Research Article

Outcomes of Mishra technique in unilateral cleft lip repair

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Abstract
Introduction: Cleft lip is a birth defect that occurs due to failure of union of the smaller upper central frontonasal prominence of the first pharyngeal arch and the two lateral maxillary prominences which result in cleft lip defect of a newborn- leading to affection of the upper lip, the palate or both. The ultimate goal of cleft lip operation is to attain a perfectly symmetrical lip and nose. The symmetry and appearance of the nasolabial region is also seen as one of the principal characteristics when evaluating the results of any facial surgery. The aims of our study are to evaluate and assess the advantages, disadvantages, and outcomes of Mishra technique in unilateral complete or incomplete cleft lip repair. **Patients and Methods:** Our study is a prospective study which was conducted at Minia University Pediatric Hospital. We enrolled 50 patients with unilateral cleft lip operated upon with the Mishra technique from September 2020 to September 2021. **Results:** A total of 50 pediatric patients with unilateral cleft lip were included in our study at Pediatric Surgery Unit of General Surgery Department of Minia University Hospital. Children's age ranged from three to twelve months with a mean±SD of 6.8±3.1 months. **Conclusion:** Mishra technique is a very good technique regarding cosmetic results, less secondary deformities, less early and late complications, high parent's satisfaction, and good aesthetic results.

Keywords: Mishra technique, cleft, Pediatric, lip

Introduction
Cleft lip is a birth defect that happens due to inappropriate formation of the fetus's lip early during pregnancy between the fourth to seventh weeks of gestation [1]. It occurs due to failure of union of the smaller upper central frontonasal prominence of the first pharyngeal arch and the two lateral maxillary prominences which result in cleft lip defect of a newborn leading to affection of the upper lip, the palate or both [2].

The ultimate goal of cleft lip operation is to attain a perfectly symmetrical lip and nose. The symmetry and appearance of the nasolabial region is also seen as one of the principal characteristics when evaluating the results of any facial surgery[3].

Mishra technique that called "White Roll Vermilion turn down Flap" (WRV Flap), an adjustment in the Millard's technique is an effort to prevent these secondary deformities as "paramedian scars over the vermilion in continuation with the philtral line scar are often visible and scar contracture, vermilion notching is visible in close up view, sometimes medial hypoplastic vermilion or partial loss of medial vermilion" during the primary cleft lip surgery. WRV flap aims to focus on the importance of accomplishing a near normal look of the cleft patient[4]. Overall, WRV flap modify the Millard's procedure and incorporate the WRV flap from the lateral lip section to be used for the construction of the vermilion and white roll on the medial lip segment [5].

Outcomes are measured with postoperative photographs that assess various anatomic landmarks and features. Depending on the use of the Asher-McDade rating scale [6]. The aims of our study are to evaluate and assess the advantages, disadvantages, and outcomes of Mishra technique in unilateral complete or incomplete cleft lip repair.

Patients and Methods
Our study is a prospective study which was

conducted at Minia University Pediatric Unit. We enrolled 50 patients with unilateral cleft lip operated upon with Mishra technique from September 2020 to September 2021.

Inclusion criteria

- Patients presented with incomplete and complete unilateral cleft lip.
- Both sexes.
- Age less than 1 year.

Exclusion criteria

- Age more than 1 year.
- Patients with recurrent cleft lip.
- Patients with cleft palate.
- Bilateral cleft lip.

All patients were subjected to the following:

- **Pre-operative assessment:**
  Full history and full clinical examination with special stress on the possible associated anomalies as cleft palate.
  Patients were referred to their pediatrician for clinical evaluation to rule out cardiovascular diseases, upper respiratory tract infection……etc. and any conditions that may be of clinical significance.
- **Pre-operative preparations:**
- **Laboratory:**
  Routine laboratory investigations include:
- CBC.
- PT, INR.
- PTT.
- **Echocardiography.**
- **Surgical TechniqueMishra technique**
  Perioperative details:
- **Anesthesia:**
  All patients received general anesthesia with midline oral endotracheal intubation. Ointment eye protection and oropharyngeal packing were always checked.
- **Positioning:**
  Patients were placed in supine position with neck slightly extended using small shoulder rolland with supporting the head using ring cushion. The operating table was tilted into reverse Trendelenburg position. Face was prepared and draped.
- **Operative details of Mishra technique:**
- Landmarks.
- Cutting.
- Suturing.

Procedure:

Landmarks:

- **Points:** Nasal points and vermilion border points. (Fig. 1)
  - **Point 1**: lowest point of Cupid's bow (non-cleft side).
  - **Point 2**: 1st peak of Cupid's bow (non-cleft side).
  - **Point 3**: * (non-cleft side) 2nd peak of Cupid's bow.
    ***** (cleft side**)** corresponding peak of Cupid's bow (Noordhoff point).
  - **Point 4**: alar base (non-cleft side).
  - **Point 5**: alar base (cleft side).
  - **Point 6**: midpoint of the columella.
  - **Point 7**: a top of philtral column.
  - **Point 8**: * (non-cleft side) a top of philtral column.
    ***** (cleft side**)** corresponding atop of philtral column.
  - **Point 9**: oral commissure (non-cleft side).
  - **Point 10:** oral commissure (cleft side).

Fig. (1): Anatomical reference points of the cleft lip.

- **Lines**

  * The rotational and advancement flap lines and mucosal lines (Fig. 2)

  At non-cleft side:

  1- Rotational flap: A curvilinear line is designed from point **3** to point **6** then back cut at acute angle from point **6** in which the back cut incision shouldn‘t proceed to the contralateral philtral column.

  2- columellar flap (c-flap): it is an area boundered by 2 lines : a curvilinear line of rotational flap and a line from above point **3** to nasal sill along white roll.

  3- line from point **1** to point **3** along white roll but just above white roll about 1mm.

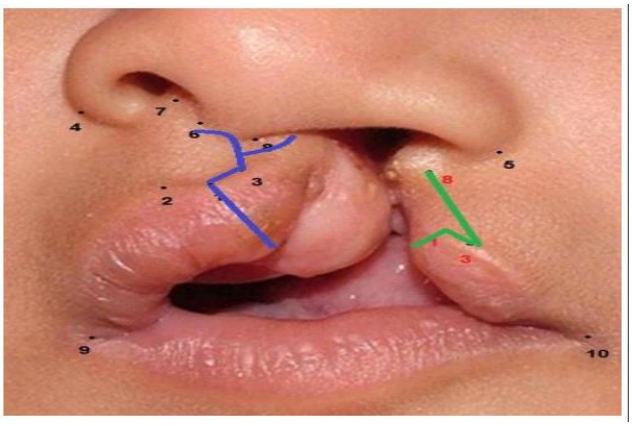
  4- Mucosal line: it is a line from point **1** perpendicular to the vermilion border to the vestibule.

  At cleft side:

  1- WRV turn down flap: it is about two lines; The 1st line from point 3 to point 1 along white roll but just above white roll about 1mm.

  The 2nd line, it is a straight line from point 3 to point 8.

  2- Mucosal line: it is a line from point 1 perpendicular to the vermilion border and then with mucosal crease to the vestibule.



(Fig. 2): Mishra technique landmarks and cutting lines.

3- Cutting:

- Cutting of the cutaneous and mucosal tissues.
- Dissection of the muscle.
- Nasal dissection.

After cutting during this stage and removing the discarded tissue 3 flaps are created: WRV flap, rotational flap, and c flap.

4- Dissection of the muscle:

We dissect the orbicular muscle from the skin and the mucosa over a distance.

5- Suturing :

1- Nasal floor suturing.

2- Alar base suturing.

3- Muscle layer suturing.

4- Cutaneous and mucosal suturing.

5- Nasal floor suturing; the suturing of the anterior floor of the nose always starts posterior and proceeds anteriorly.

Using a vicryl 5-0.

6- Alar base suturing; position the alar base using a vicryl 4-0. This suture is important for two reasons. It levels both nostrils on the same height and it determines the width of the nostril.

7- Muscle layer suturing; the suturing of the muscle is carried out using a vicryl 4-0.

8- Cutaneous and mucosal suturing; repair is completed by suturing these points together: point 8 with point a, point 3 with point 3 and tip of c flap with point 5. The suturing is carried out using a vicryl 6-0. The suturing of mucosal

Post-operative Care

Include; Post-operative instructions about feeding, medications, careful follow-up of the repair technique, and assessment of the outcomes of the surgical technique in the outpatient clinic.

Cosmetic results evaluation

1- Post-operative cosmesis ;

a) White role: matching or not matching

b) Alar base: symmetric or non-symmetric

c) Cupoid's bow: symmetric or non-symmetric

2- Satisfaction score.

Patient parent's satisfaction according to satisfaction scoring.

- unsatisfied
- satisfied
- happy

3- Asher-McDade aesthetic Index [7]

Results

A total of 50 pediatric patients with unilateral cleft lip were included in our study at Pediatric Surgery Unit of General Surgery Department of Minia University Hospital. Children's age ranged from three to twelve months with a mean±SD of 6.8±3.1 months (Table 1). Out of 50 patients ; there were 35(70%) males and 15(30%) females, with male: female ratio was 2.3: 1. Out of 50 patients, 24(48%) were isolated complete unilateral cleft lip and the remaining 26 (52%) consists of incomplete unilateral cleft lip. The mean operative time was 72.7±7.9 minutes.

Data about sex distribution of patients, age, type of cleft lip (complete or incomplete), and operative time were summarized on table 1.

Table (1): Demographic and clinical data of study patients

	Total (N=50)	
	N	**%**
Age (months)		
Mean±SD	6.8±3.1	
(Range)	(3-12)	
Sex		
Male	35	70.0%
Female	15	30.0%
Type of unilateral cleft lip		
Complete	24	48.0%
Incomplete	26	52.0%
Operative time (minutes)		
Mean±SD	72.4±7.9	
(Range)	(62-90)	

All cosmetic results were recorded after 3 months of operation. (Fig. 3 and 4)

Regarding white roll matching, alar base symmetry and Cupoid bow symmetry, results are in table 2.

Table (2): Postoperative cosmetic results.

	Total (N=50)	
	N	**%**
white roll		
Not matching	6	12.0%
Matching	44	88.0%
Alar base		
Non-symmetric	8	16.0%
Symmetric	42	84.0%
Cupoid's bow		
Non-symmetric	5	10.0%
Symmetric	45	90.0%

Regarding parents' satisfaction, results are in table 3

Table 3: parents satisfaction score

	Total (N=50)	
	N	**%**
Satisfaction score		
Happy	44	88.0%
Satisfied	3	6.0%
Unsatisfied	3	6.0%

Table 4: Asher-McDade aesthetic Index

	Total (N=50)	
	N	**%**
Nasal form (frontal view)		
Very good appearance	15	30.0%
Good appearance	23	46.0%
Fair appearance	11	22.0%
Poor appearance	1	2.0%
Deviation of the nose		
Very good appearance	6	12.0%
Good appearance	24	48.0%
Fair appearance	20	40.0%
Shape of the vermilion border		
Very good appearance	7	14.0%
Good appearance	31	62.0%
Fair appearance	8	16.0%
Poor appearance	2	4.0%
Very poor appearance	2	4.0%
Nasal profile including upper lip (lateral view)		
Very good appearance	8	16.0%
Good appearance	28	56.0%
Fair appearance	10	20.0%
Poor appearance	3	6.0%
Very poor appearance	1	2.0%

Figure (3) Preoperative and postoperative result (3 months), satisfaction score (happy), Asher-McDade aesthetic Index (Good).

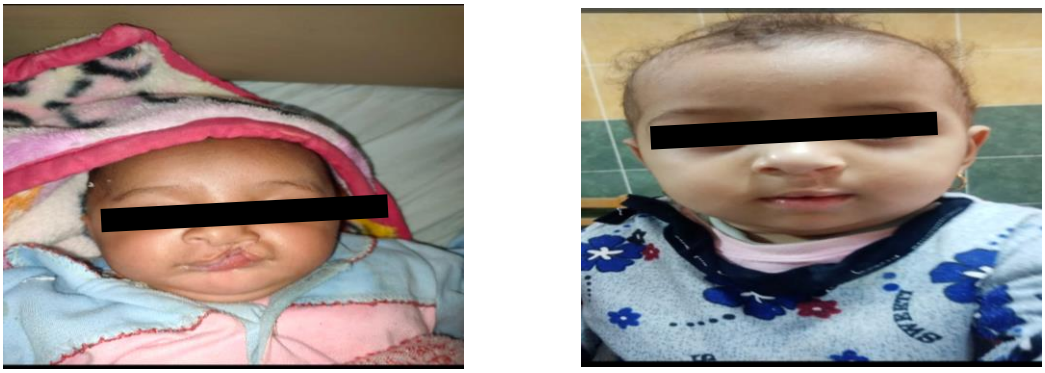


Figure (4): Case 2 preoperative and postoperative result (3 months), satisfaction score (Satisfied), Asher-McDade aesthetic Index (Fair)

Discussion

Our study included 50 patients and aims at evaluating and assess the advantages, disadvantages, and outcomes of Mishra technique in unilateral complete or incomplete cleft lip repair we evaluated cleft repair outcomes three months post-operatively. A three-month post-operative evaluation study was also done by Adetayo et al., and Lu TC et al.,[8,9]; however, Murthy et al., evaluated the patients for outcomes after one month post-operatively[10].

In our study, the age at which the repair was done ranged from 3-12 months with the average age of the patients being 6.8 ± SD 3.1. In the study done by Adetyo et al.,[9] and Murthy et al.,[10] patients' age at the time of lip repair ranged from 1 to 12 months. Most lip repairs were performed within 3 to 6 months for both groups.

Regarding the satisfaction by patients' parents in our study, most patients' parents were happy and satisfied. In the study done by Kirschner et al.,**[11],** the satisfaction score (unsatisfied, satisfied, and happy) was done and was also not statistically significant with most being satisfied and happy.

Regarding post-operative cosmetic results in our study; white roll matching was observed in 44 patients (88%). This is in concordance with the findings of Moore et al.,**[12],** the white roll matching was 93% for the Tennison group and 83% for the Millard group.

Alar base symmetry in our study was 84% which is much better than the findings of Sperber et al., [13], 50% were symmetric in the Tennison group and 66% were symmetric in the Millard group.

By using the Asher-McDade Aesthetic Index for the assessment of the nose and lip of each patient operated by Mishra technique; the nasal form was better with 30% very good appearance and 46% good appearance. Assessment of the deviation of the nose was 12% very good appearance, 48% good appearance, and 20% fair appearance. Shape of the vermillion border was 76% good and very good collectively. Nasal profile was 72% very good and good appearance collectively. These results are in concordance with those of Tomohiro et al.,**[14]** who concluded that the rotational advancement technique was better than the triangular flap technique. However, they are slightly different from those reported by Gadre et al.,**[15]** who concluded no significant difference between the two techniques.

Mishra et al., published this technique with an experience of more than 100 cases of unilateral cleft lip repair, they achieved a good symmetry and peaking of cupid's bow with no vermilion notching of the lips. These results are in accordance with our results [8].

Conclusion

Mishra technique is a very good technique regarding cosmetic results, less secondary deformities, less early and late complications, high parent's satisfaction, and good aesthetic results.

References

1. Mountokalakis TD. Hippocrates and the essence of evidence-based medicine. Hospital chronicles.2006;1(1):7-8.
2. Van de Ven B, Defrancq J, Defrancq E. Cleft lip surgery: a practical guide. Zgierz: Drukarnia WIST. 2008:1-27.
3. Dixon MJ, Marazita ML, Beaty TH, Murray JC. Cleft lip and palate: understanding genetic and environmental influences. Nature Reviews Genetics. 2011;12(3):167-178.
4. Little J, Cardy A, Munger RG. Tobacco smoking and oral clefts: a meta-analysis. Bulletin of the World Health Organization. 2004;82:213-218.
5. Honein MA, Rasmussen SA, Reefhuis J, et al., Maternal smoking and environmental tobacco smoke exposure and the risk of orofacial clefts. Epidemiology. 2007:226-233.
6. Mossey PA, Little J, Munger RG, Dixon MJ, Shaw WC. Cleft lip and palate. The Lancet. 2009;374 (9703): 1773-1785.
7. Demke JC, Tatum SA. Analysis and evolution of rotation principles in unilateral cleft lip repair. Journal of plastic, reconstructive & aesthetic surgery. 2011;64(3):313-318.
8. Mishra R, Agarwal A. White Roll Vermilion turn down flap in primary unilateral cleft lip repair: A novel approach. Indian Journal of Plastic Surgery. 2015;48(02):178-184.
9. Adetayo AM, James O, Adeyemo WL, Ogunlewe MO, Butali A. Unilateral cleft lip repair: a comparison of treatment outcome with two surgical techniques using quantitative (anthropometry) assessment. Journal of the Korean Association of Oral and Maxillofacial Surgeons.2018;44(1):3-11.
10. Lu T-C, Filson S, Yao C-F, Chen P-T. Septal anchoring suture: a key suture to improve the nasolabial symmetry in unilateral cheiloplasty. International journal of oral and maxillofacial surgery. 2018;47(9):1106-1113.
11. Murthy J. White roll vermilion-turn downflap in primary unilateral cleft lip repair: A novel approach. Indian Journal of Plastic Surgery. 2015;48 (02):184-186.
12. Kirschner RE, LaRossa D. Cleft lip and palate. Otolaryngologic Clinics of North America. 2000;33(6):1191-1215.
13. Moore K, Persaud T, Torchia M. Human birth defects. The Developing Human: Clinically Oriented Embryology. 9th edition. Saunders/ Elsevier, Philadelphia,PA. 2013:471-501.
14. Sperber G, Sperber S, Guttman G. Craniofacial embryogenetics and development. People's medical publishinghouse. Shelton, CT. 2010.
15. Yamada T, Mori Y, Minami K, Mishima K, Sugahara T. Three-dimensional facial morphology, following primary cleft lip repair using the triangular flap with or without rotation advancement. Journal of Cranio-Maxillofacial Surgery. 2002;30 (6):337-342.
16. Smarius B, Loozen C, Manten W, Bekker M, Pistorius L, Breugem C. Accurate diagnosis of prenatal cleft lip/palate by understanding the embryology. World journal of methodology. 2017;7(3):93.
17. Gadre P, Borle R, Rudagi B, Bhola N, Yadav A. Comparison between Millard's Rotational Advancement Flap and Tennison-Randall Flap Techniques for Surgical Correction of Unilateral Cleft Lip Deformity. Austin J Otolaryngol. 2016;3(3):1081.