

An Improved Technique for Repair of Bilateral Cleft Lip Deformities through Extensive Muscle Dissection in One Stage Surgery

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ABSTRACT

Aim of Work: Bilateral cleft lip deformity is much more difficult to correct than unilateral deformity. It is often quoted that compared with the unilateral cleft 'the bilateral cleft is twice as difficult, and the results are half as good' along with many others, our aim is to continue the legacy of building on the surgical feats of our forebears in the ongoing evolution of bilateral lip management.

Patients and Methods: This study was carried out on 22 cases of bilateral cleft lip, alveolus and nose deformity. The surgical management is done by combing the best features of previously proposed repair methods. In addition to use a composite of tissue from both the prolabium and lateral lip elements to form the central portion of the lip, the extensive muscle dissection was done in one stage surgery to improve the outcome of all repair methods.

Results: The commonly used techniques for bilateral cleft lip deformities were improved after convenient extensive orbicularis oris muscle dissection.

Conclusion: It is secured to do simultaneously the extensive orbicularis oris muscle dissection as a single convenient technique for repair of bilateral cleft lip deformities. It helps the muscle repair in the midline over the premaxilla and more over it helps the central prolabium to be used for built up the upper part of anterior labial sulcus and lengthening columella without central scar.

INTRODUCTION

Patients with bilateral, cleft lip and palate represent the most challenging condition for the reconstructive team. What makes these patients so difficult are that commonly, the premaxilla is extremely protrusive, the premaxilla and prolabium can be of variable size, the columella is deficient or almost nonexistent, the palatal clefts are wider than usual, and occasionally, the maxillary palatal shelves are collapsed. In addition, the nasal domes are usually wide apart and tip projection is decreased [1].

A number of surgical procedures with many variations for the repair of bilateral cleft lip are

well described. Among these are the repairs of Veau, Tennison, Manchester, Millard, and others. The Veau III [2] operation is a straight line closure without elevation of the prolabial skin and correspondingly without any attempt at restoring the continuity of the orbicularis oris. The central Cupid's bow and tubercle is constructed from the vermilion of the lateral lip elements. In contrast, Millard's [3] repair involved complete elevation of the prolabium and reconstitution of the orbicularis across the premaxilla. In addition, Millard banked lateral segments of the prolabium as "forked flaps" that were meant to add columellar height at a later stage. As with Veau, the central vermilion is recreated from the lateral lip elements.

Unlike Veau [2] and Millard [3], Manchester [4] preferred to maintain the prolabial vermilion to create the Cupid's bow and tubercle, but similarly to Veau, Manchester's repair did not involve repairing the orbicularis as he felt this would create an overly tight lip. In recent years, significant contributions by McComb [5], Mulliken [6], Nakajima [7] and Cutting [8] have integrated the correction of the associated nasal deformity with simultaneous lip repair that appears to achieve adequate primary columellar lengthening and nasal tip projection. More recently, McComb's [5] experience led him to stage the repair. The initial stage involves approximating and repositioning the splayed alar cartilages through a V-Y nasal tip "gull-wing" incision that allows redraping the overlying skin with a simultaneous bilateral lip adhesion. A definitive lip repair follows at a second stage. Mulliken's [9] extensive experience has evolved from a median nasal tip incision for exposure to bilateral rim incisions that allow adequate access to correct the nasal cartilage deformity. Throughout the years, there have been numerous proposed surgical techniques advocated for bilateral cleft lip repairs,

attesting to the difficulty in obtaining consistently optimal results by any one method [10].

The ideal lip repair results in symmetrically shaped nostrils, nasal sill, and alar base; adequate columellar length; a well-defined philtral dimple and columns; a natural-appearing cupid's bow with a pout to the vermilion tubercle; and an adequate labial sulcus. In addition, lip scars approximate the natural landmarks. The ideal repair results in functional muscle repair that with animation mimics a normal lip.

Recognizing that each patient mandates an individualized approach, hence in this work we attempt to incorporate the best of all repair methods proposed, and instead of limited orbicularis muscle dissection we are going to try to do extensive muscle dissection to find out the ultimate results, some features are also analogous to those presented by Veau [2], Millard [3], Manchester [4], Mulliken [6], Noordhoff [11], Cutting [8] and Ghada and Hardesty [10] to be an improved technique that suitable for repair of bilateral cleft lip and nose deformity in one stage surgery.

MATERIAL AND METHODS

This study was carried out on 22 patients at age of 3-4 months. The description of the operative technique the authors have used was: General anesthesia with a noncuffed oral endotracheal tube positioned midline was used. Typically, the otolaryngologist then examines the ears; if needed, myringotomy and pressure equalizing tubes are placed. Prior to infiltration with a local anesthetic (0.5% lidocaine with 1:200,000 epinephrine), tattoo the anatomic landmarks with a methylene blue dye and mark the proposed incisions (Fig. 1). The preoperative considerations are identical to those appeared in Fig. (2) which is described as follow: The skin landmarks include CC; either side of columellar base; bilateral AB, MIP which is about 1mm above vermilion border; and the LIPS which are 2mm from the IPM, at a more superiolateral level. A wide double-pronged skin hook is placed on either side of the columella, gently retracting the nasal tip upward to optimize visualization. Incisions are made from MIP to each LIP and hourglass-outlined philtral columns or MPLs. This creates the prolabial flap. Elevate and thin the prolabial flap to the base of the columella. The lateral prolabial cutaneous elements are primarily dissected from the premaxilla where it is tailored to reconstruct the upper part of the anterior labial sulcus by connecting the upper part lateral vermilion mucosal flaps.

On the lateral lip segments and just above the white roll, a 2-mm incision is made parallel to the vermilion border: The LSWR. A gently curved incision is made from the medial AB to the lateral point of the LSWR: The LPL. The ultimate goal is to have equally long LPLs with closure. The curved rectangular prolabial vermilion flap is turned down, debulked, and sutured to the nasal spine to create the posterior labial sulcus. The lateral segment vermilion is incised in a curvilinear manner from the medial point of LSWR, posteriorly around the lip and widened medially to increase the bulk of the future tubercle. The incision then ascends on the mucosal side (parallel to LPL) and stops just proximal to lingual mucosal-maxillary junction before creating a back cut line laterally. Identify the orbicularis oris muscle and separate it from the overlying skin and underlying labial mucosa. The dissection of the muscle is extensive up to cheek region. After complete dissection we have three layers flaps: Skin layer flap, muscle layer flap and mucosal layer flaps instead of two layers flap, skin layer flap and musclemucosal flaps. The aberrantly inserted orbicularis oris muscle is liberated from the alar base and rotated horizontally. A superperiosteal dissection releases the labial soft tissue from the underlying maxillary complexes after cutting by diathermy. Extending anteriorly to site of cleft and posteriorly up to the level of buccal pad of fat to allow medial mobilization of the labial mucosa (Fig. 3). Full mobilization of the layered soft tissue segments is reassessed with manual tension. The bilateral lateral lip segment tissue is first opposed via vicryl sutures to reconstruct the mucosal layer in the midline. The upper part by suturing the bilateral prolabial cutaneous flap to the upper vermilion mucosal flaps of lateral lip elements by inverted in stitches and the lower lip tubercle by opposing the bilateral mucosal vermilion of bilateral lip segments in midline to maintain excess mucosal-submucosal tissue at the midline such that a full philtral tubercle is reconstructed (Fig. 4).

As noted above, the most superior suture had placed to the anterior nasal spine to avoid future lip descent to approximate the orbicularis oris muscle, with its opposing element with a series of sutures, passing deeply through periosteum of the prolabium. The alar bases are then set into place (inferior and medial) to the nasal spine. Tailor the flaps at the nasal sill and then close the alar and intranasal incisions (Fig. 5).

The skin layer closure commences by inseting the philtral flap into the skin gap between the lateral lip segments (Fig. 6). To decrease tension on this flap, a horizontal mattress sutures is passed

from one lateral segment dermal layer to the contralateral side, thus avoiding excess lateral traction on the intervening philtral flap and hence possible scar widening.

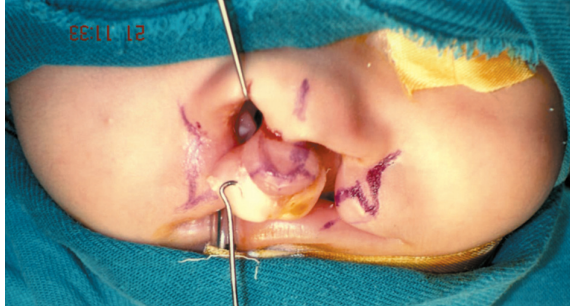


Fig. (1): Marking the proposed incisions.



Fig. (2): Skin landmarks. Prolabial segment markings: CC' central columella; MIP, midline of inferior prolabium; LIP, lateral point of inferior prolabium; MPL, medial philtral lines; P, philteral flap; F, fork flaps (bilateral). Lateral lip segment markings; AB; alar base; LSWR, lateral segment white roll; LPL, lateral philtral line.

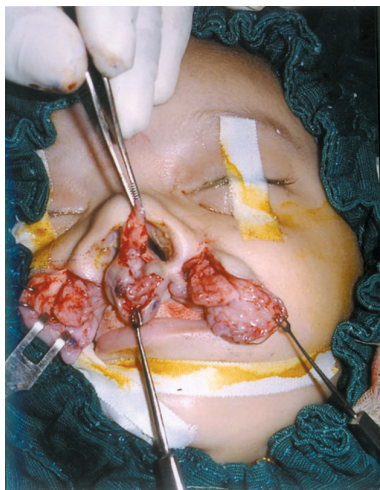


Fig. (3): The three layers flaps: Skin layer flap, muscle layer flap and mucosal layer flap after extensive dissection.

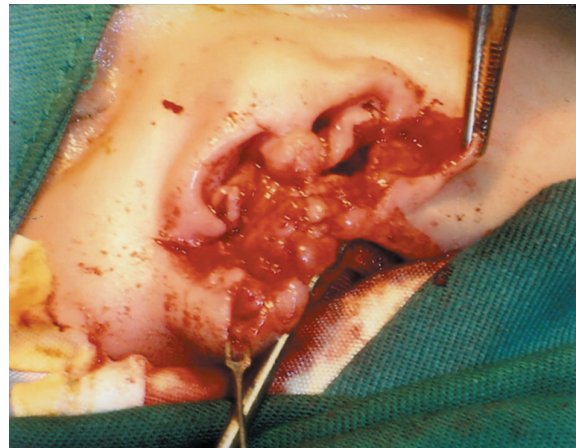


Fig. (4): Suturing the bilateral prolabial cutaneous flap to the upper vermilion mucosal flaps of lateral lip segments by inverted in stitches.



Fig. (5): The orbicularis oris muscle is approximated in the midline and the lip tubercle by opposing lateral vermilion of lateral lip segments. The alar bases are settled into place.



Fig. (6): Insetting the philtral flap into the skin gap between the lateral lip segments.

After the dermal layer is closed with 4-0 vicryl suture, final skin closure is done via 6-0 vicryl. The dermal closure should completely tension free so that skin layer closure is achieved only for cosmesis at the end of surgery. Sometimes we use the 2-3 mucocutaneous stitches (in out, out in) for remolding each nostril. Apply the tincture benzoic and then a topical antibiotic ointment to the lip. Adhesive dressing all through help ed assistant to approximate the two cheeks medially to avoid tension over the site of repair for one to two days, after that the dressing is removed and only topical antibiotic is used.

RESULTS

This method of repair was used in 22 patients

with bilateral clefts involving the lip, nose, and anterior alveolus. One patient required readmission and blood transfusion for secondary bleeding at the gingivoperiosteoplasty. Transient airway compromise in the immediate postoperative period in three patients. Figs. (7-10) demonstrated results obtained with this technique. The major complications rate or unexpected outcome resulting in wound dehiscence is encountered in one case, it is most likely due to excessive tension on the repair and once happened, conservative wound care was initiated until all inflammation resolved. After optimizing all preoperative factors, such as nutrition, and correcting any causative factors, repair had been attempted 3 months later.

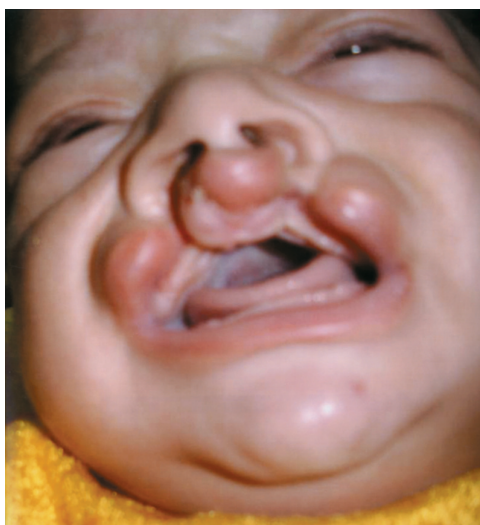


Fig. (7): Preoperative bilateral cleft lip deformities of case 1.



Fig. (8): Postoperative repair of bilateral cleft lip deformities of case 1.

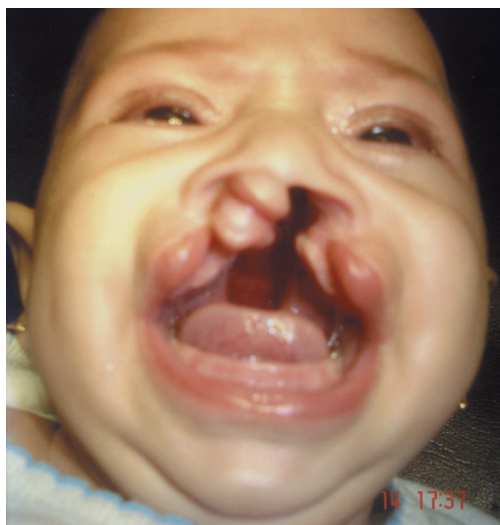


Fig. (9): Preoperative bilateral cleft lip deformities of case 2.

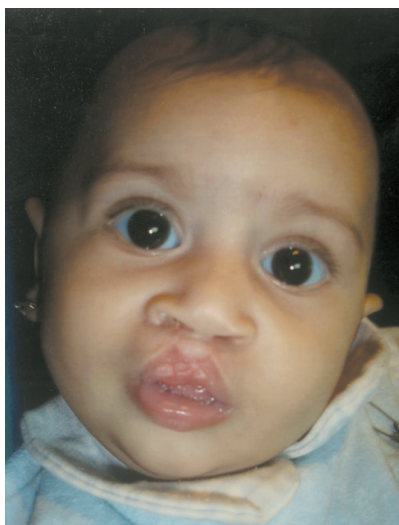


Fig. (10): Postoperative repair of bilateral cleft lip deformities of case 2.

In our surgical plan careful muscle dissection and more anatomical repair gave use good shape of the bilateral lip repair, only in two cases there was wound expansion resulted from excessive tension in large clefts, once present, we favor allowing the child to develop until the next stage of cleft reconstruction, at which time a scar revision may be performed without requiring a separate anaesthetic. Premaxilla malposition such as little bit tilting or retrusion is not so obvious due to good jumping of the muscle after extensive dissection over the protruding premaxilla to act as sphincter like action and using the central prolabial vermilion for creation of the posterior lip sulcus. There was no whistle deformity or vermilion deficiency due to good lip tubercle that have been achieved after suraperiosteal dissection that releases the labial soft tissue from the underlying maxillary complexes. Extending anteriorly to site of cleft and posteriorly up to the level of buccal pad of fat to allow medial mobilization of the lateral lip segment as a three layers flap technique. This extensive muscle dissection prevents lip length abnormality or asymmetry. Regarding nasal deformity we continue to have some difficulty with lateral drift of the alar bases in the postoperative period as well as asymmetry of anatomic distances: Inadequate tip projection, inadequate bony platform, and loss of normalization of soft tissue-cartilagenous framework.

DISCUSSION

The absence of orbicularis muscle fibers in the prolabium of complete cleft lips, with its resulting absence of white roll, has resulted in the use of the white roll of the lateral lip segments to be incorporated into the philtral base in most current common techniques [10].

In our improved surgical plan we constructed the vermilion under the central lip element by turn down flaps from lateral lip elements to achieve full lip tubercle, which was more anatomical and cosmetic rather than other methods. The alternative method for central vermilion creation is to turn down the buccal mucosa that is attached to the bottom of the prolabial skin and wrap it under the repair, connecting the lateral lip elements, but the technique often produces a central vermilion notch. Even when the central vermilion contour is good, the character of the mucosa is different from that of the lateral lip elements. The buccal mucosa often dries out, cracks, and desquamates [12]. The prolabial vermilion is to be replaced by vermilion from the lateral lip segments, the reconstruction is so

reliable and easily done that the technique was the technique of choice. In different methods used for repair of bilateralcleft lip deformities it is a difficulty to built up the proper lip sulcus as mentioned by Cutting. In our surgical plane we used the central prolabial vermilion for construction of posterior lip sulcus by fixation in the posterior nasal spine and the remaining two skin mucosal flap that was created from the prolabium were carefully dissected from the primaxilla and were sutured by inverted technique to bilateral mucosal flap of the lateral lip elements under the muscle to form the upper part of the anterior labial sulcus. The lateral vermilion of both sides of lateral lip elements approximated in the midline to form the lower part of anterior labial sulcus and lip tubercle. The central prolabial skin flap is repositioned in its new site as a tie flap to bilateral skin flaps alone from lateral lip elements.

There continues to be controversy about how best to construct the muscle in the lip. A number of authors believe it is best not to approximate the lateral lip muscles in the midline [13-15]. They think this will produce excessive lip tension and maxillary retrusion. A number of authors repair the lateral muscles in the midline under the prolabial skin [16-18]. Approximation is easily accomplished if the premaxilla has been presurgically retracted. It is the muscle repair that brings the alar bases into a normal position. If the muscles are not repaired, the ala usually drift excessively laterally. This coincides with our improved surgical technique through extensive muscle dissection up to cheek region creating the three layers flaps and approximation of the orbicularis muscle over the premaxilla to bring the both parts of the muscle as one part. Repair of the muscle in the midline results in a more dynamic lip. If the lateral lip muscle is intentionally sutured to lateral edge of the prolabial flap, progressive contraction of the muscle with growth usually leads to an overly wide interphiltral distance. This is sometimes done intentionally when only a tiny prolabium is present. We observed the prolabial vermilion is always hypo-plastic and impresses as being a foreign body in the closed lip, when it remains in place in cases that were subjected for repair without any attempt at restoring the continuity of orbicularis oris in midline. The excessively small prolabium is common and may represent median facial dysgenesis [19]. Lip repair to this diminutive prolabium will cause it to stretch out, facilitating later secondary repair [20]. During active contraction of unapproximated lateral muscles, "ball up" under the lateral lip skin is seen, producing no central lip movement at all. The

lower incidence of wound dehiscence in our surgical plane would explain the extensive muscle dissection to obviate the tension over the muscle in the midline. Wound expansion also results from excessive tension, which is likewise less common in this improved technique by delaying our surgical interference up to 3-4 months age and optimizing the all anatomical layers technique. Another advantage of our method is that no midline scar in the lip or columella was produced. A number of surgeons advocate leaving the prolabium wide at the initial lip repair. At the time of the second stage, a central flap of prolabial skin can be taken to construct a columella [21] or forked flaps may be cut from the lip for use in the columella [20] a midline scar is produced in the columella and the lip if forked flap is used. In our surgical plane we used the small narrow prolabium from the start and after extensive dissection up to the tip of nose and after built up the lateral vermilion and the muscle below, ultimately the prolabium is rested over it after given a chance of its upper part to be used for columella lengthening. Hence, there is no midline scar in the columella, or midline. A midline scar of the lip or columella with horizontal scar between the lip and base of columella produces lip tightness across the alar bases, retraction of the columella, and frequently, unsightly scars [22]. Because of the absence of the anterior nasal spine in the premaxilla in patients with bilateral clefts [23] retraction at the base of the columella with a second stage horizontal narrowing can be particularly undesirable. Although many surgeons may vary in their overall approach and timing of the cleft nasal repair, most will agree that there are specific goals for alar base reconstruction that should be concomitantly obtained during lip repair through obtaining symmetry of alar base widths, aligning alar bases at the same transverse levels, and simultaneous assurance of nasal airway patency [10]. All these steps are delineated in our improved surgical plan. The primary nasal repair is not fully undertaken through our surgical plan. The resultant irregularities should be repaired either with next procedures or more formally in the teenage years. As with other authors, we perform more columellar lengthening if needed, alveolar bone grafting, and a more formal cleft rhinoplasty, as indicated, in subsequent procedures.

This improved surgical plane were done through extensive muscle dissection from lateral lip segment that helps its repair in the midline over the premaxilla this convenient dissection helps the use of central prolabium and lateral lip elements for construction of the lip tubercle and lengthening of the columella without central scar.

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