Application of the Nasal Septal Cartilage graft For the correction of nasal deformity of unilateral cleft lip

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Abstract:

Background:

An intranasal surgical approach is often taken in reconstruction of the tip as a part of the cleft rhinoplasty. A rim incision provide maximal exposure to the nasal tip and usually obviates the need for external incisions.

The asymmetrical nasal deformity of unilateral cleft lip can be resistant to correction. All the components of the nose are involved; the cover, support lining and platform. Pathological anatomy of unilateral cleft nose includes (1) deflection of the nasal tip toward the side of the cleft, (2) posterior and inferior displacement of the dome of the alar cartilage on the cleft side, (3) an abuse angle between the medial and the lateral crura of the alar cartilage, (4) obtuse alar facial attachment, and (5) inward buckling of the alar on the cleft side. The alar-collumella web is unsightly and is difficult to correct in both secondary and primary surgery. The purpose of this article to improve the appearance of the nose by the correction of the alar web deformity in patients with unilateral cleft lip nasal deformities by introducing our cartilage graft technique inside the web.

Methods:

The article include 15 patients with alar webbing had underwent cleft lip surgery between May 2002 to July 2015. Most of the patient's age are ranged between 13-25 years at the time of the surgery. The incision was an open rhinoplasty that including a reverse U shape incision. After that the cleft side was equalized with the dome angle of the healthy side, we use a nasal septal cartilage graft as a stiffy pattern to fix and stabilize the deformed converted web skin. The septal cartilage graft fixed to the cleft side web skin's inner with (3-4) sutures to maintain the tackling of the vestibular skin.

The Results:

Many views basal and frontal are included postoperatively that have been showed, that the nostril and collummella had better shape. Our results showed that most patients demonstrated correction of the dropping alar and nasal tip and correction of the symmetry of the nostrils. The web cartilage graft was fixed to the deformed cleft side web skin's inner with 3-4 sutures to prevent the tackling of the vestibular skin. Most of the patients have been followed up for a period ranged fro, 1-15 months.

Introduction

There are a number of suture suspension techniques which have been applied to the repositioning of the cIeft aIa to produce a more normaI shape to the dome on the cIeft side.

(Fg.1, 2) it usuaIIy involves suturing the aIa to the upper IateraI cartiIages on the cIeft and noncIeft side as weII as suturing the cIeft dome to the dome on the noncIeft side.

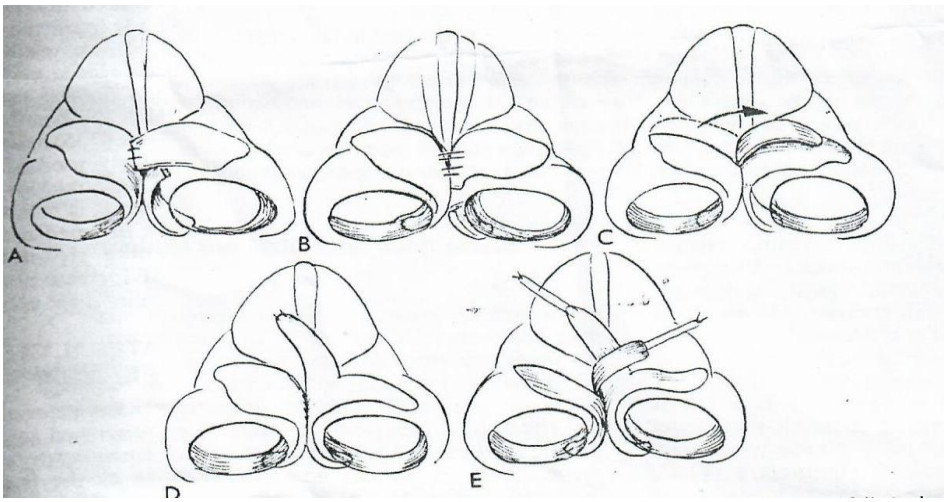


Fig 1

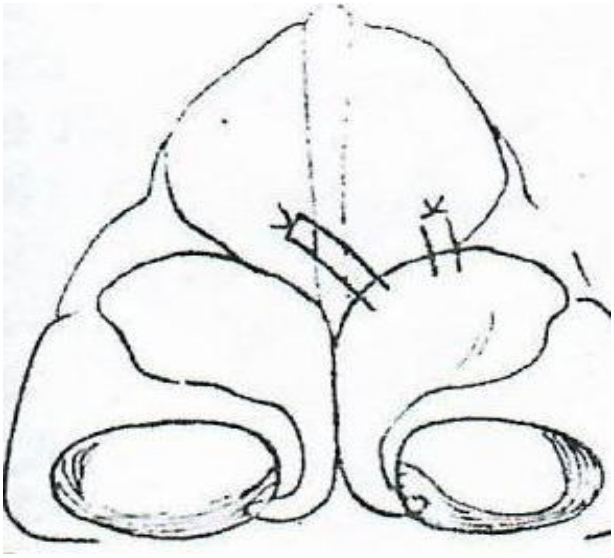


Fig 2

Fig.1 & 2: Suture fixation of the alar cartilage

Among the many secondary deformity in uniIateraI cIeft Iip nose deformities, aIar webbing and nasal deformities remains a constant and difficult to correct with recurrent deformity that had defied surgical efforts at the correction. fig. 3

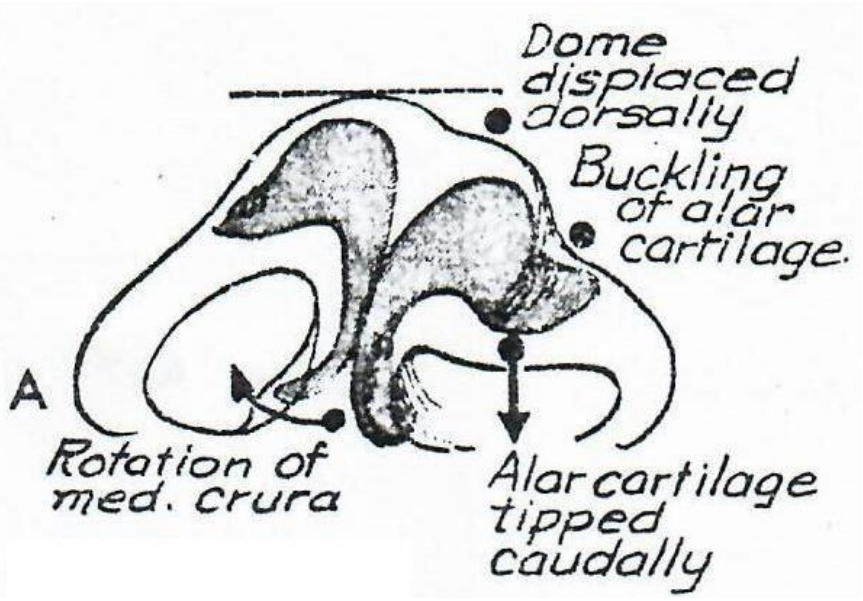


Fig.3 Deformity of unilateral cleft lip

Astaged repair was performed in an effort to lengthen the columnella and bring in additional soft tissue to correct the soft tissue deformity such as a short collumella. The purpose of this study is to attempting to correct the alar web deformities in patients with cleft lip nasal deformities and to introduce our web nasal cartilage graft technique. To correct redundant skin and nasal The technique discussed later have been used to operate on 15 patients presented from May 2002 to July 2015. The indication for use of the nasal septal cartilage as a web graft procedure was wide alar and short collumela. The age of the patient are ranged between 13 to 25 years at the time of surgery. The graft was placed on the inner side of the reversed web flaring, so we used a septal cartilage graft to the web as a stiff pattern to stabilize the converted web skin.

Patient and methods:

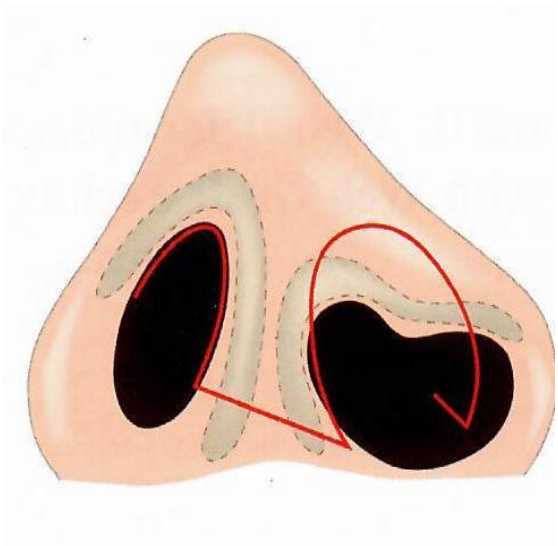
A totaI of 80 patients with uniIateraI cIeft-Iip nasaI deformities were operated on between 2002 and 2015 by one surgeon.

skin, and above the deformed alar cartilage. The graft is located on the alar rim but not located as in a pocket, it is located only in the medial alar side. A panel discussion consist of two examiner (one plastic surgeon and independent observer), all of them are independent to assess the results. Photography was taken and shown to the panel, these photos were taken pre

and post operatively. The photos taken to show the appearance of the nasal symmetry and the nostril shape to be graded by panel. The results were rated as excellent, good, satisfactory, and poor.

SurgicaI technique:

The incision used at this technique was an open rhinoplasty incision, including a reversed U shaped incision. Skin infolding was marked. An open approach with asymmetrical collumela incision was used to take complete exposure of the lower lateral cartilage by laterally and to reduce tension when closing to reserve the newly formed nasal tip break and to create a medial crus elevation (Fig 4). Bilateral cleft and non-cleft alar cartilage were exposed by meticulous and delicate dissection with wide generous undermining to release the colomella base attachments. The goal to release the cartilage from the skin and to advance the medial crust upward and to release the lateral attachment to be free. The proper repair of the secondary cleft nasal tip deformity were corrected according to the specific pathological anomalies then we used the alar web graft that have been harvested from the nasal septum and then reshaping to be similar degree of the convexity of other side as a stiff pattern to fix the converted skin. The graft should be extend up to 2 mm and pass the infolded area medially and laterally to restore the deformed converted skin, the graft should be trimmed to fit the inner surface of the web skin. The length of the graft was ranged between 3-6 mm. The graft was curved to take the shape of the strip to cover the full length of the converted skin. The graft was fixed to the affected cleft side web skin and then sutured by 2-4 sutures to maintain the tucking of the vestibular skin (Fig 5). We used a steri strips to support the nostril for 2 months.

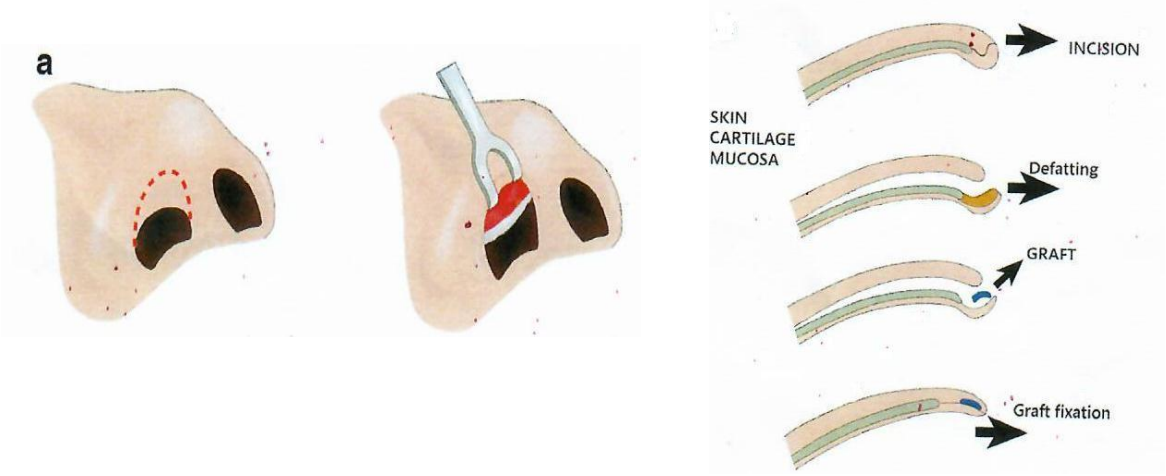


A

B

C D

Fig. 4: (A & B); external approach rhinoplasty excision reveals an asymmetric columella incision. (C & D); open rhinoplasty incision with on lay nasal septal cartilage web graft.



A B

Fig 5 (A & B): the harvested nasal septal cartilage graft was curved into the shape of a strip 3 mm wide ans 5 mm in length to cover the full length of the reversed web skin with fixation by 2 to 3 sutures to prevent recoiling tendency of web skin

Result:

The time have been taken for follow up was extend from 1-15 months, the outcome of the operation was judged and analyzed by independent examiner (one plastic surgeon and other independent observer). The results were rated as shown in the (Table 1), the majority of the patients were good (n=7), excellent (n=4) by independent observer postoperatively. Photos views have been taken basal and frontal to the collumela and nostril, it reveal better satisfactory symmetry of the nostril. One patient was rated poor because only the alar deformity was corrected while the tiling of the collumella and nasal septal cartilage protrusion still remained (Fig 8). There was no recurrence of the nasal tip dropping, but nostril stenosis is the most difficult complication and no recurrence of the web dropping.

Table 1: It explain the judgment of the cosmetic and reconstructive results of surgery

Results	Plastic Surgeon	Independent observer
Excellent	6 (40%)	4 (27%)
Good	4 (27%)	7 (47%)
Satisfactory	4 (27%)	3(20%)
Poor	1 (7%)	1(7%)

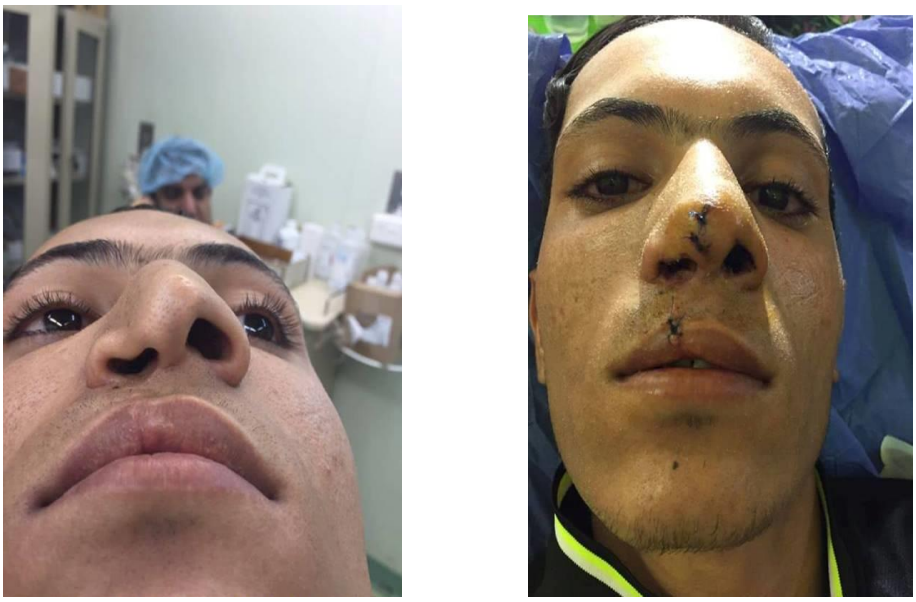
Value are (%)

A B C

Fig.6: (A & B); are pre and post-operative photos showing 14 years old girl with right secondary cleft lip nasal deformity. (C); is the same girl at the age of 16 years showing postoperatively, her result was good

A B

Fig.7: (A); a 16 years old girl with right secondary cleft clip. Nasal deformity 7 days after operation, (B); 15 day after operation, her result was rated good.



A B

Fig 8: (A); A 23 old man with right secondary cleft lip nasal repair preoperative photo. (B); post operative results after 15 days shows correction of deformed ala and converted vestibular skin.

Discussion

The asymmetrical nasal deformity of unilateral cleft lip can be resistant to correct because of the downward displacement of the anal cartilage on the left side [1]. The investing soft tissue with the descent of the lower on the affected side resuIts in the obIiteration of the soft triangIe [2] and causes the overhang of the nostriI's apex [3]. Therefore it needs to use a number of suture suspension technique which have been applied to the reposition of the cleft ala to produce a normal shape to the dome on the cleft side after mobilization from the skin and mucosal attachment [3]. However in the mild cases where the nostril is short but the alar base has a normal wide, only simple excision of the full thick web tissue at the apex is effective to elevate the apex of the nostril [4]. After the correction of the alar cartilage there is a tendency of the dropping the web to recoil because of the excess formation fibrous soft tissue of the web, this result assert to the skin correction to prevent deformity. Ariyan and Krizek [5] and Millard [6] introduced a method that invoIves the direct excision of the free margin of the aIar. The intranasal web cam be corrected by an apex Z-pIasty [7] an interpositional fIap. A web transposition flap to the nostril sill [9], and marginal lapping after dermabrasion [10]. In 1973, Meyer and Kesselring [11] introduced the infoIding method which was derived from the plication of the forehead fIap. After thinning the skin at the nostriI's free margin, the skin was foIded inward to Iift the aIar margin to the same Ievel as the opposite side and was fixed with mattress sutures.

Tajima and Maruyama [12] advanced the evolution of cleft rhinoplasty with the "reverse -U" incision into a rim incision at the point of the aIar web. In this technique, after wide undermining of the nasal skin envelope, the cartilage are repositioned and the excess skin of the nostril apex is rolled into the nostril. The new vestibular Iining flap, which was once the dorsal part of the alar web, is tucked into the vestibular behind the alar rim. This conversion of the external skin of the alar web into the vestibular lining also corrects the redundancy of the overhanging skin [13]. The inverted-U incision can be incorporated into an open rhinoplasty and provides wide and direct exposure [14]. Fujimoto et al. [15] presented a slight modification of this technique and concluded that the rigid fixation and release of nasal cartilage are very important to achieving lasting results. The use of suspension suture to connect the web's inner side to the contralateral outer skin and the top of the alar cartilage [16]. It is a method attempts to correct the tendency of the web dropping recoil and symmetric alar incision was introduced [17].

Cho introduced trimming, a method involving scoring the reverse-U flap and using horizontal mattress sutures, and after that a mild change in the alar collumelar web occured after 5 years of follow up [18]. The structural support of the alar rim skin should be augmented with cartilage resulting in stronger and more stable newly formed alar rim contour. Tajima and Maruyama aIso do not use cartilage grafts and typically rely on " fibrosis " to retain the cartilage [12]. Unfortunately cartilage graft used to stabilize the framework if the suture technique are not sufficient to maintain the cartilage in anatomical position. Extra anatomical onlay cartilage graft can be located below, alongside, above the distorted lateral crus [21]. Comparability between other technique the alar rim contour graft, the web graft is not in the pocket and is not located in the lateral part of the rim, the web graft does not prevent upper skin collapse but attracts the lower vestibular skin as show in (Fig 9).

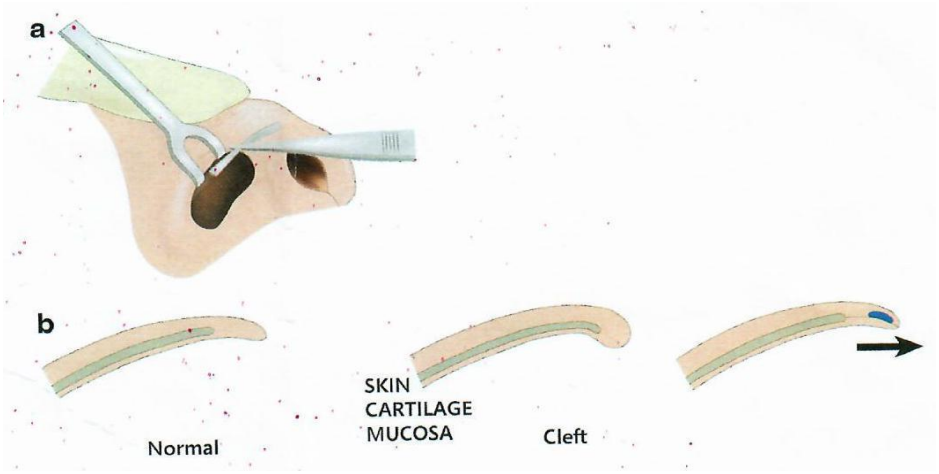


Fig. 9 Fig. 9 Comparison between the nasal web graft technique and the alar rim contour graft. (A); The location of the alar contour graft is deep within the surface of the lateral crus just anterior to the vestibular skin, in a subcutaneous pocket along the lateral part of the alar rim. (B); the nasal web graft is noting the pocket and is not located in the lateral part of the rim. It does not prevent upper skin collapse but attracts lower vestibular skin.

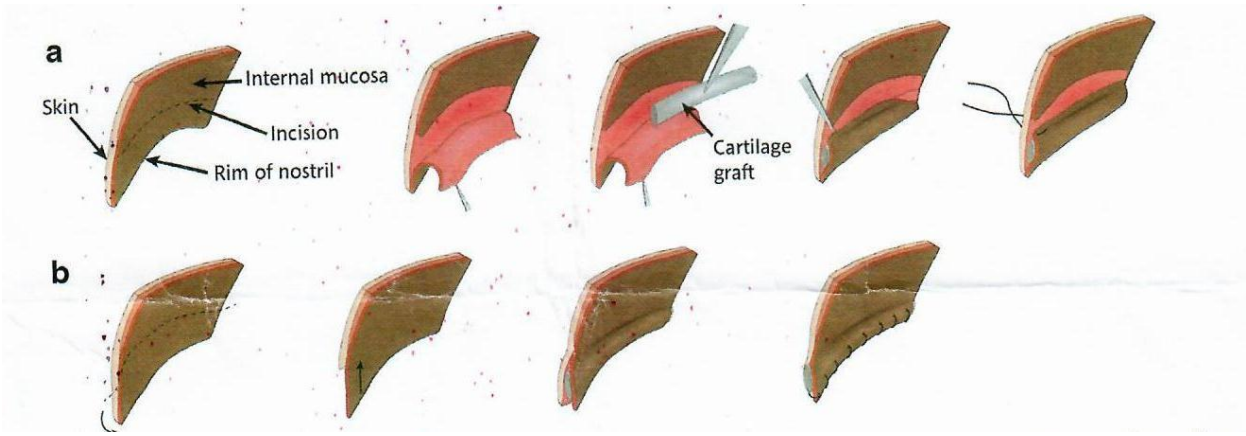


Fig 10: a nasal web graft compared with unfolding technique. (A); The unfurling is used to correct alar rim retraction due to skin deficiency and cartilage is inserted between the skin and vestibular mucosa (B); The nasal web graft corrects alar rim skin excess and the cartilage is inserted between the skin and infolded skin.

The web graft introduced to extend at least 2 mm to pass the infolded area medially and laterally, and the graft must be fit on the minimally trimmed inner surface of the web skin. When the graft fixed properly on the surface, it will be invisibly corrected the tendency of the web skin to recoil. The graft must not be located to close to the incisional margin to avoid a thick nostril arch. Of it located too far from the margin so it will not prevent the redroping of the distal alar rim skin. It is better to preserve much fat from the converted skin to assure the survival of the graft. The limitation of this study include the lack of the details information regarding the long follow up post operatively, although there were a sufficient records before and after photos. As the nature of the cleft nasal deformity is continuous and difficult to correct in both primary and secondary surgery, the outcome following surgery at an older age is potentially more important than static comparism, so the web graft have some advantage that it support the vestibular skin and it increase the strength of the new concavity tucked skin. The follow up period of this study was short because the patient disappear after we remove the stiches.

Conclusion:

The use of nasal septal cartilage for repair and correction of the nasal deformity of unilateral cleft lip as a web graft to support the vestibular skin lining through the reversed U shaped incision and increase the strength of the new concave of the tucked skin. The purpose of this article is to attempting to correct the asymmetrical alar web deformity in patients with cleft lip nasal deformity and to introduce our web graft technique. Rigid fixation of the dorsal skin with cartilage is recommended.

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