International Journal of Research in Medical Sciences
Ramírez ARP et al. Int J Res Med Sci. 2024 Jul;12(7):2537-2544
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012

DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20241907

Case Series

Rhinoplasty approach for cleft lip and palate patients in a public institution in Mexico

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Received: 03 June 2024
Revised: 17 June 2024
Accepted: 18 June 2024

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ABSTRACT

Background: Cleft lip (CL) with or without cleft palate is a common condition in newborns, leading to significant anatomical defects and psychosocial problems. Surgical correction is crucial for improving aesthetic appearance and psychological well-being. Medical records of patients with cleft lip and palate were reviewed at a public hospital in Mexico City from March 2022 to April 2024. Preoperative and postoperative photographs were analyzed to assess aesthetic outcomes. Nine patients (5 males, 4 females) with unilateral cleft lip underwent definitive rhinoplasty, with a mean age of 17 years. Three approaches were identified: without prior secondary cheiloplasty (2 patients), with simultaneous cheiloplasty (1 patient), and following previous secondary cheiloplasty (6 patients). Costal cartilage grafts were used in 5 patients for structural support. Our study underscores the importance of combining lip and nasal corrections to enhance facial harmony. Personalized surgical plans based on the specific sequelae of primary cheiloplasty are essential for optimal results in cleft lip nasal deformity management.

Keywords: Cleft lip and palate, Rhinoplasty, Cheiloplasty, Costal cartilage grafts

INTRODUCTION

Cleft lip (CL) with or without cleft palate is a very common condition in newborn patients, with a global incidence of 0.2 to 2.3 per 1000 births.[1] Patients suffering from CL exhibit anatomical defects in all layers of the nose, including soft tissue, bone, cartilage, and mucous lining. In cases of complete unilateral CL, there is a deviation of the nasal tip, columella, and caudal septum towards the non-cleft side. Additionally, there is a shortened columella, a widening of the nasal tip and nostril, hypoplastic and flattened inferior lateral cartilage, shortened medial crura, and elongated lateral crura that form an S shape and shift posteriorly and inferiorly.[2] In contrast, in patients with complete bilateral CL, the alar bases are displaced posteriorly, laterally, and inferiorly. Both sides exhibit longer lateral crura, while the medial crura are short and underdeveloped. The nasal tip is wide, flat, and poorly projected, with a noticeable lack of projection. Additionally, the columella is shortened.[3]

Aesthetic deformities, particularly nasal deformities, can generate significant psychosocial problems, including poor social interactions and low self-esteem. Surgical correction of these nasal deformities is essential, as it can significantly improve both aesthetic appearance and psychological well-being, leading to better social integration and overall quality of life.[4]

The surgical correction of CL nasal deformity is complex due to the intricate anatomy and hetereogenous clinical presentation. Rhinoplasty in patients with CL can be performed at different stages of life. Some patients may receive primary rhinoplasty during the initial cheiloplasty, typically performed between 3 and 6 months of age. These patients often require secondary revisions during growth to address residual asymmetries. The other main intervention is definitive rhinoplasty, which is performed after skeletal facial maturity, usually between 15 and 17 years old in females and between 16 and 18 years old in males.[3,5,6] In most cases, due to the anatomical complexity, autologous grafts, such as rib cartilage grafting, are necessary to provide the structural support needed for achieving satisfactory aesthetic and functional results in the nose.[7]

For a long time, there was debate about whether nasal surgery should be delayed until the patient's facial growth was complete. However, concerns about disrupting nasal growth centers have diminished over time. Evidence now suggests that carefully dissecting the perichondrial surface and using repositioning sutures can enhance nasal shape without adversely affecting growth. Several studies have shown that early intervention with primary rhinoplasty at the time of lip repair leads to better long-term nasal form and reduces the need for complex secondary rhinoplasty procedures.[8,9]

Unfortunately, in developing countries, the complexity of CL surgeries and the need for specialized expertise often result in unsatisfactory surgical outcomes. This can lead to two main issues: more complex definitive rhinoplasties and secondary deformities in the lip, causing significant aesthetic sequelae due to the intricate nature of these procedures.

The objective of this study is to identify the management and aesthethic outcome of definitive rhinoplasty in patients with cleft lip and palate in a reference hospital in México City. We will also assess the need for secondary cheiloplasty to correct aesthetic sequelae in these patients based on different approaches.

CASE SERIES

Medical records of patients with a history of cleft lip and palate in a public reference Hospital in Mexico City were reviewed from March 2022 to April 2024. The study included patients over 15 years old who were candidates for rhinoplasty, had undergone previous cheiloplasty and/or palatoplasty in childhood, but had not previously undergone rhinoplasty. Also, all patients should have signed an informed consent and a permission to use their pictures for research purposes. Patients with previous rhinoplasty not performed in our institution were not included. Preoperative and postoperative photographs of these patients were analyzed, including frontal, right lateral, left lateral, and basal views. An aesthetic-facial analysis and description of sequelae from primary cheiloplasty were performed, following the methodologies of Stal et al and Brito et al. [10,11]

Between March 2022 and April 2024, a total of 68 records were screened for inclusion, 59 patients were not included because primary rhinoplasty was not yet performed at the moment of this study. A total of 9 patients with a history of cleft lip and palate underwent definitive rhinoplasty surgery at the General Hospital of Mexico 'Dr. Eduardo Liceaga'. These surgeries were performed by different fourth-year residents in the Plastic and Reconstructive Surgery department. The mean age at the time of rhinoplasty was 17 years, ranging from 15 to 21 years old. The study included 5 males and 4 females, all of whom presented with unilateral cleft lip accompanied by nasal and secondary lip deformities.

We identified three different approaches to rhinoplasty in this unit, each of which could be performed with or without costal cartilage harvesting.

The three groups of interventions were as follows.

Group 1: Two patients underwent definitive rhinoplasty without prior secondary cheiloplasty for lip correction.

Group 2: One patient had both rhinoplasty and secondary cheiloplasty performed in the same surgical session.

Group 3: Six patients had rhinoplasty after previously undergoing secondary cheiloplasty for lip correction.

In all cases, an open rhinoplasty approach was used. The distribution and aesthethic outcomes of these interventions are summarized in Figure 1, Table 1 and 2.

Table 1: Aesthetic and surgical sequelae of included subjects before initial surgical approach.

Surgical approach	Short Lip	Long Lip	Misaligned White roll	Vermilion notch	Myorrhaphy dehiscence	Excessive scarring
Rhinoplasty Without previous secondary cheiloplasty (n=2)	0/2	2/2	2/2	2/2	1/2	2/2
Rhinoplasty With Simultaneous secondary cheiloplasty (n=1)	0/1	1/1	1/1	1/1	1/1	1/1
Rhinoplasty With prior secondary cheiloplasty (n=6)	3/6	0/6	4/6	4/6	2/6	5/6

Table 2. Aesthetic and surgical sequelae of included subjects after secondary cheiloplasty approach.

Surgical approach	Short Lip	Long Lip	Misaligned White roll	Vermilion notch	Myorrhaphy dehiscence	Excessive scarring
Rhinoplasty Without previous secondary cheiloplasty (n=2)	0/2	2/2	2/2	2/2	1/2	2/2
Rhinoplasty With Simultaneous secondary cheiloplasty (n=1)	0/1	0/1	0/1	0/1	0/1	0/1
Rhinoplasty With prior secondary cheiloplasty (n=6)	0/6	0/6	0/6	0/6	0/6	1/6

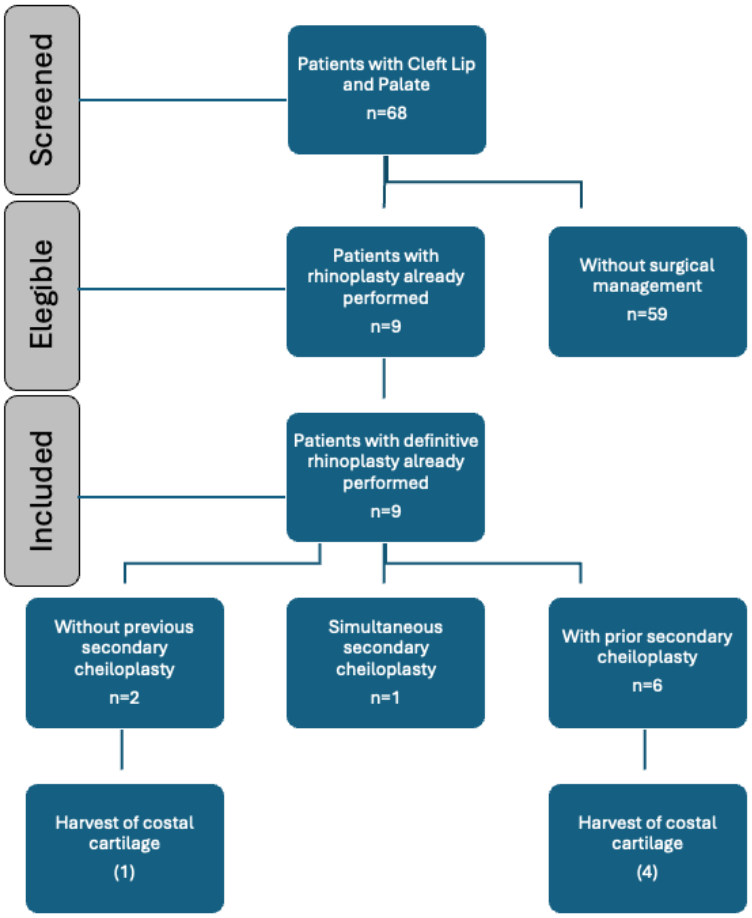

Figure 1: Flowchart describing the process and characteristics of included subjects.

Group 1: Rhinoplasty without secondary lip surgery

Two cases were found to follow this approach. Case one received surgery without costal cartilage graft while case two had costal cartilage harvest.

Case 1

Male, 21 years old, operated in 2022. In Figure 2 A, D, G, and J show preoperative images before definitive rhinoplasty, depicting a dorsal "C shape deviation," asymmetric dorsal aesthetic lines, a dorsum with an osteocartilaginous hump, an under-projected and under-rotated tip, an acute nasolabial angle, collapsed ala, asymmetric nostrils, and sequelae of primary cheiloplasty with a short lip, misaligned white roll, vermilion notch, and muscular mamelons secondary to dehiscence of orbicularis oris muscle repair. In Figure 2 B, E, H, and K, postoperative images at two months after definitive rhinoplasty show an aligned dorsum but poorly defined dorsal aesthetic lines, a tip adequately projected and rotated, a nasolabial angle greater than 90°, collapsed ala, and slight asymmetry in nostrils. In C, F, I, and L (Figure 2), the two-year follow-up images demonstrate a slight drop in the nasal tip, with the same sequelae from his primary cheiloplasty still present.

Figure 2: (A, D, G and J) show preoperative conditions; (B, E, H and K) show postoperative results after two months after surgery and (C, F, I and L) show postoperative results two years after surgery.

Figure 3: (A, D, G and J) show preoperative conditions; (B, E, H and K) show postoperative results after two months after surgery and (C, F, I and L) show postoperative results two years after surgery.

Case 2

Female, 16 years old, operated in 2022. Figure 3 A, D, G, and J show preoperative images before definitive rhinoplasty, depicting dorsal deviation in a "C" shape, asymmetrical dorsal aesthetic lines, a dorsum with an osteocartilaginous hump, an under-projected and under-rotated tip, an acute nasolabial angle, hanging ala, asymmetric nostrils, and sequelae of primary cheiloplasty with a short lip, misaligned white roll, vermilion notch, and excessive scarring. Postoperative images Figure 3B, E, H, and K at two months after definitive rhinoplasty show poorly defined dorsal aesthetic lines, an aligned dorsum, a tip properly projected and rotated, a nasolabial angle greater than 90°, hanging ala, and slightly asymmetric nostrils. Figure 3C, F, I, and L, two-year follow-up images, show a slight descent of the nasal tip, collapse of the right dome, right soft triangle collapse, and asymmetrical nostrils, with the same sequelae from her primary cheiloplasty still present.

Group 2: Rhinoplasty with simultaneous cheiloplasty

Case three was an open approach to rhinoplasty, and surgical correction of aesthetic sequelae of the lip during the same surgical time, without harvesting costal cartilage.

Figure 4: (A, D, G and J) show preoperative conditions; (K) immediate postoperative basal view of definitive rhinoplasty; (B, E, and H) show postoperative results two months after surgery and (C, F, I and L) show postoperative results two years after surgery.

Case 3

Male, 20 years old, operated on in 2022. Preoperative images (Figure 4A, D, G, and J) show deviation in an “S” shape, asymmetric dorsal aesthetic lines, smooth dorsum, poorly defined tip, under-projected and under-rotated tip, acute nasolabial angle, right alar rim notch, hanging ala, hanging columella, and adequately symmetrical nostrils. Sequelae from primary cheiloplasty include a long lip, misaligned white roll, vermilion notch, and dehiscence of orbicularis oris myorrhaphy. Immediate postoperative images (Figure 4 K) show adequate nostril symmetry.

Two-month postoperative images (Figure 4 B, E, and H) show an aligned dorsum, symmetrical dorsal aesthetic lines, tip with appropriate projection and rotation, nasolabial angle >90°, hanging ala, slight asymmetry in nostrils, and hypertrophic lip scar. Two-year follow-up images (Figure 4C, F, I, and L) show a slight drop of the nasal tip, alar collapse, lateral wall collapse on the cleft side, resulting in evident asymmetry of the right nostril, and decreased lip scar with proper alignment of the white roll.

Group 3: Rhinoplasty with previous secondary cheiloplasty

In the following group of patients, those who had previously undergone surgical correction of aesthetic sequelae in the lip and subsequent open rhinoplasty were: case four and six without harvesting costal cartilage, the rest with costal cartilage graft harvesting.

Figure 5: (A, D, G and J) show preoperative conditions; (K) immediate postoperative basal view of definitive rhinoplasty; (B, E and H) show postoperative results two months after surgery and (C, F, I and L) show postoperative results two years after surgery.

Case 4

Female, 15 years old, underwent secondary cheiloplasty in 2022 and definitive rhinoplasty in 2023. Preoperative images (Figure 5A, D, G, and J) show deviation in an "S" shape, poorly defined dorsal aesthetic lines, wide bony and cartilaginous vaults, poorly defined tip, osteocartilaginous hump, bulbous under-projected and under-rotated tip, acute nasolabial angle, retracted alar rim, alar collapse, and short columella. Nostrils show adequate symmetry with no sequelae from previous cheiloplasty. Immediate postoperative image (Figure 5K) shows nostril asymmetry. Two-month postoperative images (Figure 5B, E, H) show an aligned dorsum but poorly defined dorsal aesthetic lines, a wide bony and cartilaginous vault, properly projected and rotated tip, nasolabial angle >90°. One-year follow-up images (Figure 5C, F, I, L) show adequate nasal tip projection and rotation, alar rim collapse, and lateral wall collapse on the cleft side, resulting in left nostril asymmetry with no lip sequelae.

Case 5

Female, 18 years old, underwent secondary cheiloplasty in 2022 and definitive rhinoplasty with autologous costal graft in 2023. Preoperative images of definitive rhinoplasty (Figure 6A, C, F, and I) show an S-shaped deviation, asymmetrical dorsal aesthetic lines, poorly defined tip, dorsum with osteocartilaginous hump, square under-projected and under-rotated tip, acute nasolabial angle, right dome collapse, hanging ala, retracted columella, and asymmetrical nostrils with no cheiloplasty sequelae. Immediate postoperative images (Figure 6D and K) show adequate tip projection and rotation, and smooth dorsum. One-year postoperative images (Figure 6B, E, H, and J) show aligned dorsum, symmetrical dorsal aesthetic lines, collapse of the right dome and lateral wall, and excessive lip scarring.

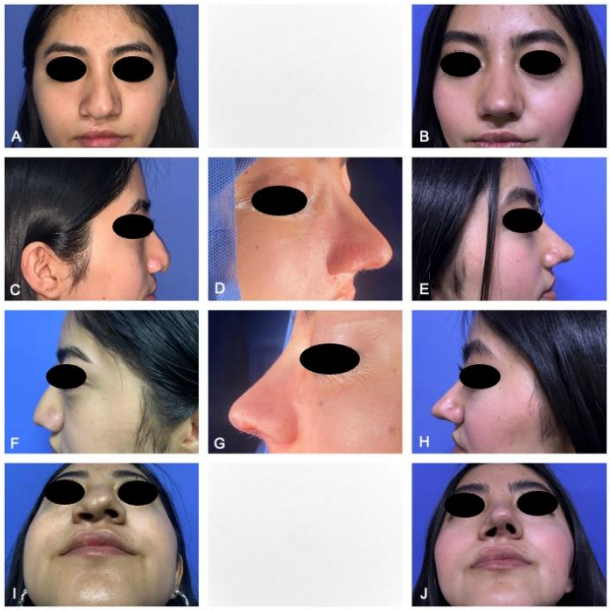

Figure 6: (A, C, F and I) show preoperative conditions of definitive rhinoplasty; (D and G) show immediate postoperative results; (B, E, H and J) show postoperative results after one year of surgery.

Case 6

Female, 18 years old, underwent secondary cheiloplasty in 2023 and definitive rhinoplasty two months later. Preoperative images of secondary cheiloplasty (Figure 7A, D, G, and J) show an S-shaped deviation,

asymmetrical dorsal aesthetic lines, poorly defined tip, dorsum with osteocartilaginous hump, bulbous under-projected and under-rotated tip, acute nasolabial angle, left dome collapse, hanging ala, retracted columella, asymmetric nostrils, and sequelae of cheiloplasty including a short lip, misaligned white roll, vermilion notch, and excessive scarring. One-month postoperative images of definitive rhinoplasty (Figure 7B, E, H, and K) show a properly projected and rotated tip, smooth dorsum, poorly defined dorsal aesthetic lines. One-year follow-up images (Figure 7C, F, I, and L) show a drooping tip, aligned dorsum, poorly defined dorsal aesthetic lines, asymmetric nostrils, collapsed left soft triangle, and no lip sequelae.

Figure 7: (A, D, G and J) show preoperative conditions of secondary cheiloplasty; (B, E,H and K) show one month postoperative results of definitive rhinoplasty and (C, F, I and L) show postoperative results after one year of surgery.

Case 7

Male, 15 years old, underwent secondary cheiloplasty in 2023 and definitive rhinoplasty in 2024 with rib cartilage graft. Preoperative images (Figure 8A, D, and G) of secondary cheiloplasty show misaligned white roll, orbicularis oris myorrhaphy dehiscence, vermillion notch, and excessive scarring. Preoperative images of definitive rhinoplasty (Figure 8B, E, H, and J) show left dorsal deviation, asymmetrical dorsal aesthetic lines, poorly defined tip, wide bony and cartilaginous vault, smooth dorsum, bulbous under-projected and under-rotated tip, acute nasolabial angle, right dome collapse, hanging ala, short and retracted columella, and asymmetrical nostrils. One-month postoperative images (Figure 8C, F, I, and K) show a properly projected and rotated tip, smooth aligned dorsum, symmetrical dorsal aesthetic lines, and asymmetric nostrils, with no lip sequelae.

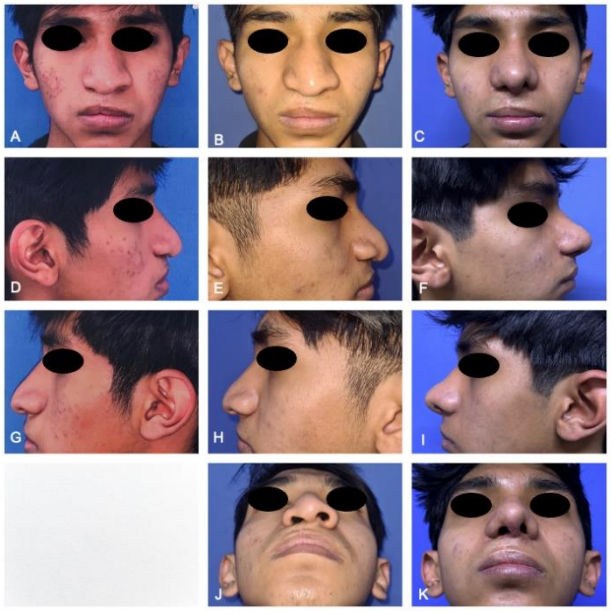

Figure 8: (A, D and G) show preoperative conditions of secondary cheiloplasty; (B, E, H and J) show preoperative images of definitive rhinoplasty and (C, F, I and K) show postoperative results after one month of surgery.

Figure 9: (A, D, and J) show preoperative conditions of secondary cheiloplasty; (B, E, H and K) show preoperative images of definitive rhinoplasty and (C, F, I and L) show postoperative results after one month of surgery.

Case 8

Male, 18 years old, underwent secondary cheiloplasty in 2023 and definitive rhinoplasty in 2024 with rib cartilage graft. Preoperative images of secondary cheiloplasty (Figure 9A, D, G, and J) show a short lip, misaligned

white roll, vermilion notch, and excessive scarring. Preoperative images of rhinoplasty (Figure 9B, E, H, and K) show right dorsal deviation, asymmetrical dorsal aesthetic lines, poorly defined light points, dorsum with a dorsal hump, bulbous under-projected and under-rotated tip, acute nasolabial angle, alar retraction, and hanging columella. One-month postoperative images (Figure 9C, F, I, and L) show a properly projected and rotated tip, smooth aligned dorsum, symmetrical dorsal aesthetic lines, symmetrical nostrils, with no lip sequelae.

Case 9

Male, 16 years old, underwent secondary lip surgery in 2022 and definitive rhinoplasty in 2024 with rib cartilage graft. Preoperative images of secondary cheiloplasty (Figure 10A, D, G, and J) show a short lip, misaligned white roll, vermilion notch, orbicularis oris myorrhaphy dehiscence, and excessive scarring. Preoperative images of definitive rhinoplasty (Figure 10B, E, H, and K) show reverse C-shaped dorsal deviation, wide bony and cartilaginous vault, asymmetrical dorsal aesthetic lines, poorly defined light points, osteocartilaginous hump, bulbous under-projected and under-rotated tip, acute nasolabial angle, right dome collapse, hanging ala, retracted columella, short columella, and slight nostril asymmetry. One-month postoperative images (Figure 10C, F, I, and L) show a properly projected and rotated tip, smooth aligned dorsum, symmetrical dorsal aesthetic lines, symmetrical nostrils, with no lip sequelae.

Figure 10: (A, D, and J) show preoperative conditions of secondary cheiloplasty; (B, E, H and K) show preoperative images of definitive rhinoplasty and (C, F, I and L) show postoperative results after one month of surgery.

DISCUSSION

Aesthetic rhinoplasty is a complex surgical procedure that is constantly evolving to improve long-term cosmetic results without compromising the function of the nose.[12] This complexity is further amplified in patients with cleft lip and palate, where successful surgery requires not only surgical expertise but also a deep understanding of the underlying pathological anatomy and the evolution of the deformity over time Patients with cleft lip and palate often present with intricate nasal and lip abnormalities that pose significant surgical challenges. Consequently, the use of graft materials from the nasal septum, rib, and/or ear is frequently necessary and recommended for achieving successful correction of these deformities.[13]

In our study, we found that a total of 5 patients received a costal graft. The use of costal cartilage is often necessary for successful rhinoplasty in patients with cleft lip and palate. Without harvesting costal cartilage, the nasal tip tends to fall, decreasing the nasolabial angle, as demonstrated in cases where costal cartilage was not used. Costal cartilage provides the necessary structural support, whereas ear cartilage is too thick and not strong enough to perform the reconstruction effectively. Thinly carved costal cartilage is preferred as it offers the required strength without adding excessive thickness to the sidewall of the nose.[7]

Regarding the relationship between aesthetic outcomes and the use of grafts, our study shows that patients who received grafts have good aesthetic outcomes. However, without a proper control group, it is not possible to conclusively determine if grafts generate better aesthetic results in our sample.

In the first group of patients, it was observed that not performing a secondary cheiloplasty prior to rhinoplasty could result in suboptimal outcomes. Patients in this group continued to present significant aesthetic sequelae in the lip, leading them to seek further corrections. Despite this, good aesthetic results were still found in the reported cases.

Unfortunately, most patients with cleft lip and palate in our setting present with some type of lip sequelae, and addressing these lip issues through secondary cheiloplasty before performing definitive rhinoplasty is recommended (group 3). This comprehensive approach, which involves correcting the lip deformity first, can optimize the position and configuration of the nasal base, nostrils, and columella, thereby enhancing the overall facial harmony for individuals with this congenital condition. We suggest that a comprehensive approach involving both lip and nasal correction can significantly improve facial harmony and balance in patients with cleft lip deformities, leading to an acceptable and favorable surgical outcome for the patient.[7,9,15,16]

This study has several limitations that should be considered when interpreting the results. First, the small sample size limits the generalizability of the findings.

With only nine patients included, the study may not fully capture the variability in outcomes that can occur in a larger, more diverse population. Second, the retrospective design of the study introduces potential biases, such as selection bias and recall bias, which can affect the accuracy and completeness of the data collected. Third, the heterogeneity of previous cleft lip surgeries and aesthetic outcomes among the patients adds another layer of complexity, making it difficult to draw definitive conclusions about the effectiveness of different surgical approaches. Additionally, the absence of a proper control group means that the observed improvements in aesthetic outcomes cannot be conclusively attributed to the use of grafts or specific surgical techniques. Finally, the surgeries were performed by different fourth-year residents, which may introduce variability in surgical skill and technique. Future studies with larger sample sizes, prospective designs, and standardized surgical protocols are needed to better understand the optimal approaches for rhinoplasty in patients with cleft lip and palate.

CONCLUSION

The decision to perform a previous cheiloplasty, a simultaneous cheiloplasty along with definitive rhinoplasty, or to proceed directly with a definitive rhinoplasty should be personalized for each individual patient, based on the specific sequelae or results of the primary cheiloplasty.

The cases presented demonstrate the complexity of managing cleft lip nasal deformities, highlighting the importance of a multidisciplinary approach that addresses both aesthetics and function.

We suggest harvesting costal cartilage, as the cartilages of cleft patients are weak and require additional structural support to the nose.

ACKNOWLEDGEMENTS

We thank all the patients who participated in this study. We also appreciate the medical staff and fourth-year residents of the Plastic and Reconstructive Surgery Department at the General Hospital of Mexico 'Dr. Eduardo Liceaga' for their support and expertise.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

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Cite this article as: Ramírez ARP, López RLRLY, Guerrero ORRG, Rubio KFGG, Zamudio ST. Rhinoplasty approach for cleft lip and palate patients in a public institution in Mexico. Int J Res Med Sci 2024;12:2537-44.