

## Medial Vermilion Augmentation in Unilateral Cleft Lip Repair by Lateral Vermilion Flap

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### ABSTRACT

In this study we review vermilion reconstruction during the unilateral cleft lip repair. A series of 15 cases with unilateral cleft lip either complete or incomplete were treated using the lateral triangular vermilion flap technique to ensure vermilion augmentation resulted in good approximation of both medial and lateral sides.

### INTRODUCTION

Techniques for repairing unilateral cleft lips have evolved continuously over the past few decades. Although many authors have revised the original Millard method [1], these methods have potential problems, such as obvious scarring along the nostril despite attempts to minimize the transverse scar on the alar base, and lip drooping caused by misapplication of small triangular flaps. Onizuka [4] applied a small triangular flap above a white roll to allow enough rotation and to minimize the back-cut, whereas Noordhof and Chen avoided the alar base incision to prevent unacceptable scarring. Despite continuous efforts to improve unilateral cleft lip repair, few methods specific for incomplete cleft lip repair have been introduced. Even though numerous techniques have evolved throughout the history of cleft surgery, most lip repairs still require secondary procedures due to unsatisfactory results [4]. These revisions often aim to excise scar tissue, repair the Cupid's bow, or increase lip height. Accurate reconstruction of the vermilion aids in the creation of a natural looking lip and may decrease the frequency of secondary surgeries [5]. All of the above types of repairs involve rotation and advancement to one degree or another and most involve geometrically oriented flaps. In the end, designing such flaps in a way that achieves desired rotation, both vertical and horizontal lip length and minimizes disruption of natural philtral and nasal aesthetic subunits is optimal. The unilateral cleft lip deformity reveals two-thirds of the philtral unit to be essentially intact. The peak of

the Cupid's bow, however, is rotated apically along the cleft margin of the medial lip element as a result of short vertical lip height which also leads to a shortened cleft-side philtral column. The cleft-side peak of the Cupid's bow is usually recognizable. Re-establishing a natural and symmetric-appearing lip and nose is best achieved when lip and nasal subunits are preserved and incisions hidden along lines parallel to highlights and shadows around the philtral, columellar and alar subunits; restoring shape and function to the underlying muscular sling while minimizing potential growth disturbances. The difference between cleft philtral column height and non-cleft philtral column height determines the amount of downward rotation needed in order to re-establish cleft side vertical lip length and a natural appearing Cupid's bow and philtrum, and how that rotation is achieved largely differentiates techniques and types of repairs [6]. A recent survey of 269 responding North American cleft teams performing cleft lip surgery reported only 1% using straight-line repair for complete cleft lip and 2% for incomplete cleft lip [7]. This study approaches and illustrates the common principles of applying vermilion augmentation by lateral vermilion flap technique, in repair of the unilateral cleft lip in the life long quest of improved outcomes.

### PATIENTS AND METHODS

This study was carried out on 15 patients at age of 3-9 months. General anesthesia with a non-cuffed oral endotracheal tube positioned midline was used in all patients. 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 was done to the following Markings (Fig. 1). On the non-cleft medial side: Point (a) highest point of cupid's bow, point (b) on the line at Junc-

tion between vermilion and oral mucosa and point (c) opposite the lowest point of cupid's bow at cleft side. The detailed operative technique was as follows: Opposite the highest point of cupid's bow make an incision from (a) to (b) then from (b) to (c). As a result (b) point will open to (b<sub>1</sub>) and (b<sub>2</sub>). On the cleft lateral side: Point (a') the highest point of Cupid's bow. Point (b<sub>1</sub>') at the perpendicular line from (a') to the red line with length of line segment (a' b') equal to line segment (a b). Point (b<sub>2</sub>') is on the end perpendicular line from (a') to the red line at the red line. Point (c') is the apex of triangle (b<sub>1</sub>' b<sub>2</sub>' c') drawn medially where the height on the base (b<sub>1</sub>' b<sub>2</sub>') is equal to line segment (b c) on the cleft side. Incision is done from point (a') to (b<sub>1</sub>') to (c') and finally to (b<sub>2</sub>'). Then suturing (a) to (a') (highest point of cupid's bow) and (b<sub>1</sub>) will meet (b<sub>1</sub>'), (c) meet (c') and (b<sub>2</sub>) will meet (b<sub>2</sub>'). At the end the area of triangle (b<sub>1</sub>' c' b<sub>2</sub>') will add thickness the vermilion on the cleft medial side.

After the dermal layer is closed with 5-0 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. Apply the tincture benzoic and then a topical antibiotic ointment to the lip. Adhesive dressing all through helped by 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.

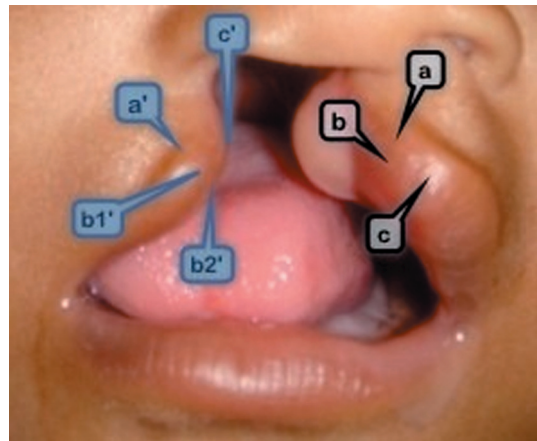


Fig. (1): Points of vermilion marking before incisions were made.



Fig. (2): Per and immediate post operative photo showing lateral vermilion flap.



Fig. (3): Per and 6 months post operative case with lateral vermilion flap.

## RESULTS

This study included 15 patients with age ranged from 3-9 months with a mean of  $4 \pm 2.7$  months. The Gender of patient was nine females (60%) and six Males (40%) the male-to-female ratio was 1:1.5. The Classifications of clefts was seven on the right side 8 on the left side, we observed a right-to-left cleft lip ratio of 1:1.1. Incomplete clefts were observed in 11 patients and four were complete clefts. The mean Length of surgery was  $71.43 \pm 24.09$  minutes this time counts for the actual surgery time without the anesthesia time (Time of intubation intravenous lines inserted before surgery plus the time from the end of surgery until extubation). Figs. (2,3) demonstrated results obtained with this technique, Post-operative pictures demonstrate near normal Cupid's bow anatomy with the muco-vermilion border parallel to the white roll. Transient airway compromise in the immediate postoperative period occurred in two patients. The major complications rate or unexpected outcome resulting in wound dehiscence is encountered in one case, it is most likely due to traumatic dehiscence 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.

## DISCUSSION

The knowledge of proper vermilion reconstruction improves the appearance of cleft lip repair by aiding restoration of a normal Cupid's bow and may result in a more accurate re-approximation of the pars marginalis. Throughout the history of cleft surgery, many techniques for lip repair have been introduced to improve the functional and aesthetic outcomes. Few of these have become applicable on a routine basis due to the complexity of the technique, and the time required for the procedure [7].

In this paper, we present a modified technique for vermilion reconstruction based on the fact that vermilion is always deficient on the cleft side in cases of unilateral cleft lip. Suturing this to the thicker lateral side vermilion will result to inequality and notching of the vermilion. The lateral

vermilion flap is used to fill the medial vermilion deficiency and providing adequate vermilion thickness to create a natural appearing Cupid's bow and parallel both red line with the white roll. The methods employ simple geometry to increase accuracy when matching the vermilion width to the non-cleft segment. Many factors are responsible for the vermilion mismatch. Surgical inadequacy can be evident in muscle rotation at the lower part of the lip, the medial flap rotation or in the lateral flap advancement. Correct repositioning of muscle into a horizontal orientation is critical in repair. Success at the skin level will never compensate for deficiencies in muscle redirection [9].

### Conclusion:

A technique of vermilion reconstruction in cases of unilateral cleft lip repair allows for proper approximation of the medial and lateral vermilion lip elements.

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