

Alar Cartilage Concavity Correction by Using Turned-in Folded Cephalic Part of Lateral Crus

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ABSTRACT

Lower lateral cartilage concavity deformities, ranging from mild unilateral depression to its extreme bilateral from described as paradoxical lower lateral crus, can cause aesthetic and even functional problems. Several surgical techniques were used in treating such condition depending on the location and severity of the concavity.

The use of suture techniques, onlay grafting, or domal division with resewing was tried but with incomplete correction in some cases specially with paradoxical crus cases.

This study included 18 patients, 16 females and 2 males, with median age of 22 years (range, 20-32 years) who had varying degrees of alar concavity, including paradoxical lower lateral crura and were subjected to open rhinoplasty with turn-in, folding the cephalic part of lateral crus and fixing it to reinforce the lateral crus.

All patients were followed-up for a period between 8 to 14 months were satisfactory correction was achieved with minimal complications. The results reported here show that the use of turn-in folded cephalic part of lateral crus in treating alar cartilage concavity cases is a safe procedure and associated with high satisfactory result both aesthetically and functionally.

INTRODUCTION

The challenge of rhinoplasty stems from the innumerable variations of the bony and cartilaginous nasal skeleton. No two noses are alike, which can leave a surgeon struggling to find a predicable technique.

The only naturally occurring concavities of the nose are a slight supratip break, supra-alar hollows and occasionally, minimal bifidity of the nasal tip. Lower lateral cartilage showed be convex at the nasal dome with gradual flattening towards the pyriform aperture. Alar concavity most often represents a weakness in the patient's nasal framework. Etiologies include inherent buckling, trauma and iatrogenic causes. In children, minimal trauma can

disrupt cartilage and can affect the growth centers, which translates into abnormal growth and might ultimately develop into a concavity [1].

Zelnik and Gingrass described variations of the lateral crus based on cadaveric studies. The concavities range from mild unilateral depression to the extreme, which is a bilateral lower lateral cartilage concavity called paradoxical lower lateral cartilages [2] (Figs. 1,2).

The lateral crus plays a significant role in the aesthetic appearance of the nose. It also determines the volume, size and position of the nasal tip. So, when a unilateral irregularity exists in the cartilage, the trippod length is affected, causing not only the topographical concavity but also a deviation of the nasal tip to the side of the shorter lateral crus [3]. Hyperplasia of the lateral crus of the alar cartilage may cause a concave alar rim and even collapse of the alar (external nasal valve collapse) in more severe cases [4].

When the lateral crus is weak, the anterior and middle portions of the rim may collapse because these areas are directly supported by the lateral crus. Posteriorly, however, because the rim has no cartilage supports, but is held in position by the thick alar skin, the negative pressure in the nasal vestibule during inspiration often exacerbates the collapse. The alar cartilage does not provide the support required to counteract the negative inspiratory pressure. In severe cases, collapsed rims limit the volume of air that can flow through the nose [5].

The area and significance of the concavity and the degree of functional impairment dictates the correction, which is best approached by open rhinoplasty. Concavities of a lesser degree can be

repaired with suture techniques, alar batten grafts, onlay grafts, or domal division with resewing [6].

Excision of the cephalic part of the lateral crus is the most popular technique for the correction of tip deformities. The advantages of this step in rhinoplasty is that it reduces crus tip volume, permits medialization of the tip-defining points thus narrowing the nasal tip. Also, it increases a visual gain in tip position [4]. However, this procedure decreases the size of the lateral crus and can cause weakness in the alar rim and in severe cases, it may cause incompetence of the external nasal valve and nasal valve collapse. So, minimal crural resection and attempting to leave 8 to 9mm of the lateral crural width to avoid lower lateral crus flaccidity was recommended by many authors [7,8].

In contrast to excision, the turn-in folding of cephalic portion of the lateral crus not only allows the aesthetic corrections, but also reinforces the lateral crus thus adding support to the alar rim and also treating the already existing external nasal valve collapse.

In this work, we present the technique of turn-in folding of the cephalic portion of the lateral crus in rhinoplasty patients to treat cases with alar concavity with or without alar collapse and evaluate the results.

PATIENTS AND METHODS

Between November 2005 and April 2007, turn-in folding technique was used in 18 open rhinoplasty operations. All patients had bilateral alar cartilage concavity with aesthetic disfigurement. Only 3 patients had alar valve collapse in addition to the disfigurement. In this study, female to male ratio was 8:1 (16 and 2 patients) with an average age of 22 years (range between 20 to 32 years). All patients were followed-up to evaluate the early and late outcome, regarding both aesthetic and functional aspects and the presented complications.

Operative technique:

- The technique of turn-in folding of the cephalic part of the lateral crus to correct alar cartilage concavity was carried out during open primary rhinoplasty in all patients. Dissection of the lower lateral cartilage with the lateral crus from the covering skin was performed, specially the cephalic portion of the crus that was determined and carefully dissected.

- The lateral crus and the upper lateral cartilage were separated in the scroll area then the nasal mucosa was dissected from the under surface of the lateral crus. A line running at 6mm distance cephalic to its caudal margin on its outer surface was marked and gently scored with No. 15 blade except the most medial and most lateral aspects of the cephalic portion of the lateral crus where two small right-angled incisions were done to facilitate the folding of the cartilage.

The cephalic portion of the crus was folded and fixed with gauge 30 fine needles in the proper position then stabilized with 5/0 non absorbable mattress sutures where we usually used three or four 5/0 prolene mattress sutures to fix the cartilage in the new position where the suture knots were placed on the inner surface of the lateral crus.

RESULTS

The average follow-up period was 9 months (8-14 months). All patients achieved satisfactory results both aesthetically and functionally. The pinch deformity and alar rim collapse (present in 3 cases) were not observed in the post operative follow-up period. We recorded 2 cases with temporary bulge (folded cartilage covered with mucosa) on the under surface of the ala which didn't interfere with respiration and disappeared gradually within 3 months. One patient developed stitch sinus due to prolene knots that fix the cartilage in the new position that necessitates its removal under local anesthesia (Xylocaine spray) after 10 weeks).

There was no residual deformity, protrusion of the cartilage through the wound, suture infection or suture visualization.

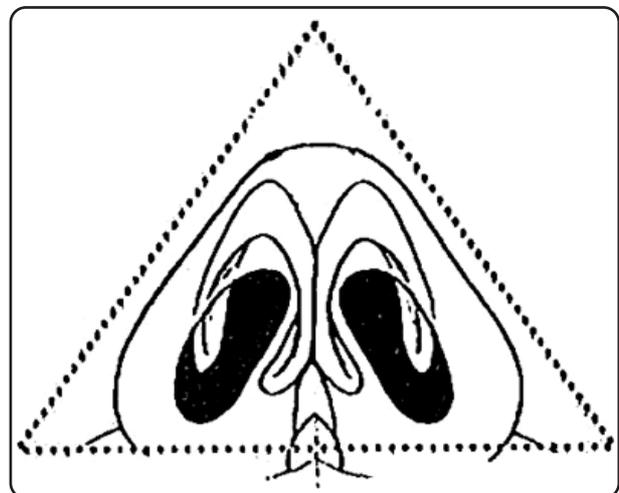


Fig. (1): Basal view for the nasal lobule.

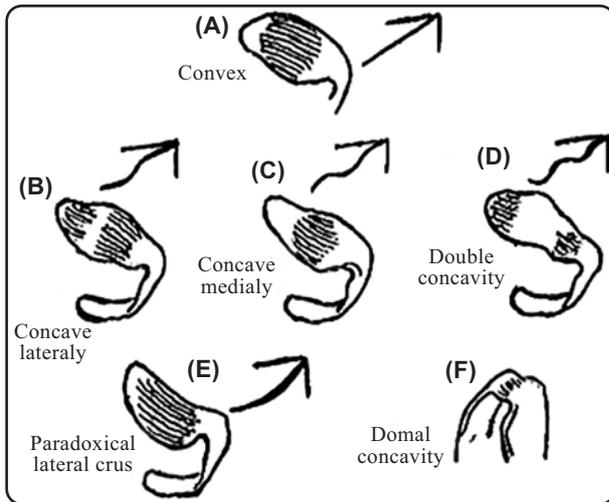


Fig. (2): Varieties of the lower lateral cartilage.

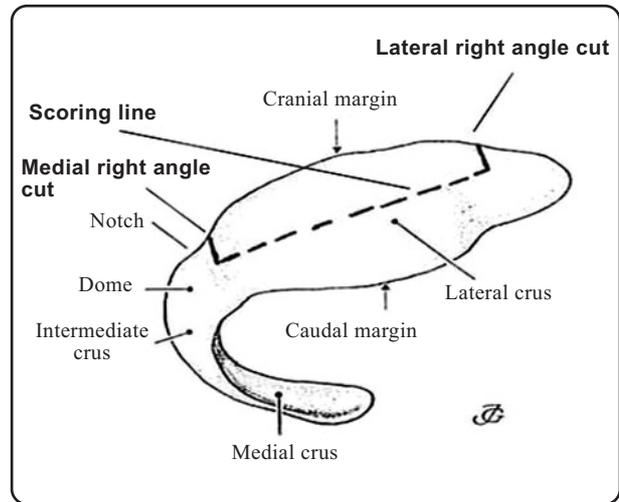


Fig. (3): The line of alar cartilage scoring running 6mm cephalic to its caudal margin with medial and lateral right-angle incisions.



Fig. (4): Through an open rhinoplasty approach, dissection of the lower lateral cartilage was done with careful dissection of the lateral crus and its cephalic part.



Fig. (5): The cephalic portion of lateral crus was turned-in folded in the left side and fixed with 3 non-absorbable sutures.



Fig. (6): Preoperative "frontal, right lateral and basal" views of a 31 years old female with paradoxical lower crura with alar collapse.

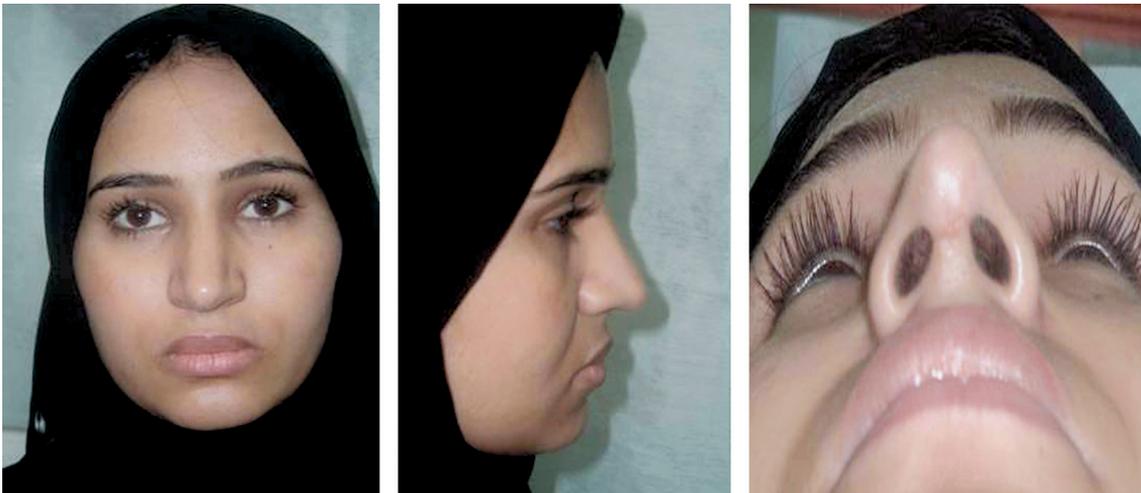


Fig. (7): Postoperative "frontal, right lateral and basal" views for same patient 6 months after turn-in folding the alar cartilage.



Fig. (8): Preoperative (frontal, left lateral and basal) views of a 28 years old female with concave hanging ala associated with inspiratory alar valve collapse.



Fig. (9): Postoperative (frontal, left lateral and basal) views for the same patient 2 weeks following turn-in folding of alar cartilage and elliptical excision from inside to correct the hanging ala.

DISCUSSION

Concave flaccid lower lateral cartilage can buckle under the force of skin tension, causing the concavity of the nasal sidewall. These depressions create not only a cosmetic deformity but they can also cause airway obstruction by projecting downward into the nasal vestibule, causing external valve dysfunction, which is especially seen when the entire lateral crus is concave [9].

The repair of such concavities depends on its severity. Neu and Toriumi described the use of small interlocking mattress sutures to correct shallow and small sized cartilage irregularities [10,11]. Batten grafts are designed from septal or auricular cartilage and are placed at the level of the supra-alar crease in a non anatomic position, supporting the concavity. The onlay graft can camouflage a medial or lateral concavity of the lateral crus [12].

Concavities of greater degrees, as in paradoxical lateral crura, can be treated by, resecting the paradoxical part, inverting it and suturing it back into place to give the convex lateral crus or using a conchal graft to rebuilt the power lateral cartilage if the existing crura are insufficient. These techniques can finally lead to incomplete correction due to cartilage resewing difficulties, weak alar framework in addition to more morbidity [8].

In this study, turn-in folding of the cephalic portion of the lateral crus was used successfully in 18 patients to correct concavity (and weakness in 3 patients) by adding an additional support to the caudal 6mm left in the lateral crus of the alar cartilage. So, it provided good acceptable aesthetic results in correcting the alar cartilage concavities as well as treating the external nasal valve dysfunction.

The technique has the advantages of being simple, reversible, doesn't require extragraft material, form the septum or the concha and can be used in both alar concavity or convexity correction. The scoring of the alar cartilage done along the desirable line facilitates its folding and make the cartilage easily controlled and reshaped with the mattress sutures [12].

In contrast to the dome suturing techniques used to correct the alar cartilage concavities that may result in medial displacement of the weak lateral crus [13] and also may cause pinching of the nasal tip with narrowing of the airway, this technique prevents the medial displacement of the weak lateral crus and in addition it supports it and prevents its collapse.

Deficient alar cartilage due to previous surgery, trauma or infection can interfere with using this technique to correct alar concavities [14], so that in our study, the 18 patients were subjected to primary rhinoplasty to avoid cases with deficient alar cartilage, due to previous excision or fibrosis, that may limit the amount of the lateral crus to be used in turn-in folding technique.

Conclusion:

It is to be concluded from this study that, the use of turn-in folding of the cephalic part of the lateral crus, in treating alar cartilage concavities, is a simple safe procedure that can be done with minimal morbidity and gives good aesthetic and functional results.

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