

Modification of the Mulliken Technique for Reconstruction of Naso-Labial Clefts

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Received: January 10, 2025; **Accepted:** January 27, 2025; **Published:** February 03, 2025

ABSTRACT

Bilateral lip clefts represent one of the most common craniofacial malformations, which manifest themselves in various amplitudes or severities. Cleft lip and palate represent the most common congenital craniofacial malformation worldwide, occurring in approximately 1 in every 1000 live births. BCLP has characteristics such as a short or missing columella, a flat nasal tip, a prominent and rotated premaxilla, and flared alar bases. The repair of these deformities has been treated for centuries, using multiple techniques and modifications used for surgical correction, hoping to obtain the best result taking into account that the prolabium and premaxilla are found in many situations without prior orthopedic management, the reconstruction of the anatomical structures is a challenge for the surgeon. The following report presents a modification of the Mulliken technique for closing bilateral labial clefts, since 2023 to 2024 was used in 9 pediatric patients between the ages of 3 months to 7 years, in The Maternidad Castillo Plaza in Maracaibo, Venezuela; to get the proposed objectives, from the closure of the nasal plane with a bowtie of labial mucosa tissue from the lateral flap to the conformation of the lip, vermillion, symmetries of the cartilage, nasal wings and heights of the nasal columella.

Keywords: Mulliken Technique, Bilateral Cleft Lip, Modified Flap Design, Flag-Shaped Flaps

Abbreviations

BCLP Bilateral cleft lip and palate

Introduction

Cleft lip and palate represent the most common congenital craniofacial malformation worldwide, occurring in approximately 1 in every 1000 live births [6]. Bilateral cleft lip and palate BCLP has characteristics such as a short or missing columella, a flat nasal tip, a prominent and rotated premaxilla, and flared alar bases. These anomalies can cause several problems such as defective speech, impaired suckling, deafness, gross facial deformity, malocclusion, and serious psychological issues. They can also bring tremendous stress to the whole family [7].

Cheiloplasty techniques for the management of complete or incomplete bilateral lip clefts have been constantly modified to improve the relationship between nose-lip cleft deformity. Based on the principles of the Mulliken technique, it has been possible to develop this modification. The main objective of which is the formation of the nasal floor with the mucosal flap of the bilateral lateral labial segments. It is known that in the Mulliken technique, the incisions of the alar bases allow the repositioning of the alar cartilages to achieve symmetry and an acceptable columella height [1].

The principles by Mulliken are the basis of the modifications, which are 1) preserve symmetry, 2) restore muscular continuity, 3) use the prolabium judiciously to recreate the anatomical filter, 4) use lateral labial tissue to recreate the tubercle medial and mucocutaneous ridge, 5) reconstruct the nasal tip and columella by restoring the anatomy of the alar cartilage [1].

Citation: Mariduena Debora, Solano Nicolas, Arianna Hidalgo, Salomon Ramos. Modification of the Mulliken Technique for Reconstruction of Naso-Labial Clefts. J Stoma Dent Res. 2025. 3(1): 1-5. DOI: doi.org/10.61440/JSDR.2025.v3.15

Primary cheiloplasty and replacement of the premaxilla have been reported at the same surgical time, due to the protrusion of the premaxilla that intensifies the overjet and overbite as a result of vertical and horizontal displacements of the premaxilla. Without this replacement, it would be impossible to approximate the orbicularis oris muscles. In such a case of correcting the nasolabial cleft with a protruded premaxilla, the interalar distance would remain wide, there would be a distortion in the prolabium and an extended scar [2].

Furthermore, it is important to mention the principles of rotation and advancement, for which the flag flaps proposed by Dr. Tulio Chacín consist of a flap on the vermillion, with a distal end and a proximal base. These flaps allow the orbicularis muscles to be reorganized. lips, with advantages such as allowing flexibility in the technique by modifying the design, incisions, and repair. [3].

Bilateral lip clefts represent a challenge for the surgeon, due to the small number of tissues and the projection of the premaxilla, which is why it has been described that this technique through anthropometric measurements has achieved not only a height and projection of the columella but rather the replacement of the alar cartilages, the use of this flap provides adequate closure of the nasal floor with a greater amount of tissue, maintaining the principles.

Mulliken technique

Mulliken in 1985 identified the correction of early nasal deformity and bilateral lip clefts using this technique. The main characteristic is to make a narrow flap in the prolabium to reconstruct the filter [4].

The design of the Mulliken technique begins with the marking of the prolabial flap, 2.0 to 2.5 mm at the base and 3.5 to 4 mm between the highest points of the cupid's bow, and both incisions in the bilateral segments for the flap, are infiltrated with lidocaine with epinephrine, the prolabial flap is lifted, and the lateral labial segments, dissecting the vermillion, the Cupid's bow and the vermillion tubercle are made. This technique promotes incisions on the edges of the alar bases. Finally, the lateral segments were advanced towards the prolabium facing the orbicularis oris muscles including the periosteum of the anterior nasal spine. The central vermillion tubercle is formed with bilateral mucovermillion flaps, the dissected alar cartilages will be repositioned in the incisions at the base of both nasal wings with 5-0 prolene and the closure of the respective planes [1].

This means that Mulliken uses bilateral alar rim incisions to approach and dissect the alar cartilages which are sutured with interdental sutures and also ipsilateral lower to upper lateral cartilage sutures [8].

Case Report Modified Mulliken Technique

An infant male patient under 4 months of age with a diagnosis of complete bilateral cleft lip (Figure 1), managed at the Castillo Plaza Maternity Hospital in the city of Maracaibo, Venezuela, underwent primary rhinocheiloplasty surgery under general anesthesia with orotracheal intubation. Lidocaine with 2% epinephrine at 1:80,000 was infiltrated into the mucosa of the premaxilla; an incision was made in the vomerian mucosa for vomer osteotomy, the subsequent retrusion of the premaxilla

and sutured from the vomerian mucosa to the mucosa of the premaxilla.

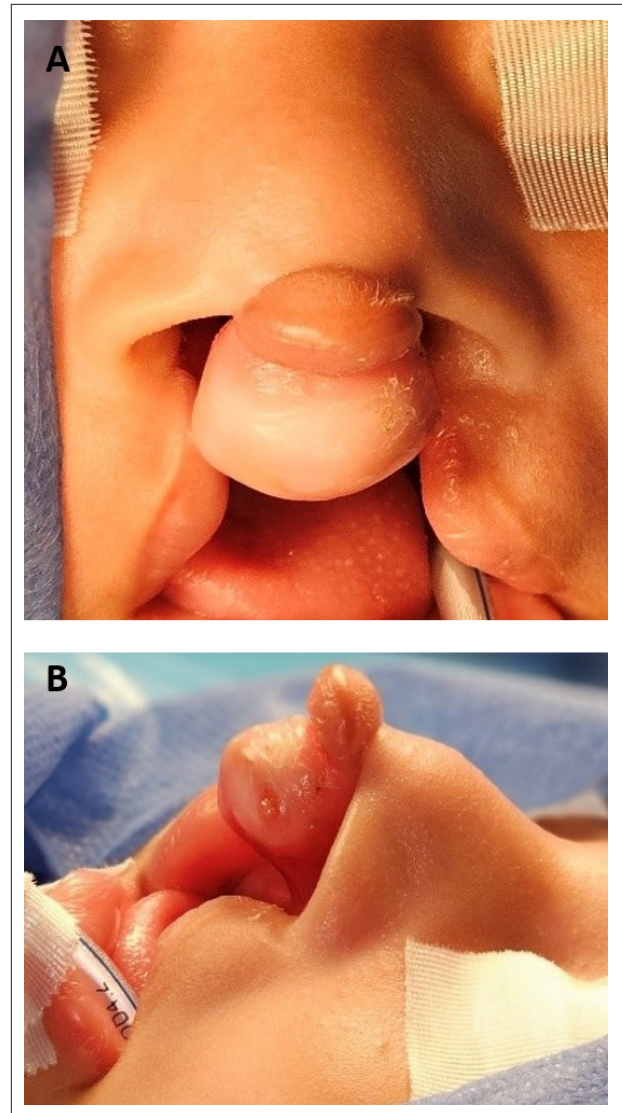


Figure 1A: Frontal Pre Operative View

Figure 1B: Lateral Pre Operative View

The following reference points were marked with methylene blue before lidocaine infiltration. (Figure 2)

1. The highest point of the right cupid's bow on the prolabium.
2. Center of the philtrum in the prolabium.
3. The highest point of the left cupid's bow on the prolabium, is equidistant from points 1 and 2.
4. Lateral wall of the right columellar base.
5. Lateral wall of the left columellar base.
6. At the mucocutaneous limit. Center of the right lip philtrum.
7. At the mucocutaneous limit. Center of the left lip philtrum.

Using the reference points, the following flaps were designed:

Flap A: Right labial mucosa: objective to reconstruct the posterior wall of the lip, fixed on the alveolar ridge

Flap B: Left labial mucosa: reconstruct the posterior wall of the lip, fixed on the alveolar ridge

Two vertical parallel lines were continued from points 1 and 3 to points 4 and 5 to form the design. incision and dissection were made, and a mucosal plane and cutaneous plane were obtained.

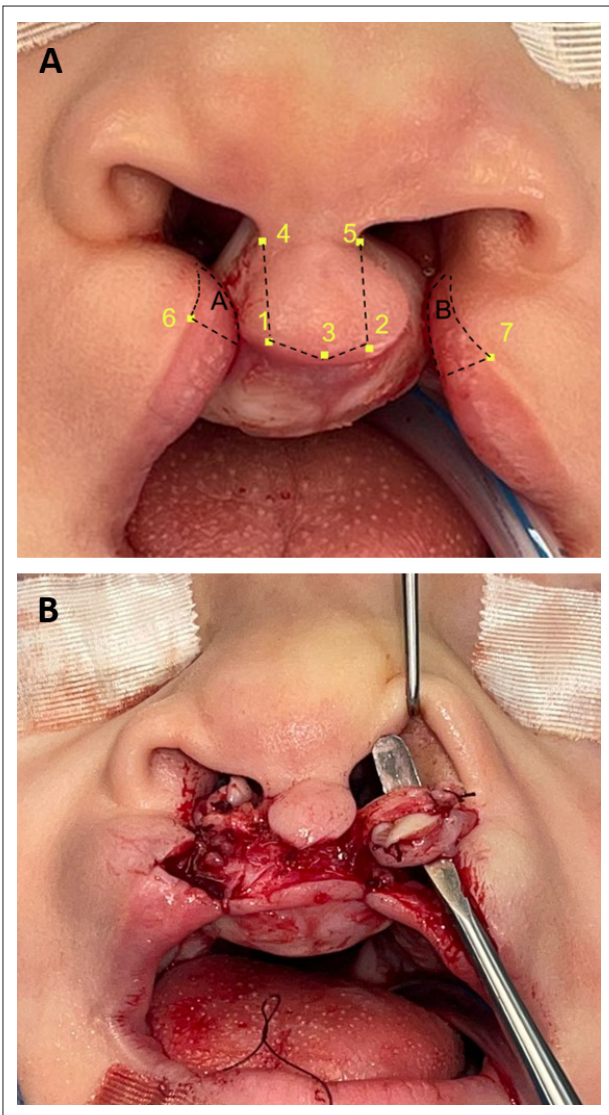


Figure 2A: Marking Of The Reference Points

Figure 2B: Incision And Dissection Of The Lateral Flag-Shaped Flap And The Prolabium Flap.

The flaps were designed in a flag shape, both flaps released from the vermillion, of which approximately 5 mm of mucosa was left, the planes are dissected and the mucosal and muscular planes were obtained, along with the flag flaps were transposed cephalad and fixed on the nasal floor and the alveolar bone respectively for bilateral nasolabial reconstruction. the posterior part of the lip and the oral vestibule were created. Closing the mucosa of the lateral labial segments and the mucosa of the prolabium.

Therefore, the closure was continued by planes, the muscular plane of both flaps up to the midline with 4-0 vicryl, labial mucosa plane, vermillion, and finally the skin was closed with 5-0 prolene of both segments with the prolabium with simple stitches, It is important to emphasize the Z-plasty performed on the labial semi-mucosa to avoid the whistling effect. In this modification, the incision was not made at the base of the nasal wings.

Periodic controls were maintained for postoperative supervision and removal of stitches, and healing without complications was observed, without dehiscence, formation of the nasal floor, labial philtrum, and symmetries in both nostrils. (Figure 3)

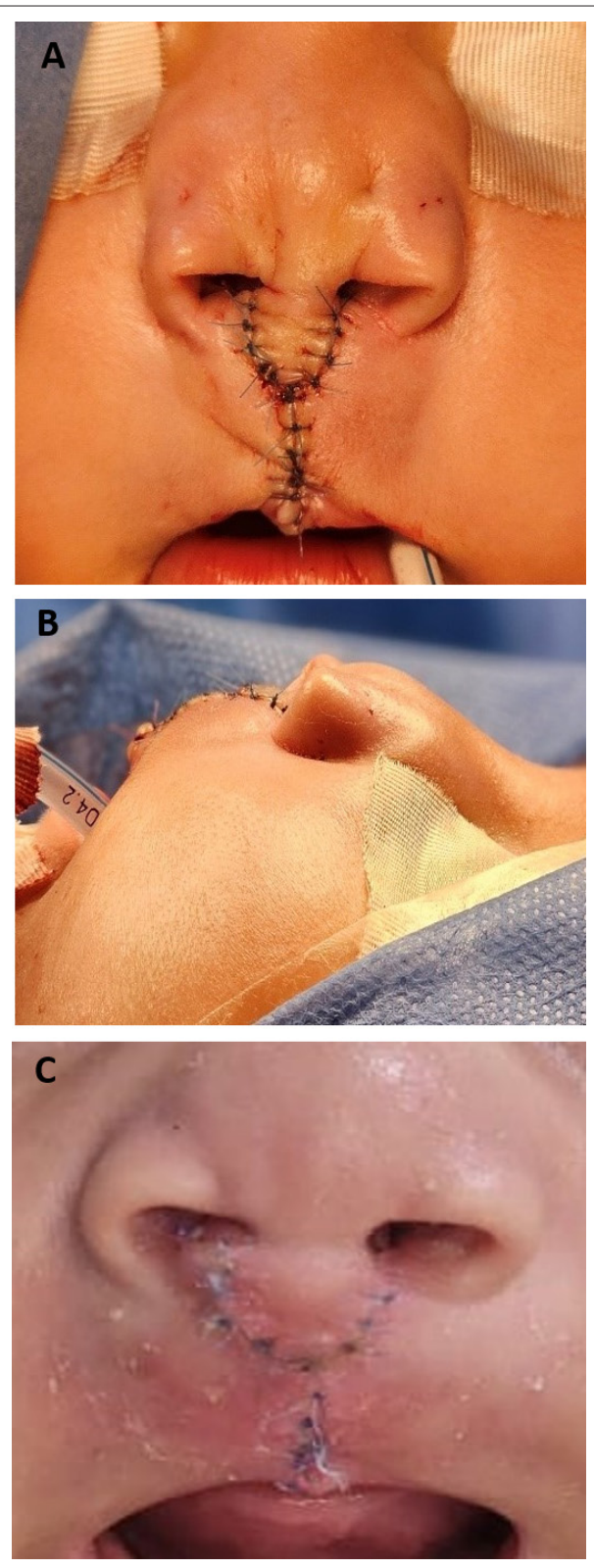


Figure 3A: Frontal Immediate Post Operative View

Figure 3B: Lateral Immediate Post Operative View

Figure 3C: Post Operative After 14 Days.

Postoperative follow-ups over the years have been recorded, showing an appropriate scar, alignment of both nasal fossa heights, a centered nasal columella, minimal deviation of the nasal cartilages, and no reported dehiscences or prolapses of the nasal bases. This technique demonstrates support on the

nasal floor, which has been proven over time to be accepted and effective. (Figure 4)

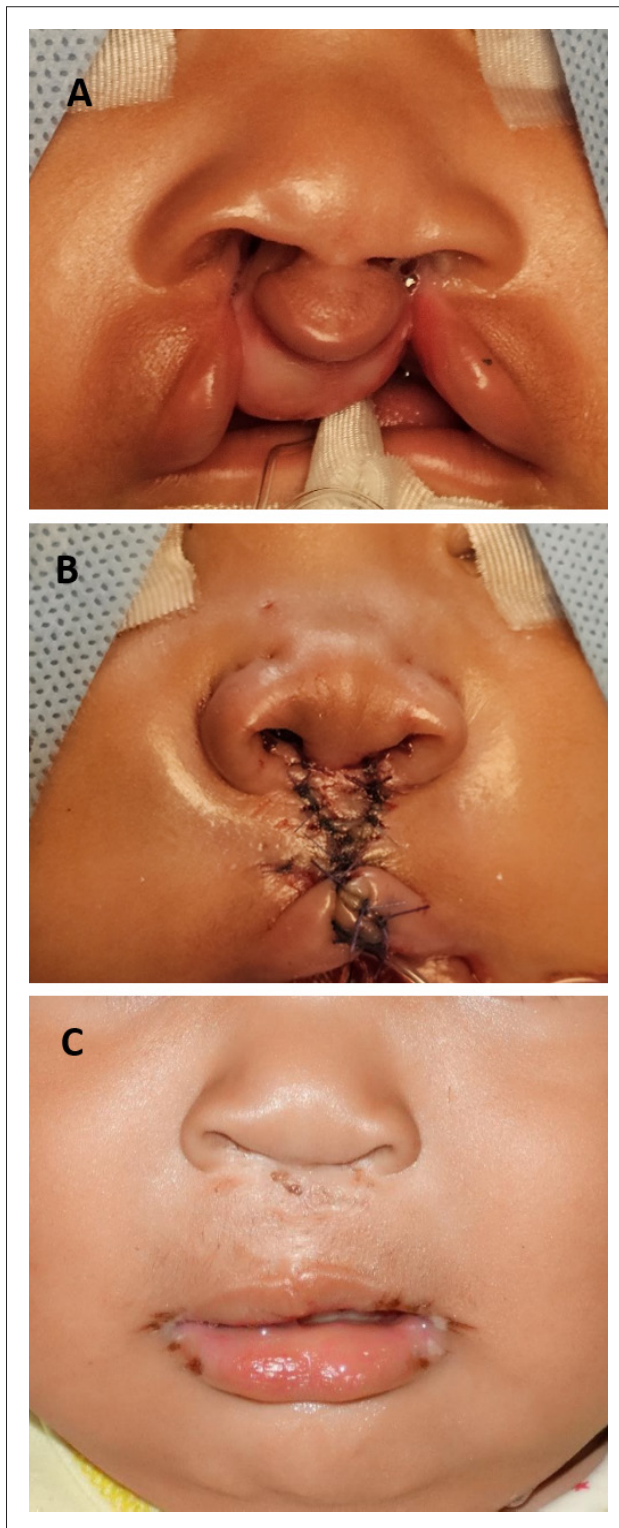


Figure 4A: Pre Reconstruction Surgery

Figure 4B: Post Reconstruction Surgery.

Figure 4C: 1 Year Post Reconstruction Result

Discussion

Conventional surgical techniques (e.g.: Millard's technique) to repair the lip and nose result in unnatural proportions of the columella, nasal tip, and nostrils. To improve the nasal anatomy, these patients often undergo multiple rhinoplasties,

which, in a plethora of cases, results in a scared columella and residual deformities. Surgical history teaches us that complex malformations that once required multiple procedures can, with experience, be corrected in a single surgery. Staged closure of bilateral cleft lip, one side and then the other, has been abandoned in the last quarter-century. Synchronous repair of the bilateral labial cleft, nose, and alveolar clefts has become the "state of the art" during the past decade. [9].

Mulliken 2001 describes the technique for bilateral lip clefts where two rotation flaps are made for the nasal floor, which will be inserted below the incisions of the nasal wings, thus forming the nasal floor and closing the interalar distance to 25mm. [4].

Percy Russell Perry et al. describe that performing bilateral cleft lip closure should be based on the use of two techniques since treating all forms of bilateral lip clefts with a single technique was not optimal for them. They used the Mulliken technique in conjunction with the Millard technique, having optimal results in their patients. [1].

The Mulliken technique for closure of bilateral cleft lips gives very good results as validated by the way the appearance of the patient is perceived by the layman (who is the representative of the society). The general facial appearance received the highest score which shows that the overall appearance of the patient does not take into account the small incongruities of the lip and the nose. The overall facial balance is a combination of all features, and minor discrepancies are excused by an individual's eye. The satisfaction levels with the Mulliken technique in bilateral clefts are excellent and should be regularly adopted for primary bilateral cleft lips. [10].

Dr. Tulio Chacín describes in his techniques the use of flag-shaped flaps, flap A making a triangular design with a distal end and a proximal base, flap B from the contralateral vermillion, M-shaped at its distal end and with a proximal base, he then makes a marginal incision in the nasal vestibule on the cleft side to release the alar cartilage and improve rotation of the nasal component [3].

By making small modifications to this technique, incisions are not made at the level of the alar bases for rotation flaps. These are inserted into the premaxilla at the level of the inner surface of the nasal columella, forming the nasal floor. The inter-alar distances are closed with 3-0 simple stitches vicryl suture. Following the principles of the Mulliken technique, primary closure of the lip is performed.

In the technique that we have described, no fixation method is used for the fracture of the vomer and premaxilla, following the principles of bone consolidation in pediatric patients is a faster process.

Since 2023 to 2024, 9 patients with bilateral nasolabioalveolopalatal clefts were registered, with surgical technique performed of bilateral rhinocheiloplasty, among which are 7 females and 2 males, ranging from 3 months to 7 years of age, with acceptable aesthetic and functional results.

Conclusion

The modification of the Mulliken technique presented allows for greater support of the nasal floor, which is more common to present post-operative dehiscences, then reducing complications and sequelae. We have used this modified technique with favorable aesthetic and functional results.

Conflicts of Interest

The authors declare no conflicts of interest

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