

Is Alar Cinch Suture Effective in Controlling Alar Base Widening in Le Fort I Osteotomy?

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ABSTRACT

Le Fort I osteotomy causes nasolabial alterations that may be unattractive, such as expansion of the alae and alar bases and thinning of the upper lip. After maxillary impaction, there is a propensity for the tip to elevate, and in some circumstances, this may even become excessive. The nasolabial angle closes and similar alterations are observed with maxillary advancement. When Le Fort I impaction or maxilla advancement occurs, the alar base cinch suture is frequently utilised to reduce the unfavourable rise in nasal width. There are significant changes in the nasolabial morphology associated with Le Fort I osteotomy. Numerous changes occur after the surgical intervention in the maxilla namely- widening of the alar base of the nose, upturning of the nasal tip, flattening and thinning of the upper lip and down turning of the commissures. Widening of the alar bases of the nose appears to be the most common undesirable outcome. Some people may benefit aesthetically from nasal widening. For instance, the long face syndrome is frequently characterised by a narrow nose with a large dorsum. In these situations, superior maxillary relocation typically improves the look of the nose by enlarging the bases of the arches. However, excessive alar base broadening and superior retraction would cause the alar-facial groove to aesthetically deepen, giving the patient an older appearance, and may cause asymmetry in the alae. It is crucial for the surgeon to comprehend the preoperative aesthetic facial linkages and anticipate any potential impact the surgical operation may have on the nasolabial region before performing maxillary surgery. To control the width of the alar base after maxillary osteotomy clinicians have advocated the placement of cinch sutures, reduction of the anterior nasal spine and use of V-Y closure technique. There are inconstant opinions on the effect of the cinch suture.

Keywords: Aesthetics, Alar-facial groove, Nasal tip, Nasolabial region, Nose, Upper lip

INTRODUCTION

Improved jaw function and facial aesthetics are the goals of surgery to treat maxillofacial abnormalities. Since, both factors are equally significant, achieving one goal should not come at the expense of the other. More uncertainty exists in the prognosis of the soft tissue response to surgical treatment of maxillary abnormalities than in that of the mandibular deformities. A typical surgical method for treating facial dentoskeletal abnormalities is Le Fort I osteotomy. But it can also result in unfavourable and unforeseen morphological alterations of the nose. The majority of the facial muscle insertions surrounding the nasal region, piriform rim, and anterolateral side of the maxilla are removed during the typical Le Fort I surgical approach. However, the buccinator muscle, which has a very powerful lateral pull when functioning, is unaffected by surgery. As a result of the tissue in the area lateralising, the upper lip becomes thinner and the alar base of the nose becomes wider. The secret to controlling the thickness of the lip, the width of the alar base, and the morphology of the overlying soft tissue is to manage these facial muscles, their insertions, and their orientation. By combining Le Fort I osteotomy with specific surgical procedures like the alar cinch and V-Y sutures, surgeons have attempted to limit this outcome [1]. The former aims to preserve the normal interalar width by reconstructing the interrupted muscles, in order to prevent lateral nasal deviations and to reduce nasal enlargement following surgery. There has not been any concrete proof that V-Y sutures are successful in preventing interalar width enhancement, so far as that is concerned. The data that are currently available in the literature appear to be contradictory, and there are still no reliable ways to predict nasal changes after Le Fort I osteotomy [1]. In most cases, inpatient preoperative variances, different treatment philosophies, and poor repeatability of the data collected can explain variations between individuals.

DISCUSSION

Studies/Authors not in Favour of Cinch Suture Placement

Howley C et al., studied the change in the alar base width after Le Fort I osteotomy with alar base cinch suture in 30 patients [2]. They concluded that there was an overall reduction in the width of the alar base between one and six months after operation. This indicated resolution of soft tissue swelling associated with the surgery but the average reduction was small and unlikely to be clinically significant. The initial findings suggested that the suture provides less benefit in controlling the alar width of the nose after Le Fort I Osteotomy.

Van LB et al., evaluated the changes in the nasal region in 26 patients caused due to orthognathic surgery [3]. They studied the nasal volume and alar width, using combined three-dimensional (3D) stereophotogrammetry and Cone Beam Computed Tomography (CBCT). Preoperative and postoperative documentation using the alar cinch suture techniques were performed. It was noted that there was no difference in the alar base width and nasal volume in the patients who had undergone an alar cinch and those who had not. In both the groups, the nose widened and volume increased.

Betts NJ et al., in their study on 32 patients who underwent Le Fort I osteotomy indicated that accurate prediction of the parameters can be done if the patients were grouped by vector specific maxillary movements [4]. They concluded that, in general the base of the nose widened in all the cases irrespective of the vector of surgical maxillary movement. They found that, alar base widened even more after using alar cinch suturing.

Sanroman F et al., reported no significant changes in nasal morphology after sub spinal Le Fort I osteotomy associated with alar cinch suture and V-Y closure. However, the study regarded only cases of maxillary advancement and elongation without impaction [5].

The correlation between movements and greatest interalar width was not investigated.

Studies/Authors in Favour of Cinch Suture Placement

Stewart A and Edler RJ, observed that measurement of alar base width after placement of cinch suture during operation is very difficult because of the presence of nasal endotracheal tube [6]. They measured nasal width in 36 patients before, during and 12 months after bimaxillary surgery with submental intubation. By changing to submental intubation, they found that better accuracy of the readings can be achieved. Measurements were taken at three, six and 12 months after the surgery which showed that cinch suture is effective in preventing the increase in nasal width produced during Le Fort I osteotomy.

Mani V et al., conducted a photographic study of 100 female patients aged between 18 and 30 years who underwent Le Fort I osteotomy to assess the changes in alar base widening [7]. The mean alar base width preoperatively was 14.11 mm and postoperatively was 15.28 mm. The mean increase in alar base width was 1.176 mm. There was a definite change between preoperative and postoperative alar width but the change was clinically not significant. The authors concluded that the effect on alar base width after Le Fort I osteotomy can be controlled by cinch suture without any additional anchorage on the Anterior Nasal Spine (ANS) with predictable results.

Westermarck AH et al., (1991) published a paper describing the effects of alar cinch suture on gaining control over alar flaring associated with Le Fort I osteotomy on 212 patients [8]. They aimed to evaluate the effect of the suture on lip and nasal morphology, particularly alar width and nasolabial angle. They measured not only the alar base width but also nasolabial angle. They concluded that cinch suture had a positive effect in controlling the alar base width but in addition, they found that there is a negative correlation between the suture technique and nasolabial angle. They concluded that the cinch suture reduced alar flaring but led to an increase in the nasolabial angle. Also, the effect of suture on nasolabial angle is far greater than it has on alar width. There was no significant effect on nasal tip projection.

Mustafa K et al., in their study on 30 patients discussed the factors contributing to alar flare widening as a result of Le Fort I osteotomy and the importance of alar cinch suture [9]. These 30 patients with vertical maxillary excess were divided into two groups of 15 each. One group was intubated via endonasal route, Le Fort I osteotomy was performed with superior repositioning without any additional procedure. The other group was subjected to cinch suturing as an additional procedure. This suturing was preceded by changing the intubation route to oral route.

They observed that after Le Fort I osteotomy the nasal aperture depth decreases which does not allow adequate space for the alar base to occupy. This causes the nasolabial muscles being pushed laterally which results in the interalar width widening. They concluded that alar cinch suture caused a significant reduction in alar flare width by preventing the lateral drift of the muscles. Also, they confirmed that cinch suture is not effective completely as it does not overcome the other contributing factors such as the loss of pyriform depth and septal resection.

Authors Perspective

The aesthetic outcomes of maxillary orthognathic procedures depend to a large extent on alar flare. Control over the alar anatomy is required to ensure superior surgical outcomes. In our series of 46 Le Fort I osteotomies, majority of them being superior repositioning and advancement, we placed cinch sutures engaging the anterior nasal spine. The authors use the alar cinch sutures in all the surgical repositioning of maxilla using Le Fort I osteotomy. In authors' experience significant improvement is evident with the use of alar cinch sutures to improve aesthetic appeal of nasal structures and prevention of alar flare [Table/Fig-1,2]. It was authors experience

that the use of non resorbable suture materials engaging the anterior nasal spine along with V-Y closure are essential surgical manoeuvres to achieve superior treatment outcomes.



[Table/Fig-1]: Preoperative and postoperative pictures showing alar flare in the above case in which cinch suture was not used.



[Table/Fig-2]: Pre and postoperative pictures showing improvement in alar flare after using cinch sutures.

CONCLUSION(S)

The nasal cinch suture offers adequate repositioning of the soft tissue to reduce postoperative nasal base enlargement due to the dissection and exposure of the paranasal musculature after Le Fort I osteotomy. If done correctly, tightening should produce an alar base width that is equal to or less than the preoperative width. This typically causes an abrupt upturning of the nose, a position of the upper lip that protrudes, and aedema. Within a few weeks, these present day alterations will cease to exist. The technique will result in a minor widening of the alar base from the preoperative measurement after healing. Authors' experience suggests that the cinch suture, using non resorbable suture material can minimise alar flare. Thus, authors' continue to use cinch sutures and V-Y closure in all cases.

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