

Original study

Lower lateral crural turnover flap combined with alar batten graft for the long-term result of the treatment of alar convexities

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Abstract

Introduction: Concave lower lateral cartilages not only cause an esthetic defect but can also lead to external nasal valve insufficiency. The objective of this article is to analyze the combination of two well-known surgical techniques: turning over the alar cartilages as well as the addition of grafts in order to obtain satisfying esthetic and functional long term results. **Materials and methods:** From August 2016 to July 2018, 62 rhinoplasties, a combination of both primary and revision cases, were performed at the Rouen University Hospital in France. Six of these involved the correction of concave alar cartilages. The turnover technique alone or in combination with Batten grafts was performed. **Results:** Immediate and 3-months post-operative esthetic results using the turnover flap technique were satisfactory. Alar batten grafts were occasionally employed in order to maintain the newly positioned alar cartilages and avoid long-term contour depressions. **Conclusion:** The combination of these two techniques seems to be an interesting solution to maintain long-term esthetic results.

Keywords: alar convexity; rhinoplasty; alar batten graft; nasal tip; nasal valve

Introduction

Concave lower lateral cartilages not only cause an esthetic defect but can also lead to external nasal valve insufficiency. This defect can be congenital, post traumatic or iatrogenic following a previous rhinoplasty [1]. Over the last twenty years, multiple surgical techniques have been developed to address this issue. Nen uses transcartilaginous sutures to recreate the complex convexities of the alar cartilages [2]. Fischer, Toriumi and Becker use alar batten grafts, mostly to correct an insufficient external nasal valve [3–5].

Procedures involving turning over the alar cartilages were introduced a few years ago and recently popularized by Haack [6] and Janis [7], which are today the most commonly used techniques.

Admittedly, rhinoplasty techniques must stand the test of time and provide pleasing long-term results. As Toriumi mentioned in his presentation at the Sixth Bergamo Open Rhinoplasty Course (Bergamo, Italy, March 2018), the nose can continue to evolve for up to 10 years post-rhinoplasty. This is why we propose systematically combining alar batten grafts to the turnover flap technique in order to prevent the appearance of a posterior concavity created by flipping over the medial portion of the alar cartilage.

The objective of this article is to demonstrate that combining these two techniques: alar batten grafts and turning over

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the alar cartilages can be beneficial in the management of concave alar cartilages and provide pleasing long-term esthetic results.

Materials and Methods

Patients

From August 2016 until the end of July 2018 we performed 62 primary and secondary rhinoplasties at the Rouen University Hospital (France). During this period we corrected six concaves malformations. Lower lateral crural turnover flap (n=3) and lower lateral crural turnover flap combined with alar batten graft (n=3) were performed. The follow-up period ranged from 2 to 24 months.

Surgical technique

All patients underwent open rhinoplasty. Local anesthesia consisting of xylocaine 1% with epinephrine was utilized in order to achieve hemostatic control and hydro-dissection. The alar cartilage was dissected in its integrity, both internally and externally, with careful attention not to violate the vestibular mucosa. The division of the cartilage is done at the beginning of the concavity and is complete. In certain situations (n=2), in order to limit alar retraction, the section was incomplete in order to preserve 2mm of alar cartilage along the rim (modification proposed by Gilbert Aiach and described in Haack's article) [6].

Lower lateral crural turnover flap (n=3)

The cartilage is then dissected and turned over in order to expose its convex side. The cartilage is then sutured in place with 5/0 PDS, medially to the remaining crus and laterally to the adjacent soft tissues, with careful attention not to violate vestibular skin.

Lower lateral crural turnover flap combined with alar batten graft (n=3)

The technique is the same as previously described with the addition of alar batten grafts harvested from the cartilaginous septum. In the majority of cases, these rectangular grafts measure 18 to 25mm in length and 4 to 6mm in width. It is important to have sufficient length in order to properly flatten the newly turned

alar cartilage. It is fixed to the alar cartilage with 5/0 PDS suture between its middle and distal third. The lateral end of the alar batten graft then lies against the pyriform aperture as usual.

Case 1: Lower lateral crural turnover flap

This is a 24-year-old patient that presenting with right nasal obstruction as well as esthetic concerns regarding a right concave alar cartilage (Figure 1A-D). He underwent a primary open rhinoplasty procedure consisting of an unilateral lower lateral crural turnover flap. No other surgical techniques were performed (Figure 1E-H).

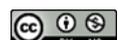
Case 2: Lower lateral crural turnover flap combined with alar batten graft

This is a 61-year-old patient consulted for esthetic concerns regarding bilateral concave alar cartilages, without any associated breathing issues (Figure 2A-E). A primary open rhinoplasty procedure involving bilateral turnover flaps with alar batten grafts was performed. No other surgical techniques were performed. Furthermore, conservative hump resection, as per the patient's wishes, was accomplished. This patient did not want his nose to be deprojected (Figure 2F-J).

Results

In the first case, the use of the lower lateral turnover flap provided immediate satisfying esthetic results by diminishing the concave aspect of the right alar cartilage. Furthermore, right external nasal valve collapse was improved with increased right nasal airflow (Figure 1E-H).

However, as early as 3 months post-operatively, a change in the esthetic appearance of the nose was noticed consisting of recurrence of alar cartilage collapse as well as a depression at the level of the pyriform aperture. The nasal airway remained patent. This change could be due to lack of support of the lateral end of the alar cartilage against the pyriform aperture (Figure 1I-L).



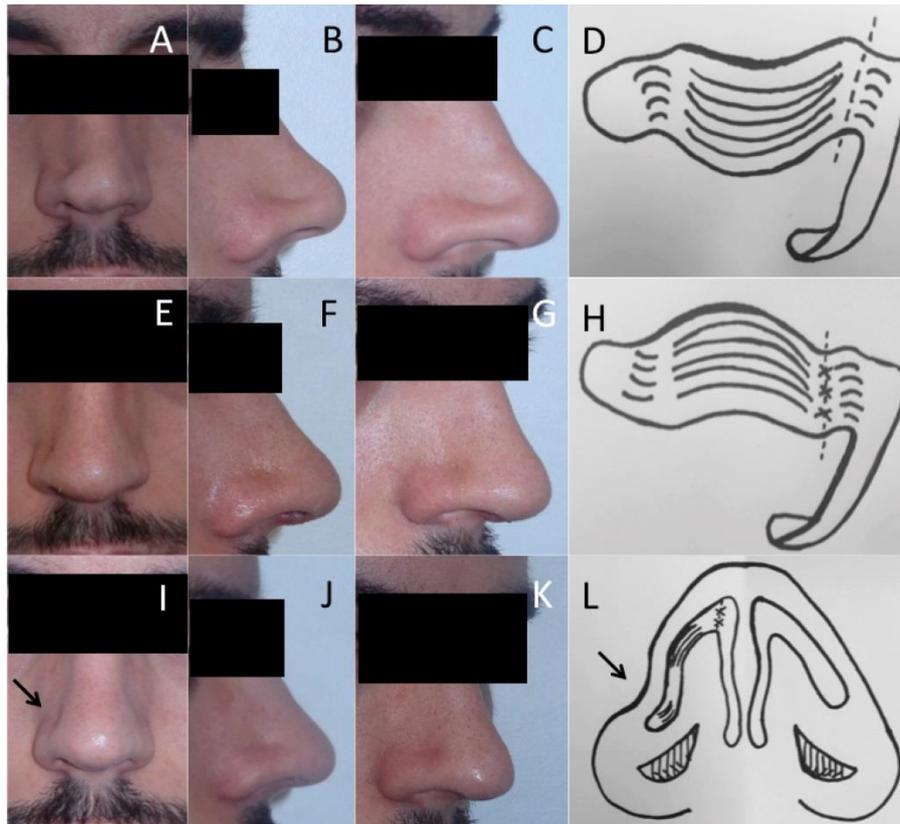


Fig. 1. Right unilateral concave alar cartilage (A-C). Dissection line of the lower lateral crural reverse plasty (D). One month results (E-G). Lower lateral reverse palsy and fixation of the graft (H). Three months results (I-K). View of the depression at the level of the piriform aperture (L).

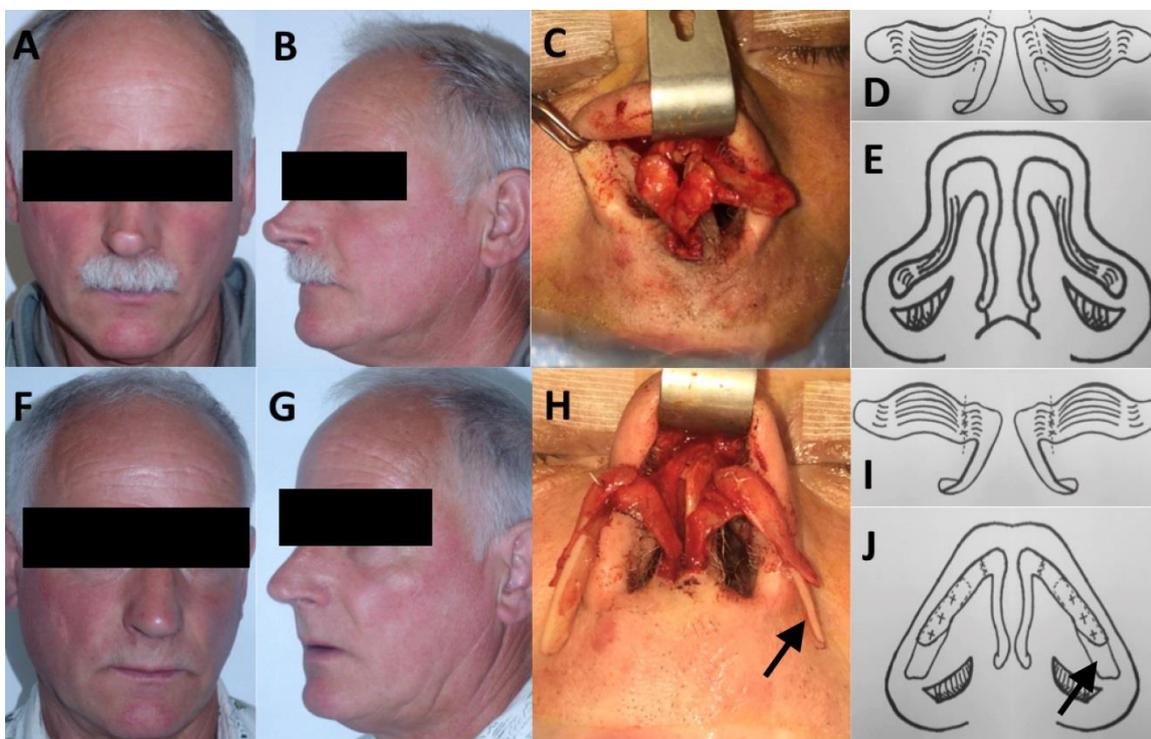


Fig. 2. Severe bilateral concave alar cartilages (A-C). Bilateral dissection line of the lower lateral crural reverse plasty (D). Basal view of the bilateral depression (E). 12 months results (F,G). Bilateral turnover flaps with alar batten grafts (H, *black arrow shows graft*). Step 1: lower lateral reverse palsy and fixation of the graft (I). Step 2: alar batten grafts fixation (J, *black arrow shows graft*).

In the second case, in order to diminish this risk, the decision was made to add alar batten grafts in order to provide lateral support to the newly flipped alar cartilages and prevent late recurrence of collapse (arrow in Figure 2H, J). Both immediate and long-term results were very satisfying (Figure 2F-J).

Discussions

The repair of deformed alar cartilages is a real challenge during rhinoplasty given their esthetic and functional importance. The majority of the time, an excessive convexity is to blame. However, concavities can occur and rhinoplasty surgeons should be familiar with the various surgical techniques needed for correction, especially if the concavity is associated with external valve collapse and breathing difficulties.

By dissecting the lateral crus, flipping it over, and putting it back in place we can “reconstruct” a new lateral crus and reshape it to correct the concavity without the need to harvest additional grafting material. By preserving a band of cartilage caudally, the continuity of the lateral crus is maintained. Unfortunately, this surgical technique seems to be associated with inconsistent long-term results, mainly involving recurrence of the collapse laterally and a depression at the level of the pyriform aperture, likely due to weak lateral support.

Toriumi et al. extensively describe multiple types of cartilaginous alar grafts used to correct functional issues while preserving the integrity and esthetic appearance of the lateral nasal wall. Long-term follow-up of these grafts has proven satisfactory with no evidence of warping or absorption [4]. The coupling of the alar batten graft to the turnover flap can therefore provide a promising solution in order to optimize long-term results.

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Cakir et al., in his interesting description of nasal surface anatomy, concludes that a good esthetic result relies on certain lines, reflections and shadows with specific proportions and cut-offs [8]. The complete esthetic evaluation of nasal surface anatomy utilizes geometry and the existence of a lateral drop-off angle of the lateral crus is defined. Lateral esthetic lines are therefore of paramount importance and serve to highlight the triangular nature of a nose [8]. It is therefore necessary to flatten the cartilage in order to avoid excessive convexity that would go against these esthetic norms. Fat grafting or other injecting methods can be proposed but must be repeated for long-term results. Authors suggest the use is for retouch.

Conclusions

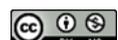
The use of alar cartilage grafts in functional rhinoplasty surgery in order to correct valve insufficiencies is well-established and provides long-term stable and predictable results. The lower lateral turnover flap is also well-described in the literature as an efficient technique to address lower lateral cartilage concavities. However, long-term esthetic results can be disappointing. The coupling of these two popular techniques seems to be an interesting solution to improve long-term esthetic results.

Consent

Written informed consent was obtained from the patients for publication of this study and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

Competing interests

The author(s) declare that they have no competing interests.



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