

EVALUATING ANATOMICAL SUBUNIT APPROXIMATION TECHNIQUE FOR UNILATERAL CLEFT LIP REPAIR

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ABSTRACT

Objective: To evaluate the outcome of anatomical subunit approximation in unilateral cleft lip of different severity.

Material and Methods: Seventy four consecutive patients with cleft lip were seen in the outpatient department of Plastic and Reconstructive Surgery at Hayatabad Medical Complex, Peshawar and Plastic Surgery unit at Said Anwar Medical Centre, Peshawar, from 1st June 2007 to 31st December 2008. The severity was assessed and all of them were operated using David Fisher's anatomical subunit approximation technique. Postoperatively the vertical height of the lip was compared on the cleft and non cleft side along with symmetry of Cupid's bow and philtral column, the alignment of white roll, quality of the cutaneous lip scar, vermilion fullness and vermilion notching. The nose was evaluated by noting the nasal tip symmetry; alar rim level; alar base height and width; and nostril sill size, both pre and post operatively.

Results: Seventy two patients showed adequate vertical height and good nostril size, alar base height. Two patients showed 1.0 mm discrepancy of the vertical height as compared to the non cleft side. These belonged to the severe complete cleft lip category.

Conclusion: This technique has shown good results in achieving vertical height and nostril size symmetry especially in incomplete and mild to moderate severity of complete cleft lip.

Key words: Unilateral Cleft lip, anatomical subunit approximation, Fisher's repair.

INTRODUCTION

Perhaps no other congenital deformity significantly alters the facial form as much as a facial cleft. The unilateral cleft lip is the second most common congenital deformity after club foot. The overall occurrence of cleft lip with or without a cleft palate is approximately 1 in 750-1000 live births. Incidence varies by race, with clefts occurring more commonly in Asians (1 in 500 births)¹.

A large variation in clinical presentation exists, from the near normal looking scar of the minimal incomplete cleft of the lip to the more typical wide, gaping cleft lip involving the maxillary alveolus and palate with a splayed nasal ala bridging the gap across the cleft. Patients with this deformity typically require the combined short-term and long-term care of several specialists. They may need numerous surgical interventions, from infancy to adulthood, in order

to provide them with the necessary function and aesthetics. The treatment goals for such patients include restoration of facial appearance and oral function, improvement of dental skeletal and occlusal relationships, and improvement of speech and psychosocial status.

The ultimate goal of cleft lip repair is a lip and nose of normal form and function. Many techniques to correct the unilateral cleft lip have been devised and subsequently modified. These include straight line closure as in Rose and Thompson repair, lateral lip tissue transfer such as Le Mesurier's quadrangular and Tennison's triangular repairs². Millard developed the concept of rotation advancement while Noordhoff modified it by adding a small triangle above the white roll. Noordhoff also described a lateral vermilion flap to augment the deficient vermilion below the white roll on the cleft side of the cupid's bow³. David Fisher combined some of these popular techniques in the anatomical subunit repair in which he adds a

small triangle above the cutaneous white roll and places the rest of the scar, up to the base of the nose, along a line that mirrors the noncleft side philtral column and avoid the rotation advancement or big triangular flaps running across the philtrum⁴.

The aim of our study was to evaluate the outcome of David Fisher's anatomical subunit approximation in patients with unilateral incomplete and complete cleft lip of varying severity.

MATERIAL AND METHODS

This descriptive study took place in the Department of Plastic and Reconstructive Surgery at Hayatabad Medical Complex, Peshawar and Plastic Surgery unit at Said Anwar Medical Centre, Peshawar, from 1st June 2007 to 31st December 2008. Seventy four consecutive patients with unilateral cleft lip were operated upon, using anatomical subunit repair described by David Fisher. All patients presenting to our outpatient department with previously unoperated unilateral complete or incomplete cleft lip, with or without a cleft palate were included in this study. The age of the patients ranged from 3 months to 19 years. Pre operatively the clefts were divided into incomplete and complete clefts. The severity of the complete cleft lip was further assessed by noting the ratio of the cleft width to the noncleft width. This width was measured as the distance from the midpoint of the columella base to the midpoint of the alar base on both the cleft and non cleft sides. The severity of the defect thus calculated was divided into four grades: Simonart's band (a soft tissue bridge only); mild: 2.0 or less; moderate: >2.0 and < 3.0; severe: > 3.0. The severity of the nasal deformity was assessed by noting the nasal tip symmetry; alar rim level; alar base height and width; and nostril sill size, both pre and post operatively.

The patients were all operated using David Fisher's technique of anatomical subunit approximation. Markings and incisions were made according to the illustration shown in Figure 1. Abnormal muscle attachment was released from the maxilla, above the periosteum. A Rose-Thompson lengthening effect combined with a small triangle (2mm or less in width) positioned just above the cutaneous roll was used to correct the deficiency in the vertical medial lip height. Central vermilion deficiency was augmented by a laterally based triangular vermilion flap from the lateral lip element. Muscles and subdermal closure was done with vicryl 5/0, dermal approximation with vicryl 6/0 and skin was closed with prolene 6/0. Vermilion and mucosa were sutured with vicryl 6/0 in infants and 5/0 in older children. Primary nasal correction was done in all cases to

centralize the columella and to release the attachments of the lower lateral cartilage from the lateral piriform rim to allow for anterior repositioning of the alar base and achieve nostril size symmetry. Following steps were done as indicated by severity of the primary deformity alar base release, lateral piriform release, alar transfixion sutures, columellar base-alar base cinch stitch, and postoperative nasal stenting. Steri strips were applied at the completion of the procedure.

Figure 1: Markings for anatomical subunit approximation repair



post operative day. Skin stitches were removed on the 5th post operative day. Patients were reviewed weekly for two weeks and once the scar healed they were advised silicone sheet application over the wound for three months. Monthly follow up continued for six months and repairs were assessed objectively by measurement of the vertical height of both the repaired and normal sides of the lip with calipers and any discrepancy between the two sides noted. Vertical height was measured from subnasale to the peak of Cupid's bow. Subjective criteria used to evaluate the repair were the symmetry of Cupid's bow and philtral column, the alignment of white roll, vermilion fullness, and quality of the cutaneous lip scar. The nose was evaluated by noting the nasal tip symmetry, alar rim level, alar base height and width, and nostril sill size as compared to the normal side.

RESULTS

A total of 74 consecutive cases of unilateral cleft have been repaired by this method at Hayatabad Medical Complex and Said Anwar Medical centre, Peshawar. The patients aged from 3 months to 19 years, the mean age being 9 months. Fifty one clefts were on the left and 23 on the right side. Thirty five patients had incomplete while 39 had complete clefts. Severity of the 39

complete clefts was as follows: 2 were classified as simonart's, 7 as mild, 17 as moderate and 13 as severe. Postoperatively, incomplete cleft lip, simonart's band and mild and moderate severity of complete cleft lip showed adequate vertical height with the mean discrepancy in vertical height (measured from subnasale to the peak of Cupid's bow and compared to the non cleft side was 0.5 mm. The mean discrepancy in patients classified preoperatively in to severe category was 1 mm. The mean base width of the inferior triangle was 2 mm (range, 1 to 2mm). Good philtral column and

Cupid's bow symmetry was found in all cases. White roll alignment was satisfactory in all cases. Similarly the vermilion triangle provided good central philtral pouting in all patients (Figure 2-4). We did not find any long lips or vermilion notching postoperatively in our study. Postoperatively the nostrils sill size, alar rim level, alar base height and width were comparable to the non cleft side (Figure 5, 6).

DISCUSSION

The understanding and management of all

Figure 2 : Complete cleft lip with severe nasal deformity



Figure 3: Anatomical subunit repair

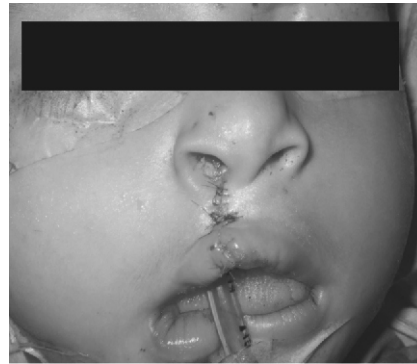


Figure 4: Six Month Post Operative photograph

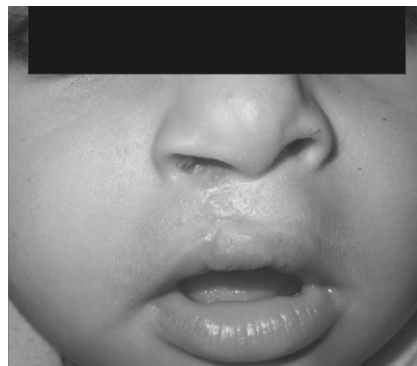
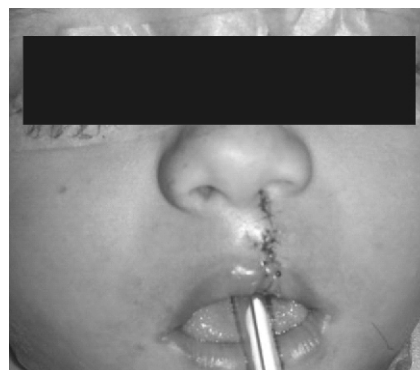


Figure 5: Incomplete cleft lip



Figure 6: Anatomical subunit approximation done



aspects of unilateral cleft lip deformities continue to evolve. Various techniques of lip repair have been described. Each of these repairs, results in a unique cutaneous scar. In the appearance of the upper lip, the philtrum plays a key role. The key objective in primary repair of the unilateral cleft lip is establishing the anatomical symmetry of the upper lip; to have a symmetrical Cupid's bow and philtrum, provide philtral concavity and a prominent philtral ridge with a minimal scar, along with good symmetrical nostrils and cleft ala level with the normal side. The ideal line of repair should be one that ascends the lip from the cleft side peak of cupid's bow to the base of the nose along a line exactly mirroring the non-cleft side philtral column and then continues to the nostril sill⁵.

Cleft lip surgery has evolved from a simple adhesion of paired margins of the cleft to an understanding of the various malpositioned elements of the lip and the need for a more complicated geometric reconstruction using transposition, rotation, and advancement flaps. Early techniques of unilateral cleft lip repair involved a straight line closure, such as in the operations proposed by Rose and Thompson. The concept of closure of the cleft lip by local flaps was introduced by Malgaigne in 1843. The next year, Mirault modified it by advancing the lateral flap across the cleft⁶. All subsequent repairs are based on this method. Le Mesurier and Tennison modified the lateral flap transfer into the lower lip in a quadrilateral and triangular flap respectively⁷. In 1955 Millard developed the concept of lateral flap advancement in the upper portion of the lip, combined with downward rotation of the medial segment⁸. Of all the methods for repair of the unilateral cleft lip, none has gained as much popularity as Millard's rotation-advancement technique⁹⁻¹².

In all these techniques the scar either crosses the philtral column as in the lower part of the lip in Tennison and Le Mesurier's repair or across the upper part of the lip at the base of the nose as in Millard's repair. In either case it becomes apparent for the eye to notice¹³. Neither of these repairs therefore produces fully desirable results and the quest for modification continues. Thus, many surgeons have tried to modify these techniques to improve the symmetry of the philtral columns. Noordhoff modified Millard's repair by adding a small triangle to the medial lip just above the cutaneous roll. This small triangle provides a small amount of tension just above the cutaneous roll that accentuates the pout of the lip¹⁴. Thomson modified the inferior triangle techniques of Tennison to limit the base width of the inferior triangle to only 2 mm¹⁵. In another modification

Noordhoff adds a lateral vermilion flap to augment the deficient vermilion below the white roll on the cleft side of the Cupid's bow³.

Applying the principle of anatomic subunits to cleft lip repair, David Fisher combined the Noordhoff's small inferior triangle above the white roll with the Rose Thompson lengthening effect and avoided the rotation incision of Millard, thus placing the majority of the scar along the ideal line of repair⁴. He limited the base width of this triangle to 2 mm according to Thomson and added the Noordhoff's vermilion triangular flap for better augmentation of vermilion^{3, 15}. The resulting scar ran parallel to the noncleft side philtral column while the small triangles above the white roll and in the vermilion were less conspicuous. Additional benefit was that the scar did not cross the upper part of the lip at the base of the nose, as in Millard's repair⁸. In our study we have confirmed the scar to run parallel to the noncleft side philtral column. The triangle above the white roll is small and not noticeable while providing extra length at the same time. The vermilion triangle provided fullness and symmetry of the vermilion. We have noticed adequate vertical height in incomplete and complete cleft lips of mild to moderate severity with this technique.

As a consequence of the clefting of the lip, an associated nasal deformity occurs. The structures of the ala base, nasal sill, vomer, and septum are distorted significantly. The lower lateral cartilage on the cleft side is positioned inferiorly, with an obtuse angle as it flattens across the cleft. The alar base is rotated outwardly. The developing nasal septum pulls the premaxilla away from the cleft, and the septum and the nasal spine are deflected toward the noncleft side. Addressing the associated nasal deformity has become an integral part of the initial lip surgery. Primary rhinoplasty is performed with the intent of improvement and the realization that complete correction of the nasal deformity depends on augmentation of the alar base and piriform margin skeletal deficiencies, which may have to wait to be addressed at the time of alveolar bone grafting. We have performed primary nasal correction in all cases as indicated by severity of the primary deformity. Good nostril size and symmetry have been achieved in all cases.

CONCLUSION

We have found the technique very reliable. Since there is a Rose Thompson lengthening effect as the sloped incisions crossing the cutaneous roll of the medial and lateral lip elements approximate, a smaller triangle is needed than the classic inferior triangle techniques such as in tennison repair. Avoiding the rotation advancement incision

avoids placing the scars across the lip at the columellar-labial junction. We have found good results of this technique in achieving vertical height and nostril size symmetry, both in incomplete and complete cleft lip.

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