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An Update on the Outcome of Primary Cleft Rhinoplasty

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Abstract

Primary cleft rhinoplasty has been a topic of interest over the decades. The cleft nasal deformities challenge all plastic surgeons. There is significant variability in the anatomy of each cleft deformity, but iatrogenic changes and scarring from the previous surgeries add another layer of complexity. There are lots of techniques described to address such deformities. These techniques were further refined and modified over time, but no one protocol is reported to be entirely satisfactory. A perfect nose with no deformity is unusual, but reasonably good results are achieved when the principles of nasal repair are fully applied. Moreover, there is still paucity in the outcomes reported, which makes it harder to evaluate the results of the primary rhinoplasty. And, even the few reported results are not evaluated according to standardized methods, making the evaluation subjective. This work aims to review recent literature on long-term primary rhinoplasty outcomes of unilateral cleft lip.

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Introduction

Cleft lip is the most common craniofacial abnormality and the second most common congenital defect in the United States, with an incidence of about 1 in 940 live births. ¹ The nasal deformity that accompanies cleft is a characteristic stigma in such cases. ²

Cleft rhinoplasties are very challenging due to the primary deformity of cartilage, bone, or skin and due to secondary scarring from previous surgeries. And, unlike cleft lip/palate, which has been well described in the medical literature, the cleft nose has received comparatively little attention.³

When to address cleft nose has remained debatable for decades. The cleft rhinoplasty is divided into primary, intermediate, and definitive. Primary rhinoplasty is to repair the nose simultaneously with cleft lip; definitive rhinoplasty is performed when the patient reaches facial skeletal maturity; intermediate rhinoplasty takes place in between.⁴

Nowadays, primary rhinoplasty has been adopted in the practice, and many techniques were

developed to repair the nasal deformities after it was long believed that early intervention would affect nasal growth.⁵ However, there is paucity in studies that assess long-term outcomes of these techniques, making it harder to evaluate the aesthetic results of primary rhinoplasty and the extent to which these results are satisfactory. ^{6,7}

Anatomy of External Nose

The external nose can be divided topographically into thirds: the upper one-third contains the paired nasal bones; the middle one-third contains the upper lateral cartilages (ULCs); and the lower onethird contains the lower lateral cartilages (LLCs). ⁸ The LLCs can be divided into medial, middle, and lateral crura **fig 1**. The middle crura are responsible for the shape of the pronasale, which is the most anterior part of the nasal tip. The medial crura are responsible for the length of the columella. The lateral crura are the largest and strongest, thus plays a major role in supporting the tip. The LLCs can also have an essential role in the shape of the ala. ⁸



Figure 1. lateral view of the normal nose, showing cartilages and soft tissues.⁸

Anatomy of Unilateral Cleft Lip

The characteristic features of unilateral cleft lip (UCL) and its nasal deformity have been documented by many authors and are presented in **table 1.** ^{3, 9} The cleft nasal deformity can be

divided into mucosal, cartilaginous, and osseous components, with the hallmark being threedimensional asymmetry of the nasal tip, the lower lateral cartilage, and the alar base. ³ Table 1. Characteristic features of unilateral cleft nasal deformity.³

Nose is asymmetric
Columella base deviates to the normal side
Alar base deviates laterally and inferiorly
LLC is flattened and elongated on deformity side
Nostril is wider on deformity side
Nostril is horizontally oriented on deformity side
Increased angle between medial and lateral crura on deformity side
Short medial crus on deformity side
Long lateral crus on deformity side
Caudal septum deviates towards the normal side
Nasal floor is absent on the deformity side (depends on severity)

On the normal side, inappropriate insertion of the orbicularis oris into the columella results in pulling the columella and the septum towards the normal side **fig 2**. On cleft side, the orbicularis oris inserts into the ala, pulling the alar base laterally and inferiorly. ^{9, 10}



Figure 2. The unilateral cleft nasal deformity. (a) frontal view; (b) basal view.³

The alar base displacement results in a deformed lower lateral cartilage (LLC) with shorter medial crus and longer lateral crus on cleft side. Therefore, the columella is shorter on cleft side, and the nostril will be horizontally oriented. Lastly, the nasal septum deviates caudally towards the non-cleft side. ^{9, 10}

Goals of primary rhinoplasty

The main goals of the primary rhinoplasty are to close the nasal floor and sill, reposition the alar base, and restore symmetrical contour to the lower lateral cartilages. ¹⁰

History of primary rhinoplasty

Historically, it was believed that rhinoplasty before facial skeletal maturity would result in inhibition of nasal growth based on animal studies that suggested disruption of nasal growth centers when interfered. ⁵ But there was not enough clinical evidence to support this assumption. ⁴

Consequently, lip repair without nose repair resulted in new pathological conditions like V-shaped nostril and small and flared nasal ala. This made these children experience considerable distress regarding their appearance during school age. ⁴ Due to lack of evidence about the interference of nasal growth, many surgeons have adopted primary rhinoplasty since the 1970s, and many techniques have been introduced. Afterward, long-term outcomes of primary rhinoplasty **fig 3** eliminated initial concerns that early nasal interference would inhibit growth. ¹¹⁻¹⁴

Moreover, a study showed that primary rhinoplasty could minimize the deformity that should be corrected at the time of definitive rhinoplasty and decrease the number of revisions needed. ¹⁵ However, inappropriate surgical interference can result in extensive scarring, claim opponents. ¹⁶



Figure 3. Salyer results. (A) right unilateral complete cleft lip and palate at 2 months of age; (B) result after primary rhinoplasty which needed secondary correction; (C) (D) (E) results following secondary correction. ¹¹

Recent long-term outcomes of primary rhinoplasty

Nowadays, primary cleft rhinoplasty is broadly accepted due to the evidence of improved outcomes and the need for fewer revisions. However, few studies have been able to assess long-term outcomes of primary rhinoplasty. ^{6, 7, 17}

In 2013, a retrospective 15-year follow-up after primary rhinoplasty for complete unilateral cleft lip was published in Indonesia. All patients were operated on by the same surgeon between 1995 and 1996; he repaired the nasal deformity at the same time of labial repair, using a triangular-flap method. All patients were managed by presurgical orthopedics. ¹⁷

Seventeen patients were followed up; eight of them (47.1%) needed secondary rhinoplasty. Lastly, this study found that primary rhinoplasty provided acceptable results but did not eliminate the need for secondary rhinoplasty **fig 4**. ¹⁷



Figure 4. (A) unilateral complete cleft lip. (B) one-year postoperative. (C, D) eight-years postoperative. (E, F) fifteen-years postoperative. There was no need for secondary revision. ¹⁷

A recent retrospective study reviewed primary rhinoplasty using the modified Sayler's technique ¹¹ with correction of the nasal deformity simultaneously with lip repair. None of those patients underwent presurgical orthopedics or nasal molding. ⁶

The patients did not require early nasal revisions before 14 years of age. 15 (26.8 %) patients (ranging from 15 to 23 years old) showed for follow-up; out of which ten did not need nasal revisions. This leaves us with a 33.3% rate of secondary rhinoplasty, but this rate is not entirely

accurate because only 15 patients out of 56 had follow-ups, and two patients were not completely satisfied but did not want to undergo more procedures. ⁶

It should be noted that more than 40% of the patients had incomplete cleft, which means less deformity and therefore better results **fig 5**, and all cases requiring definitive repair had complete cleft lip (P = 0.055). Moreover, assessment of nasal outcomes is based on patient satisfaction which leaves us with subjective evaluation. ⁶



Figure 5. patient with an incomplete unilateral cleft at 17 years of age. There was no need for secondary revision. ⁶

Another recent long follow up study reported the outcomes of one-hundred patients after primary rhinoplasty. In that study, thirteen percent of patients did not undergo any nasal revisions. Sixty-five percent required less than two revisions, and the rest had more than two revisions after primary rhinoplasty **fig 6**.⁷

However, the author chose to do nasal revisions whenever there was residual cleft deformity, for which revision was predictably successful; they were done at the time of alveolar bone grafting and other procedures. He claims that there would have been fewer nasal revisions and possibly the same outcome if they were not done concurrently with other procedures. ⁷



Figure 6. A case with repaired complete unilateral cleft lip who required several nasal revisions.⁷

He also claims that it was difficult to determine whether more nasal revisions were needed due to severe deformity at birth or early nasal revisions increased the deformity.⁷

The number of nasal maneuvers done during primary labial repair was considered to represent the cleft severity. And, more maneuvers were associated with more nasal revisions (β = 0.22; p < 0.01). fewer primary nasal maneuvers were performed as the surgeon's practice matured ($\beta = -0.20$; p < 0.01). therefore, there was a statistically significant association between recently treated patients and fewer nasal revisions in young adulthood (OR, 1.14; p = 0.04).⁷

Current Used Methods in Cleft Rhinoplasty

According to an electronic survey that was published in 2019, the use of primary nasal correction in complete UCL repairs was the most widely used method. 57% and 31% of respondents reported routinely using cleft rhinoplasty in the primary repair of complete UCL and incomplete UCL, respectively.¹⁸

Conclusion

More surgeons should report their follow-up outcomes which will make it easier to truly evaluate primary rhinoplasty. Since two studies reported a relationship between the severity of UCL and the outcome of primary rhinoplasty, more studies should be directed to evaluate this relation further. Lastly, outcomes should be evaluated according to standardized methods, making it easier to compare techniques.

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