ORIGINAL ARTICLE

MORPHOLOGICAL OUTCOME OF PRIMARY LIP REPAIR IN PATIENTS WITH UNILATERAL CLEFT LIP-PALATE WITH THE USE OF INFERIOR TURBINATE FLAP

Vijaya Kumar N[1], Rajesh S. Powar[2], Sudhir B. M[3]

HOW TO CITE THIS ARTICLE:
Vijaya Kumar N, Rajesh S. Powar, Sudhir B. M. "Morphological Outcome of Primary Lip Repair in Patients with Unilateral Cleft Lip-Palate with the Use of Inferior Turbinate Flap". Journal of Evidence based Medicine and Healthcare; Volume 2, Issue 26, June 29, 2015; Page: 3797-3803.

ABSTRACT: BACKGROUND: Cleft lip and palate deformity poses problems at every stage of growth and development of the child. Repair of cleft lip-nose complex is a major challenge for the operating surgeon as well the manner in which the deficient tissues are replenished. The major issue which still remains to be tackled is achieving a acceptable nasal correction. In the quest for tissues to bring about a better repair especially in the region of nostril floor and alar base, the hypertrophied inferior turbinate on the cleft side appears to be a good option. **OBJECTIVE:** The objective of the study is to evaluate long term aesthetic and morphological outcome of lip and nose in patients with unilateral cleft lip and palate deformity. **MATERIALS AND METHOD:** A Group of 41 patients were taken in the study and they were randomized into two groups, Study group 21 cases who underwent primary lip repair with inferior turbinate flap and Control Group B, 20 cases without inferior turbinate flap. Age, sex, side of cleft and photographic evaluation of was done at 2 years and above post operatively for nostril height, nostril width, nostril basal width and alar base level. **RESULTS:** On photographic evaluation group a showed statistically significant symmetry in the nasal architecture, and the long term follow up of these patients is necessary to comment on the aesthetic outcome. **CONCLUSION:** Inferior turbinate flap provides an adequate tissue during nostril floor reconstruction and helped in augmenting the depressed alar base on the cleft side.

KEYWORDS: Inferior turbinate flap, Unilateral cleft lip and palate, Nostril floor reconstruction, alar base level, Photographic assessment.

INTRODUCTION: Cleft lip and palate deformity possess problems at every stage of growth and development of the child. The problems are usually associated with achieving good nasal floor and proper repositioning of alar base, both being attributed to the deficiency of tissues.[1] Achieving perfect results depends a lot on restoring the anatomical and physiological normalcy as well the manner in which deficient tissues are replenished. It is said that the results leave behind a lot to be desired even in the best hands.[2,3] Though repair of the lip has been historically documented from 390 A.D., the real breakthrough was when the Millard described the rotation advancement technique of repair in the year 1957.[4,5] Several modifications in this technique have been proposed and practiced. The major issue which still remains to be tackled is achieving an acceptable nasal correction. Radical procedures like primary rhinoplasty also have not been able to address this aspect. The problems are usually associated with achieving good nasal floor and proper repositioning of alar base, both being attributed to the deficiency of tissues. To bring about a better repair especially in the region of nasal floor and alar base, the hypertrophied

inferior turbinate on the cleft side appears to be a good option. Noordhoff described the use of inferior turbinate flap effectively to correct the tissue deficiency in nostril floor reconstruction.[6,7,8]

The objective of the study is to evaluate long term aesthetic and morphological outcome of nose in patients with unilateral cleft lip and palate deformity with and without inferior turbinate flap. It is a randomised control study during the period of 2006 to 2009.

MATERIALS AND METHODS: This study was conducted on 41 patients requiring primary lip repair for unilateral cleft lip - palate. The patients were assessed pre-operatively and distributed into two groups randomly using the computer based randomization method, Control group 20 patients and study group with 21 patients. Control group patients underwent primary lip repair by the modified Millard's technique without the use of the inferior turbinate flap and the study group patients underwent primary lip repair with the same technique with the use of the inferior turbinate flap. All patients underwent primary cleft lip-palate repair by a single surgeon to avoid operative bias. The patients were discharged on the third post-operative day. Any complications like infection, wound dehiscence, bleeding were noted.

A series of standard photographs (Frontal, Lateral, Worm's eye view) were recorded for each patient pre-operatively, on the 3rd post-operative day, 6 months post-operatively and at the end of 2 years or more on follow up. Anthropometric measurements were made directly on 2year post-operative basilar view photographs by tracing. All the measurements were taken using Vernier Caliper with 0.1 mm precision.[9]

Cleft Side: Nostril height (a^1), Nostril width (b^1), Nostril basal width (c^1), Alar base level (d^1).

Non Cleft side: Nostril height (a), Nostril width (b), Nostril basal width (c), Alar base level (d).

Nostril height: The vertical distance between the horizontal reference line of the inner, upper and lower border of nostril. Nostril width: The horizontal widest distance between the inner lateral and medial borders of the nostril aperture. Nostril basal width: The horizontal distance between the outer lateral and the inner medial borders of the nostril aperture. Alar base level: The vertical distance between the inner canthus and the alar base. Fig. 1.

All the measurements and analysis were done in terms of percentage ratios comparing the cleft side to non-cleft side. Fig. 3. This was to neutralize the errors that could have occurred due to non-standardization of photographs.

Nasal symmetry was assessed by the 'quantity of asymmetry'. The quantity of asymmetry (in mm) was the linear difference of each measurement between the cleft and non-cleft side. Measurements were analyzed using unpaired 't' test and Turkey's multiple post hoc procedures. A positive value indicates that the cleft side is longer / wider than the non-cleft side and negative value indicates that the cleft side is shorter / narrower than the non-cleft side.

Surgical technique of Inferior turbinate flap:

The incision line on the inferior turbinate extends from the piriform rim on the cleft side intranasal. Incision carried on the upper and lower edges of the inferior turbinate for a distance

of 1cms, where a transverse cut is made. The inferior turbinate flap is elevated in a retrograde fashion. Nostril floor reconstruction was done by suturing medial mucoperichondrial flap with inferior turbinate flap. (Fig. 2).

RESULTS & OBSERVATIONS: The two groups in the study included 41 patients, 20 in control group and 21 in study group. Out of 20 patients in the control group 14 male and 6 female, where as in study group 11 male and 10 female. In control group 6 patients had right cleft lip and palate (RCLP) and 14 patients had left cleft lip and palate (LCLP). In study group 5 patients RCLP and 16 patients LCLP. Totally 11(27%) patients are RCLP and 30(73%) are LCLP. 37(90%) patients came for the follow up 6 months and 32(78%) patients came for at least 2year follow up. (Table 1 and 2). The results of some of the repairs are shown in fig 4 and 5.

The mean and standard deviation of A%, B%, C% and D% scores in the group calculated. The scores in the groups are compared by Tukey's multiple post hoc procedures as shown in table 3. There is a statistically significant result in the D% scores.

DISCUSSION: The Millard's rotation-advancement principle has been adopted and has become the world's most popular operative procedure for closure of primary unilateral cleft lip repair. Though there have been several modifications the basic principal still forms the golden standard. In modified Millard's rotation-advancement technique along with accurate lip measurements importance is also given to primary nasal correction, columella lengthening by 'C' flap, minimizing perialar incision along cleft side which helps in post-operative aesthetics and using back-cut in the rotation flap allows the peak of the cupids bow on the cleft side to be repositioned to achieve symmetry with the opposite side. The cleft alveolar margin is closed using 'm' and 'l' flaps1.[1,5,7,8]

If after primary surgery of the lip, orolabial dysfunctions persist, they will exert their nefarious influences during growth. These will lead to long term deformities caused during subsequent growth, among which the most important are nasal asymmetry, compromised nasal patency leading to obstruction and mouth breathing. These are to a certain extent attributed to the hypertrophied inferior turbinate on cleft side.[10,11]

Noordhoff described the use of a part of the hypertrophied inferior turbinate in the repair of nasal floor. The use of hypertrophied inferior turbinate on the cleft side is said to bring adequate mucosa for the creation of nostril floor and some amount of bone to augment the alar base area. It is also claimed to reposition the lower lateral cartilage and ala with compromising the nasal aperture. Thus, adding mucosa from the inferior turbinate is said to make complete closure relatively easy without tension and also helps in maintaining nasal patency.[6,7]

On the whole assessing the results through the outcome seems to be better in terms of alar base level elevation in patients having undergone cleft lip-palate repair by inferior turbinate flap technique found to be statistically significant. The inferior turbinate flap brings with itself not only mucosa but also certain amount of bone, which possibly helps in buttressing piriform aperture area near the alar base.

CONCLUSIONS: The use of inferior turbinate flap in the primary repair of lip in Unilateral Cleft Lip-Palate patients gives a better aesthetic outcome with respect to the nostril architecture, which

means the nostril height and elevation of alar basal level as per the photographic evaluation done in this study. This study shows that the use of Inferior turbinate flap helps in augmenting the alar base in patients with Cleft Lip Palate deformity.

REFERENCES:

1. Millard DR, Jr. Cleft craft. The evolution of its surgery. The unilateral deformity.1st Edition, Boston: Little, Brown and Company; 1976; 58-64.
2. Horswell BB, Pospisil OA. Nasal symmetry after primary cleft lip repair. J Oral Maxillofac Surg 1995; 63: 1025-1030.
3. Bardach J, Salyer KE. Correction of nasal deformity associated with unilateral cleft lip. Surgical Techniques in Cleft lip and palate. 2nd Edition, Chicago: Mosby Year Book; 1991.
4. Mathew SJ. Paediatric plastic surgery (IV), Unilateral cheiloplasty. 2nd edition, California Elservier; 2006; 165-215.
5. Romero R. The Millard rotation-advancement lip repair using accurate measurement. Oral Surg Oral Med Oral Pathol Endod 1997 Oct; 84 (4): 335-38.
6. Noordhoff MS. Bilateral cleft lip reconstruction. Plastic and Reconstructive Surgery 1986 Jul; 78 (1): 45-54.
7. McCarthy. Plastic Surgery (4), Cleft lip palate and craniofacial anomalies. First edition. United States of America: W.B. Saunders Company 1990; 2634-51.
8. Salyer KE. Primary correction of the unilateral cleft lip nose: A 15-year experience. Plastic and Reconstructive Surgery 1986 Apr; 77 (4): 558-568.
9. Kohout MP, Aligaro LM, Farkas LG, Muliken JB. Photogrammetric comparison of two methods for synchronous repair of bilateral cleft lip and nasal deformity. Plastic and Reconstructive Surg 1998 Oct; 102 (5): 1339-1349.
10. Chen PKT. Unilateral cheiloplasty w/o nasoalveolar molding. The second international workshop on surgical techniques in cleft lip and palate. Taiwan Cleft Palate – Craniofacial association and Chang Gung Craniofacial Center. Tapei, Taiwan 2002 July; 1-3.
11. McCarthy. Plastic Surgery (4), Cleft lip-palate and craniofacial anomalies. First edition, Unilateral States of America: W.B. Saunders Company 1990; 2753-70.

Group	No. of Cases
Control group	20
Study group	21
Total	**41**

Table 1: Number of Cases in each Group

Groups	Male	Female	R CLP	L CLP	Total
Control group	14	6	6	14	20
Study group	11	10	5	16	21
Total	**25(61%)**	**16(39%)**	**11(27%)**	**30(73%)**	**41**

Table 2: Side of Cleft and Sex Distribution in Two Groups

Groups	A % (Nostril height)		B% (Nostril width)		C% (Nostril Basal width)		D% (Alar basal level)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Control Group	4.61	13.41	-24.57	20.26	-11.74	16.92	-10.60	10.05
Study Group	4.44	14.45	-20.25	20.08	-10.92	12.20	-3.12	10.01
For groups	F=4.90	P=0.0339*	F=0.1079	P=0.744	F=0.1432	P=0.7076	F=2.7964	P=0.1039
Control group vs. Study group	P=0.9867		P=0.9334		P=0.9354		P=0.0195*	

Table 3: Mean and SD of A%, B%, C% and D% scores in groups (Control and study) and comparison by Turkey's multiple post hoc procedures

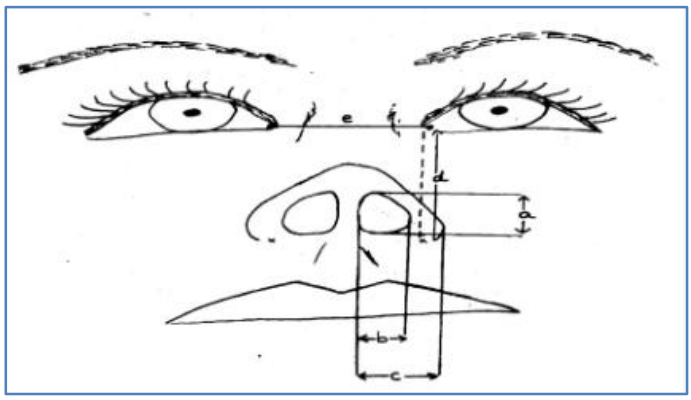

Fig. 1

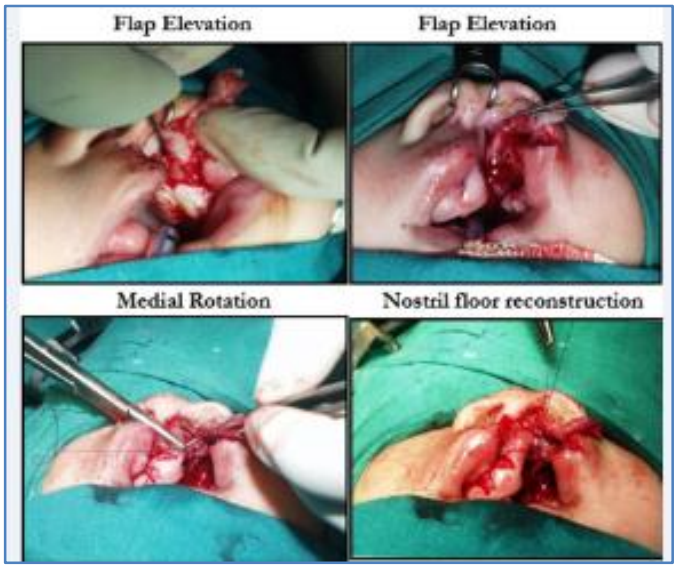

Fig. 2

Ratios which were considered:

1. $A\% = \frac{(a - a^1)}{a} \times 100$

2. $B\% = \frac{(b - b^1)}{b} \times 100$

3. $C\% = \frac{(c - c^1)}{c} \times 10$

4. $D\% = \frac{(d - d^1)}{d} \times 100$

Fig. 3

Fig. 4

Fig. 5

AUTHORS:

1. Vijaya Kumar N.
2. Rajesh S. Powar
3. Sudhir B. M.

PARTICULARS OF CONTRIBUTORS:

1. Consultant, Department of Plastic Surgery, KLES Hospital & Medical Research Centre, Nehrunagar, Belgaum.
2. Professor & HOD, Department of Plastic Surgery, KLES Hospital & Medical Research Centre, Nehrunagar, Belgaum.
3. Resident, Department of Plastic Surgery, KLES Hospital & Medical Research Centre, Nehrunagar, Belgaum.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Vijay Kumar,
784, Vaibhava,
2nd Stage, BEML Layout,
Rajarajeshwari Nagar,
Mysore-570022.
E-mail: viju_n2@yahoo.co.in

Date of Submission: 19/06/2015.
Date of Peer Review: 20/06/2015.
Date of Acceptance: 23/06/2015.
Date of Publishing: 24/06/2015.