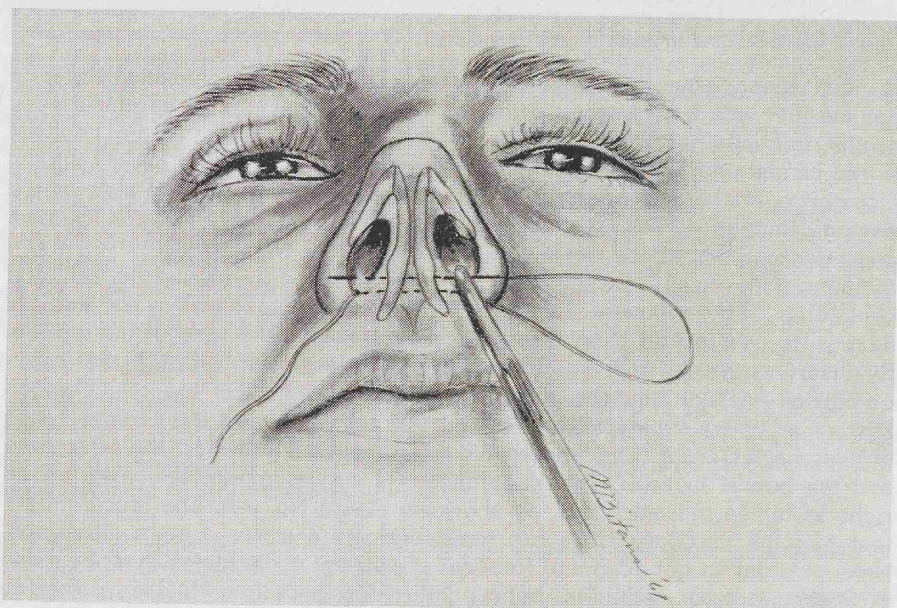


Figure 5. Indicates use of a mattress suture through the terminal end of the medial crura.

With complete freedom of the structures following the above procedures, it is necessary to proceed further to (1) correct the deformity of the lobule, (2) the upper lateral cartilage by reconstructing the valve or correcting the relationship of the caudal end of the upper lateral cartilage to the caudal end of the septum, and (3) to correct the bony pyramid by the medial and lateral osteotomy with mobilization by infracture. When these structures are mobilized adequately and the pull of the scar tissue corrected, it is possible to visualize how the basal structures fall into proper relationship. It then is necessary to hold these structures in alignment by:

1. Columellar basal bunching suture.
2. Basal bunching suture with 2—0 chromic catgut.
3. Insertion of cartilage or bone into the septal envelops.
4. Suturing of hemi-transfixion by 3—0 plain catgut.
5. Suturing of the intercartilaginous incisions by 3—0 catgut.

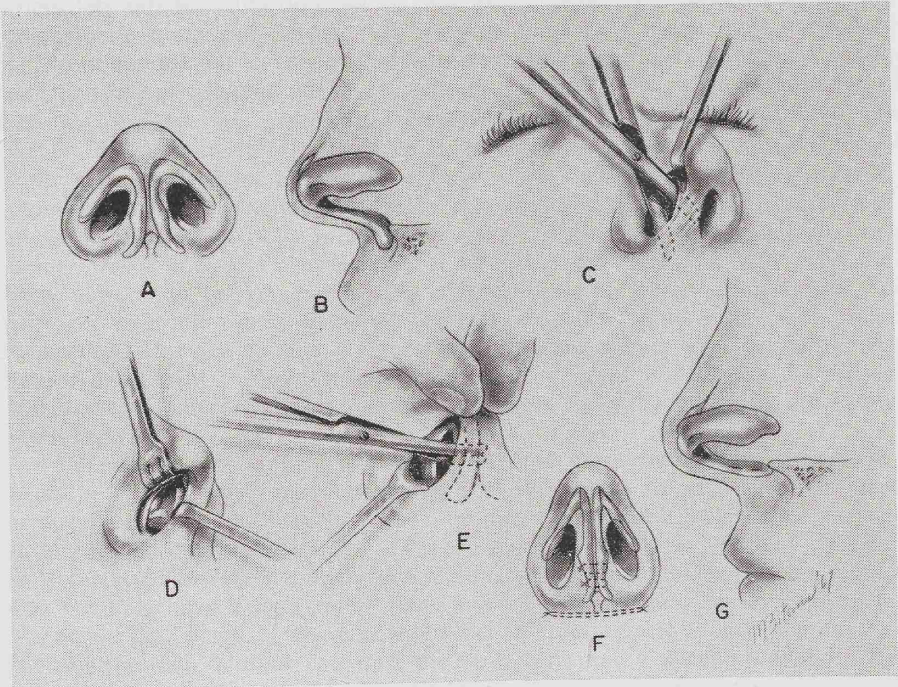


Figure 6.

- A. Indicates the diverging medial crura—front view.
- B. Diverging medial crura — side view.
- C. Separation of the terminal ends of the medial crura by blunt dissection with exposure of the maxillary spine.
- D. Indicates the maxillary spine.
- E. Separation of the skin over lateral surface of the medial crura which frees the terminal ends of medial crura.
- F. Indicates the columella bunching sutures as well as the basal bunching sutures inserted through the naso alar incision.
- G. Result of mobilization of the structures of the base of the nose — adequate narrowing of the base of the nose with rotation and projection of the lobule.

6. Intra-nasal packing or internal splinting.
7. External splinting with adhesive tape supplemented by a dental stent mould.
8. Pressure dressing over the eyes for 12 to 18 hours.

The bunching sutures at the base of the columella serve to fix the terminal ends of the media crura in front of the nasal spine to prevent recurrence of the contraction. The basal-bunching sutures through the alar incisions will narrow the base of the nose and aid in the elevation and rotation of the lobule. The structures are further held in place by adequate internal and external splinting, which not only will hold these structures into position, but also prevent any collection of serum or blood into the tissue planes.

SUMMARY

The rationale of the prevention of retracted columella in surgery of the septum and nasal pyramid are presented as well as the correction of this deformity in conservative septum pyramid surgery. By careful dissection and freeing of the structures, it is possible to reverse the process of the formation of the retracted columella which incorporates the use of the medial crura without the use of struts or battens in the columella.