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Original Research Article

A Retrospective Study of Impact of Primary Cleft Rhinoplasty on Subsequent Secondary Procedures in Unilateral Cleft Lip and Palate Patients

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Abstract:

Background: Unilateral cleft lip and palate (UCLP) represent a significant congenital deformity, often requiring multiple surgical interventions. This study focuses on understanding the impact of primary cleft rhinoplasty on the outcomes of secondary rhinoplasty procedures in UCLP patients.

Methods: A retrospective cohort study was conducted involving 70 patients with UCLP who underwent primary cleft rhinoplasty followed by secondary rhinoplasty. Data on surgical techniques, operative times, grafting requirements, and patient satisfaction were collected and analyzed. The study also assessed nasal symmetry and functionality post-surgery.

Results: The majority of patients who underwent primary rhinoplasty required less extensive secondary procedures, indicated by shorter operative times and reduced grafting needs. Improved nasal tip symmetry was observed in 86% of patient's post-primary rhinoplasty. Post-secondary rhinoplasty, 93% of patients reported high satisfaction with aesthetic outcomes, and 86% showed improved nasal airway function.

Conclusion: Primary cleft rhinoplasty plays a crucial role in reducing the complexity and extent of secondary rhinoplasty in UCLP patients. Early intervention in primary rhinoplasty leads to better long-term outcomes in terms of nasal symmetry, functionality, and patient satisfaction.

Recommendations: Early consideration of primary rhinoplasty should be integrated into the treatment plan for UCLP patients. Future research should focus on long-term follow-up and the development of standardized protocols for primary and secondary rhinoplasty in UCLP.

Keywords: Unilateral Cleft Lip and Palate, Primary Cleft Rhinoplasty, Secondary Rhinoplasty, Surgical Outcomes.

Introduction

Cleft lip and palate (CLP) represent one of the most common congenital deformities, affecting the orofacial region. Surgical intervention, primarily rhinoplasty, is a critical component in managing this condition. The primary cleft rhinoplasty, typically performed in infancy or early childhood, aims to correct nasal deformity and improve function. However, the long-term impact of this primary surgery on subsequent secondary rhinoplasties has been a subject of ongoing research and debate.

Primary cleft rhinoplasty is often performed as part of the initial lip repair in patients with unilateral CLP. The goals are to align the nasal cartilages, improve nasal symmetry, and establish a functional nasal airway. This early intervention is thought to reduce the severity of nasal deformity and potentially decrease the need for extensive secondary surgeries [1].

Despite initial corrections, many patients require secondary rhinoplasties later in life, particularly after completion of facial growth. These procedures are more complex due to the scar tissue and altered anatomy resulting from the primary surgery. Secondary rhinoplasty focuses on refining nasal shape, improving airway function, and addressing asymmetries that become more apparent with growth [2]. Some studies suggest that primary rhinoplasty can lead to more favourable outcomes in secondary procedures. By addressing major deformities early, primary rhinoplasty may simplify the challenges faced during secondary surgeries. A study [3] indicated that patients who underwent primary rhinoplasty required less extensive secondary procedures.

Conversely, there are concerns that primary rhinoplasty might complicate future surgeries. Scar tis-

sue and altered nasal growth patterns can make secondary procedures more challenging. Research [4] highlighted an increased incidence of revision surgeries in patients who had primary rhinoplasty. Advancements in surgical techniques and a better understanding of CLP growth patterns have led to improved outcomes. Surgeons now employ more conservative approaches in primary rhinoplasty to minimize long-term complications. Techniques like nasal molding and gradual correction strategies are being adopted to balance immediate aesthetic needs with long-term outcomes [5]. Therefore, this study focuses on understanding the impact of primary cleft rhinoplasty on the outcomes of secondary rhinoplasty procedures in UCLP patients.

Methodology

Study Design: A retrospective cohort study was conducted.

Study Setting: The study was conducted at 'PMCH' from 'January 2022 to July 2022'.

Participants: The study included 70 participants who have undergone primary cleft rhinoplasty followed by secondary cleft rhinoplasty at the study center.

Inclusion Criteria

- Patients with unilateral cleft lip and palate.
- Patients who underwent primary cleft rhinoplasty at an early age (typically within the first year of life).
- Patients who subsequently underwent secondary cleft rhinoplasty.
- Availability of complete medical records and follow-up data.

Exclusion Criteria

- Patients with bilateral cleft lip and palate.
- Patients who did not undergo primary rhinoplasty.
- Incomplete medical records or lack of follow-up data.
- Patients with additional craniofacial anomalies or syndromes.

Bias: To minimize selection bias, all eligible patients during the study period are included. Observer bias is reduced by having evaluations performed by independent surgeons not involved in the initial surgeries.

Variables: Variables included Primary cleft rhinoplasty, Outcomes of secondary cleft rhinoplasty (symmetry of the nasal tip, complexity of the secondary procedure, aesthetic and functional outcomes).

Data Collection and Analysis: Data is collected from patient medical records, including details of the primary and secondary rhinoplasty procedures, pre- and post-operative photographs, and surgical notes. A standardized form is used to ensure consistency in data collection.

Statistical Analysis: Descriptive statistics are used to summarize patient demographics and surgical details. Comparative analysis between the pre- and post-secondary rhinoplasty outcomes is performed using appropriate statistical tests (e.g., chi-square test for categorical variables, t-test for continuous variables). A p-value of less than 0.05 is considered statistically significant.

Ethical Considerations: Ethical approval is obtained from the institutional review board. Since the study involves retrospective data review, patient consent is waived, but patient confidentiality and data protection are strictly maintained.

Result

Table 1: Characteristics of the study

Parameter	Total Patients (N=70)	Number (%)
Gender Distribution		
• Male	70	40 (57%)
• Female	70	30 (43%)
Age at Primary Rhinoplasty	70	Range: 3-12 months. Mean age: 6 months
Age at Secondary Rhinoplasty	70	Range: 4-18 years. Mean age: 12 years.
Improved Nasal Tip Symmetry (Post-primary rhinoplasty)	70	60 (86%)
Extent of Secondary Procedures	70	
• Less Extensive (Shorter operative times, less grafting)	70	50 (71%)
• More Extensive (Due to suboptimal primary outcomes or growth)	70	20 (29%)
Patient Satisfaction (Post-secondary rhinoplasty)	70	65 (93%)
Improved Nasal Airway Function	70	60 (86%)
Complications	70	10 (14%)

A total of 70 patients who underwent primary cleft rhinoplasty followed by secondary cleft rhinoplasty were included in this study. The age at primary rhinoplasty ranged from 3 to 12 months (mean age:

6 months), and the age at secondary rhinoplasty ranged from 4 to 18 years (mean age: 12 years). The cohort consisted of 40 males (57%) and 30 females (43%).

The primary rhinoplasty resulted in improved nasal tip symmetry in 60 patients (86%). In these cases, the nasal deformity was significantly corrected, and the need for extensive secondary procedures was reduced.

Of the 70 patients, 50 (71%) required less extensive secondary rhinoplasty procedures, as evidenced by shorter operative times and less grafting material used. The remaining 20 patients (29%) required more extensive secondary procedures due to either suboptimal outcomes from the primary rhinoplasty or due to growth-related changes.

Post-secondary rhinoplasty, 65 patients (93%) reported satisfaction with the aesthetic outcomes, and 60 patients (86%) showed improved nasal airway function. The symmetry of the nasal tip was significantly improved in 58 patients (83%).

Complications were observed in 10 patients (14%), including minor wound infections (4 patients) and scar hypertrophy (6 patients). These complications were managed conservatively without the need for further surgical intervention.

Comparative analysis showed a statistically significant improvement in nasal tip symmetry ($p < 0.01$) and patient satisfaction ($p < 0.05$) post-secondary rhinoplasty. The need for extensive secondary procedures was significantly lower in patients who had successful primary rhinoplasty outcomes ($p < 0.05$).

Discussion

The key results of the study indicate that primary rhinoplasty can significantly improve the outcomes of secondary rhinoplasty. The majority of patients who underwent primary rhinoplasty required less extensive secondary procedures, as evidenced by shorter operative times and reduced need for grafting. This suggests that early intervention in primary rhinoplasty can lead to more favorable long-term nasal symmetry and functionality. Additionally, a high rate of patient satisfaction with aesthetic outcomes post-secondary rhinoplasty was observed, underscoring the positive impact of primary rhinoplasty on the overall success of nasal reconstruction in unilateral cleft lip and palate patients. These findings highlight the importance of considering primary rhinoplasty as a strategic step in the comprehensive treatment plan for cleft deformities, potentially reducing the complexity and extent of future surgical interventions.

A study [6] evaluating 78 cleft rhinoplasty operations focuses on the balance of nostril lengths in cleft rhinoplasty, emphasizing the technical nuances that contribute to successful outcomes in both primary and secondary rhinoplasties. Another significant contribution is a study [7] underscoring the benefits of early surgical intervention in primary rhinoplasty. This research aligns with the observations that primary rhinoplasty can significantly lessen the severity of secondary cleft nasal deformities, thereby simplifying subsequent interventions.

Further, a study [8] provides insights into the biological aspects of tissue remodeling in cleft surgeries. The focus on TIMP-2 elevation in primary operated cartilage offers a deeper understanding of the physiological changes post-primary rhinoplasty, which could influence secondary surgical outcomes.Additionally, research on secondary nasal deformities [9] highlights both subjective and objective improvements in facial appearance following secondary rhinoplasty in trauma and cleft patients. This study's findings corroborate observations regarding patient satisfaction and aesthetic outcomes in secondary procedures.A technique-focused study [10] demonstrates significant improvements using the component restoration technique, which could be valuable for surgeons aiming for optimal results in similar cases.

Moreover, a paper [11] discussing the current gaps in high-level evidence regarding cleft nasal deformity treatment outcomes suggests a need for more comprehensive studies in this area. Lastly, a systematic review [12] calls for more extensive prospective studies to ascertain the best timing for nasal surgeries in pediatric populations, a consideration crucial for planning primary rhinoplasties.

These studies collectively enrich the understanding of the complexities involved in managing cleft lip and palate deformities, especially concerning the timing, techniques, and long-term outcomes of rhinoplasty procedures.

They provide a broader context to the findings, suggesting a consensus on the importance of individualized treatment planning and the potential benefits of early intervention in primary rhinoplasty.

Conclusion

The study demonstrates that primary cleft rhinoplasty performed in patients with unilateral cleft lip and palate can positively impact the outcomes of secondary rhinoplasty. The majority of patients required less extensive secondary procedures and reported high satisfaction rates with aesthetic and functional outcomes. However, a subset of patients still required more extensive secondary interventions, underscoring the need for individualized treatment planning.

Limitations: The limitations of this study include a small sample population who were included in this

study. The findings of this study cannot be generalized for a larger sample population. Furthermore, the lack of comparison group also poses a limitation for this study's findings.

Recommendations: Early consideration of primary rhinoplasty should be integrated into the treatment plan for UCLP patients. Future research should focus on long-term follow-up and the development of standardized protocols for primary and secondary rhinoplasty in UCLP.

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List of abbreviations

UCLP - Unilateral Cleft Lip and Palate
CLP - Cleft Lip and Palate
PR - Primary Rhinoplasty
SR - Secondary Rhinoplasty
OR - Operative Time
GR - Grafting Requirements
NTS - Nasal Tip Symmetry
NAF - Nasal Airway Function
PS - Patient Satisfaction
RCT - Retrospective Cohort Study

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