

Comparison of Outcomes of Millard's Rotational Advancement Flap and Fisher's Techniques for Surgical Correction of Unilateral Cleft Lip Deformity

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ABSTRACT

Objective: The objective of our study is to compare the surgical outcomes of two surgical techniques namely Fisher's technique and Millard's Rotational Advancement Flap, particularly in terms of white roll symmetry, lip length, lip height, scar quality, notching, cupid's bow and alar base symmetry.

Study design: Prospective Randomized Clinical Trial study.

Place and duration of study: Department of Pediatric surgery, Sheikh Zayed Hospital, Rahim Yar Khan for a period of six months from 1st March 2021 to 31st August 2021.

Patients and method: A total of 56 patients were enrolled in the study, equally divided into two groups. Group 1 will include patients undergoing treatment via Millard's Rotational Advancement Flap technique, while group 2 will include those receiving Fisher's procedure. A single consultant performed the procedure. Variables like lip length, Alar base symmetry, scar quality, cupid's bow symmetry, and notching were accessed postoperative via the Steffensen grading method, and Vernier caliper was used for anthropometric measurements. The SPSS v 23 was used to evaluate the data. All numerical data were provided in mean and standard deviation (SD) formats. Frequencies were computed for qualitative data. Nonparametric tests (paired and unpaired t-tests) and parametric tests (Fisher's exact test) were utilized to compare the variables. P-value of < 0.05 was considered statistical significant.

Results: Both groups had identical outcomes in terms of lip length, nasal symmetry, and alar dome. On the other hand, Fisher's approach was superior in terms of vermilion roll symmetry, white roll symmetry, scar appearance, and Cupid Bow. Anthropometric measures, such as lip height and breadth, were taken; however, the results were statistically insignificant. There was no discernible difference between the outcomes of complete and incomplete cleft lip.

Conclusion: We propose using the Fisher's surgical method in unilateral cleft lip repair since it produces better outcomes than the Millard's procedure.

Keywords: Anthropometric measurement; Fisher; Lip Notching; Millard; Scar; Unilateral cleft lip.

INTRODUCTION

Both cleft lip and cleft palate are among the most frequent birth abnormalities, occurring between the 4th and 9th week of pregnancy and needing extensive long-term rehabilitation, possibly for the rest of one's life. ^[1] Globally, cleft lip and palate incidence ranges from 3.4 to 22.9 per 10,000 live births. ^[2] An individual who has a deformity is more susceptible to acquiring psychological issues. In Pakistan, its incidence is 1.46 per 1,000 live births. ^[3]

Numerous cosmetic surgeries have been offered; however, most authors advocate lip restoration in newborns between 3 and 6 months to restore face symmetry and functional features. ^[4] Unilateral cleft lip deformity affects all aspects of the lip, including the vermilion, white roll, and cupid's bow, resulting in a flattened philtral column, a short and narrow lip with narrow vermilion, an open nasal floor, a short alar flare, a depressed and grooved ala on the cleft side, and nasal septum deviated anteriorly to the noncleft side. ^[5]

The treatment goals for cleft lip defects are to close the cleft as soon as possible, with the primary goal of restoring a tension-free, mobile, and balanced lip via precise dissection and reinsertion of the orbicularis oris insertions around the cleft, in order to correct the symmetry of the nasolabial folds and alae of the nose on both sides with a natural-looking upper lip. ^[6,7]

Rose's straight-line repair, the first surgical correction for cleft lip, was described in 1891. Since then, several surgical approaches for this aim have been developed, including the Rotational Advancement technique, also known as Millard's method, Fisher's method, Anatomic Subunit Repair, Tennison-Randall technique, Olekas technique, Mohlar's technique, and Reichert technique. ^[8-10]

Millard pioneered the rotation-advancement technique for unilateral cleft lip surgery in 1955, and it has since become the most widely used procedure globally. This approach is more commonly used since it sufficiently retains the dimple on the cupid's bow and provides a lengthening effect. However, it is most frequently linked with an undesirable philtral ridge scar. ^[11]

On the other hand, Fisher published another technique in 2005 that results in a cosmetically pleasing and natural-looking columella and philtral ridge due to its symmetrical shape and lack of incision across the philtrum. It is associated with improved lip contour on the philtral ridge and overlap of the orbicularis oris muscle. ^[8]

We hypothesized that using the Fisher repair resulted in more appealing lip aesthetics and manageable lip scars, resulting in fewer significant cleft lip revisions. Various research concentrating on particular strategies for repairing unilateral cleft lip deformity or comparing numerous surgical treatments have been conducted in the past. Our study will examine the white roll match, lip length, lip height, scar quality, notching, cupid bow symmetry, and Alar base symmetry of various techniques.

MATERIAL & METHODS

It was a prospective randomized clinical trial study performed at the Department of Pediatric Surgery, Sheikh Zayed Hospital, Rahim Yar Khan, for six months from 1st March 2021 to 31st August 2021. A sample size of 28 patients in each group was calculated using 90% power of test, 95% confidence interval, mean lip height in Millard's and Fisher's technique of 9.87 (SD=2.53) and 7.87 (SD=2.03), respectively.

Patients were divided into two equal groups using the lottery method consisting of 28 patients. Group 1 will include patients

undergoing treatment via Millard's Rotational Advancement Flap technique, while group 2 will include those receiving Fisher's procedure. A single consultant performed the procedure. Variables like lip length, Alar base symmetry, scar quality, cupid's bow symmetry, and notching was assessed postoperative via Steffensen's grading method and Vernier calipers was used for anthropometric measurements i.e., lip height and width. Each anthropometric parameter on the normal side was assigned a value of 1 as a control, and the identical parameter on the treated side was assessed as a ratio of this value. Patients were followed up after 7 days and 1 month. Outcome results were noted at 1 month.

We included the patients having following characteristics: Patients in whom cleft lip is not a part of a syndrome. Partial or complete unilateral cleft lip. Patients in the age range of three months to sixteen years. Patients with anesthesia fitness of ASA (American Society of Anesthesiologists Classification) category 1 and 2.

Patients with the following characteristic were excluded from the study: Patients of cleft lip associated with the syndrome, e.g., Pierre Robin Sequence, Stickler Syndrome, and chromosome 22q11 deletion syndrome. Patients with bilateral cleft lip. Patients with an orofacial cleft. Patients required revision surgery for UCL. Patients with age below three months or above 16 years. Patients not giving consent for participation in the study. Patients with anesthesia fitness of ASA (American Society of Anesthesiologists Classification) category 3 and 4. Patients who lost follow-up.

Statistical Analysis: The Statistical Package for Social Sciences SPSS software version 23 was used to store, analyze, and evaluate the data. All numerical data was provided in mean and standard deviation (SD) formats. Frequencies were computed for qualitative data. Nonparametric tests (paired and unpaired t-tests) and parametric test (Fisher's exact test) were utilized to compare the post-surgical observations of research variables such as white roll match, lip length, lip height, scar quality, notching, cupid's bow symmetry, and alar base. Statistical significance is defined as a p-value of < 0.05.

RESULTS

The Steffensen criteria used to grade qualitative analysis were divided into three categories: good, average, and bad. In both groups, most of the patients rated white roll match, vermilion roll, scar look, cupid bow, lip height, nasal symmetry, notching, and alar base as good (range 50 to 89 %). In terms of the cupid bow, we found it as good (53.5 vs. 71.9 %), followed by average (35.7 vs. 21.4 %) in both categories. Lip length showed almost similar results, with 67.8% of patients evaluating it as good in Fisher's group and 71.4 % rating in Millard's. In Millard's and Fisher's groups, notching patients scored 50 % and 60.7 %, respectively. Table 2 summarizes the results in detail.

Lip length, nasal symmetry, and alar dome showed similar results in both groups. However, vermilion roll symmetry, white roll symmetry, scar look, and Cupid Bow were superior in Fisher's technique. Two anthropometric measurements were obtained i.e., lip height and lip width. (Table 3). There was no significant difference observed between complete and incomplete cleft lip results.

Table 1: distribution based on gender, affected site and extent between both surgical techniques.

	Millard's Technique group n=28	Fisher's technique group n=28	Total n=56
Gender			
Male	16	20	36 (64.2%)
Female	12	8	20 (35.8%)
Affected site			
Right	15	17	32 (57%)
Left	13	11	24 (43%)
Extent			
Incomplete	18	16	22 (39.2%)
Complete	10	12	34 (60.7%)

Table 2: Distribution of both groups according to Steffensen grading criteria. n=28 in each group.

Grading	Good		Average		Poor	
	Millard's	Fisher's	Millard's	Fisher's	Millard's	Fisher's
Vermillion roll	16 (57.1%)	21 (75%)	9 (32.1%)	5 (17.9%)	3 (10.7%)	2 (7.1%)
White roll symmetry	20 (71.4%)	24 (85.8%)	4 (14.2%)	3 (10.7%)	4 (14.2%)	1 (3.5%)
Scar appearance	14 (50%)	25 (89.2%)	9 (32.1%)	2 (7.1%)	5 (17.9%)	1 (3.5%)
Cupid bow	15 (53.5%)	20 (71.4%)	10 (35.7%)	6 (21.4%)	3 (10.7%)	2 (7.1%)
Lip height	20 (71.4%)	19 (67.8%)	6 (21.4%)	5 (17.9%)	2 (7.1%)	4 (14.2%)
Nasal symmetry	19 (67.8%)	20 (71.4%)	6 (21.4%)	5 (17.9%)	3 (10.7%)	3 (10.7%)
Alar base	18 (64.2%)	18 (64.2%)	9 (32.1%)	8 (28.5%)	1 (3.5%)	2 (7.1%)
Notching	14 (50%)	17 (60.7%)	5 (17.9%)	7 (25%)	9 (32.1%)	4 (14.2%)

Table 3: Comparison between two groups by using anthropometric measurement

Measurement	Fisher's technique	Millard's technique	t-test	p-value
Lip height	1.2±0.14	1.1±0.11	1.247	0.55
Lip width	1.03±0.09	1±0.14	1.452	0.60

DISCUSSION

Cleft lip is one of the most frequent congenital deformities in the oral and maxillofacial region. Despite the decreased morbidity, the deformity impairs patients' appearance and functions (such as sucking, speaking, breathing) due to its severity. Cleft lip and palate patients require specialized care. Because good outcomes are challenging to accomplish, numerous new strategies have

emerged throughout the years, with no evident superior method. Surgical therapy should be based on the best available clinical research to avoid inefficient and biased treatment schemes and improve results.

There were 36 males (64.2 %) in this study and 20 females (35.8 %). Our study had a higher male to female ratio (1.8:1) than Adetayo et al., who found a ratio of 1.3:1. [12] EIMaghraby et al. also discovered that there were 15 males (53.6%) and 13 females (46.4%) ratio of 1.2:1. Almost all previous research found that males outnumbered females. [13]

We used Steffenson grading to evaluate the good qualitative outcome of Millard's approach, which was 71.4 % white roll symmetry, 57.1 % vermilion roll, 53.5 % cupid bow, 64.2 % alar base, and 50 % notching. Another study found that the Millard

technique produced good results for symmetry of the vermilion (87.5 percent), symmetry at the Cupid's bow (79.2 %), and symmetry of the lateral lip (66.7 %).^[14]

Although the percentage of vermilion symmetry in our sample was lower than in this study, the remaining parameters yielded almost identical findings.

Suchyta et al. studied the surgical outcomes of twentyone children with unilateral cleft lip deformity who had surgery using three different procedures i.e., Mohler, Fisher, and Millard. They observed scar severity was least severe with Fisher and most severe with Millard and Mohler.^[15] In all three procedures, the other parameters were nearly identical. These data corroborated our findings: Fischer's results were 90% good, 7% average, and 3.1 % poor, whereas Millard's were 50% good, 32.1 % average, and 17.9% poor.

Using Steffensen's grading standards, Musanzayi et al. analyzed 101 unilateral cleft lip cases. They found that Fisher's approach dramatically increases the medial and lateral lip length and leaves no scar, which is consistent with previous studies and our study.^[16]

Another study published in 2020 compared Millard's and Fischer's approaches and discovered that switching from Rotational Advancement Repair to Anatomic Sub-unit Repair is linked to less scar contraction, widening, and hypertrophy, as well as improved lip aesthetics.^[17]

Kwong et al. published research in 2019 evaluated the Fischer, Mohler, and Millard repair techniques for unilateral cleft lip and concluded that Fisher's approach produces the most visually pleasing outcomes, followed by Mohler's and Millard's techniques. Millard approach required more focus and effort on the nose and ipsilateral lip than the other two.^[2]

Patel et al. evaluated Millard and Fisher cleft lip surgery in twenty-four patients with cleft lip using Steffensen Criteria and anthropometric measurements. Qualitative data did not show a significant difference between the techniques. Despite the severity of the split, the Millard's method appeared to have more parameters with asymmetry than Fischer's approach.^[10]

Our findings appear to corroborate the findings of earlier investigations. While using Steffensen grading standards to evaluate the two groups, it was discovered that Fischer's approach outperformed Millard's technique in the following parameters: vermilion roll symmetry, cupid bow, and notching. A significant association was found in the qualitative study based on the Steffensen criterion. Our research did not any statistical significance in anthropometric parameters of lip height and lip breadth.

CONCLUSION

With a greater understanding of the pathological anatomy of unilateral cleft lips, the various procedures have evolved through time and included refinements to treat the abnormality in its entirety. Taking into account the strengths and weaknesses of each approach, we suggest the Fisher's technique for unilateral cleft lip repair over the Millard's technique due to its higher qualitative outcomes. A greater sample size and a longer follow-up period are necessary for more accurate analysis.

Conflict of interest: None declared.

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