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Article

FISHER'S AND MODIFIED MILLARD-ONIZUKA TECHNIQUES FOR UNILATERAL CLEFT LIP REPAIR: COMPARISON OF SURGICAL OUTCOMES AND PATIENT SATISFACTION

Kristaninta Bangun[1,2], Andi Azwadi Rais[1,2], Vika Tania[1,2] , Puri Ambar Lestari[3], Dhita Kurniasari[3], Vania Aramita Sari[4], & Clara Menna[1]

1. Cleft and Craniofacial Centre, Division of Plastic, Reconstructive and Aesthetic Surgery, Department of Surgery, Cipto Mangunkusumo General Hospital, Jakarta, Indonesia
2. Division of Plastic, Reconstructive, and Aesthetic Surgery, Department of Surgery, Faculty of Medicine, Universitas Indonesia
3. Koja Regional General Hospital, Jakarta, Indonesia
4. Plasthetic Clinic, Jakarta, Indonesia

ABSTRACT

Introduction: Unilateral cleft lip (UCL) surgery aims to achieve symmetry and correct functional and aesthetic issues. The Millard technique dominated until 2005, when Fisher introduced a new surgical method that is still in use today. This study aims to compare the symmetry outcomes and patient satisfaction levels between the Fisher and Modified Millard-Onizuka techniques.
Method : A retrospective cohort study was conducted to compare the outcomes of the Fisher and Modified Millard-Onizuka techniques in patients with UCL who had undergone cleft lip surgery. Five experienced plastic surgeons assessed photographs using Steffensen's criteria, while patients and parents completed the Cleft Evaluation Profile satisfaction questionnaire. Data were analysed using SPSS v.29.
Results: The intraclass correlation test showed a Cronbach's alpha >0.7 for all criteria, indicating strong reliability. Statistical analysis revealed no significant differences in Steffensen's criteria scores among the five raters between the study groups. However, the satisfaction questionnaire indicated higher satisfaction with dental appearance in the Fisher technique group. This finding may be attributed to the fact that all patients in this group were treated at a multidisciplinary cleft centre.
Conclusion: Surgical outcomes and patient satisfaction after cleft lip surgery using Fisher's technique are comparable to the modified Millard-Onizuka technique.
***Key words**: Fisher's Technique, Modified Millard, Unilateral Cleft Lip, Symmetry, Satisfaction*

Pendahuluan: Pembedahan celah bibir unilateral (Unilateral Cleft Lip/UCL) bertujuan untuk mencapai simetri serta mengoreksi masalah fungsional dan estetik. Teknik Millard mendominasi hingga tahun 2005, ketika Fisher memperkenalkan metode pembedahan baru yang masih digunakan hingga saat ini. Penelitian ini bertujuan untuk membandingkan hasil simetri dan tingkat kepuasan pasien antara teknik Fisher dan teknik Modified Millard-Onizuka.
Metode: Studi kohort retrospektif dilakukan untuk membandingkan luaran teknik Fisher dan teknik Modified Millard-Onizuka pada pasien UCL yang telah menjalani operasi celah bibir. Lima orang ahli bedah plastik berpengalaman menilai foto berdasarkan kriteria Steffensen, sementara pasien dan orang tua mengisi kuesioner kepuasan Cleft Evaluation Profile. Data dianalisis menggunakan SPSS v.29.
Hasil: Uji korelasi intraclass menunjukkan nilai Cronbach's alpha > 0,7 pada seluruh kriteria, yang mengindikasikan reliabilitas yang kuat. Analisis statistik tidak menunjukkan perbedaan yang bermakna pada skor kriteria Steffensen di antara kelima penilai dalam antarkelompok studi. Namun demikian, kuesioner kepuasan menunjukkan tingkat kepuasan yang lebih tinggi terhadap penampilan gigi pada kelompok teknik Fisher. Temuan ini kemungkinan disebabkan oleh fakta bahwa seluruh pasien dalam kelompok tersebut ditangani di pusat celah bibir multidisiplin.
Simpulan: Luaran pembedahan dan kepuasan pasien pascaoperasi celah bibir menggunakan teknik Fisher sebanding dengan teknik Modified Millard-Onizuka.
***Kata Kunci:** Teknik Fisher; Modified Millard; Celah Bibir Unilateral; Simetri; Kepuasan*

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The author(s) listed in this manuscript declare the absence of any conflict of interest on the subject matter or materials discussed.

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INTRODUCTION

Cleft lip and palate (CLP) are congenital facial deformities occurring in around 1 out of 700-1000 births, varying by geographic locations, sex, and ethnicity.[1] The incidence of cleft lip is higher in Asians and Native Americans (1 in 500) than in African populations (1 in 2500).[2] In every 10,000 people, the prevalence is 17.17 in Chinese, 16.92 in Malays, and 10.74 in South Asians.[3] The distribution of cleft types was isolated cleft lip (15%), isolated cleft palate (40%), and cleft lip and palate (45%).[4] In Indonesia, the prevalence of CLP increased from 0.08% in 2013 to 0.12% in 2018,[5] with an incidence of isolated unilateral cleft lip (UCL) at 33.6%, and UCL with or without cleft palate at 70%.[6] Our centre is a national referral cleft centre, performing around 20 cleft lip cases every month.

Cleft lip abnormalities involve deficiencies in vertical lip length, vermilion, and philtral volume, as well as nasal sill defects and nasal base asymmetry. The primary goal of unilateral cleft lip repair is to restore both function and aesthetics by achieving symmetry, concealing scars within anatomical divisions, aligning the white roll, repositioning muscles, and correcting nasal deformities.[7] Aesthetic outcomes play a crucial role in psychological well-being, self-perception, and social interactions, making it essential for surgeons to optimise both functional and cosmetic results in every case.[8]

Over time, surgical approaches have evolved from the linear incisions of Rose and Thompson to the geometric flap designs of LeMesurier and Tennison. Millard's rotation-advancement technique (1964) remained dominant until Fisher introduced the anatomical subunit approach in 2005.[9] While various studies have compared post-operative lip symmetry across techniques,[10] no data from Indonesia are available.

Several factors influence the functional and aesthetic outcomes of cleft lip repair, including surgical technique, cleft width, pre-surgical orthodontic treatment, patient characteristics, timing of repair, surgeon expertise, and post-operative care.[11] Among these, the choice of surgical technique plays a critical role in determining lip symmetry[9] and overall patient satisfaction. This study aims to compare qualitative outcomes in lip symmetry and patient satisfaction between Fisher's technique and the modified Millard-Onizuka technique.

METHOD

This retrospective cohort study aims to compare the outcomes of the Modified Onizuka Millard and Fisher techniques in patients with unilateral cleft lip. Data collection took place at three treatment settings in Jakarta, namely Cipto Mangunkusumo National Referral Hospital, Koja Regional General Hospital, and Plasthetic Clinic Jakarta, in September-December 2024. The study population consists of all patients with UCL who underwent surgery using either the Fisher technique or the modified Millard-Onizuka technique. The surgery should be conducted at least one year prior to enrollment. Exclusion criteria consist of patients with syndromic or congenital anomalies, patients refusing to consent, those with bilateral cleft lips, and patients who underwent revision surgery.

Enrolled patients or their guardians completed the Cleft Evaluation Profile (CEP)[12] questionnaire, which assesses satisfaction with facial, lip, nasal, and dental appearance using a four-point scale: very satisfied, satisfied, dissatisfied, and very dissatisfied. Each patient also has their postoperative photographs taken, which will be evaluated in a blinded manner by five board-certified plastic surgeons with over 10 years of experience. Surgical outcome assessment was conducted using Steffensen's criteria,[10], which includes five lip and three nasal criteria, rated as poor, moderate, or good.

To facilitate comparison, we assigned numerical values to the ratings: 'poor' = 1, 'moderate' = 2, and 'good' = 3. The scores for each criterion were averaged across all five assessors and presented in a table. Additionally, we summed the scores for all eight criteria per patient, yielding a total score ranging from 8 (lowest) to 24 (highest). To illustrate overall surgical outcomes, individual scores were converted to percentages by dividing by 24 and multiplying by 100%, with mean scores reported for each study group.

The study was approved by the ethics committee of Cipto Mangunkusumo Hospital - Faculty of Medicine, Universitas Indonesia. Patients received a full explanation of the study, including its objectives and potential risks and benefits, and provided enrollment approval

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through written consent forms. Confidentiality was maintained, and data were only used for research and publication purposes.

Statistical analyses were performed using SPSS version 26 for Mac. Inter-rater reliability of Steffensen's criteria assessments was evaluated using the Intraclass Correlation Coefficient (ICC), with values of 0–0.5 indicating poor agreement, 0.5–0.75 indicating moderate, 0.75–0.9 indicating good, and 0.9–1.0 indicating excellent agreement. Comparisons between the two surgical techniques were analysed using the Mann-Whitney U test, with statistical significance set at $p < 0.05$.

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RESULTS

A total of 36 cleft lip patients underwent labiaplasty: 18 in the Fisher technique group treated at Cipto Mangunkusumo Hospital, and 18 in the Modified Millard-Onizuka group treated at Koja Hospital, Jakarta, and Plasthetic Clinic, Jakarta. Table 1 presents the characteristics of the study subjects.

Table 1. Subjects' characteristics

Characteristics		**n (%)**
Gender	Male	17 (48%)
	Female	19 (52%)
Age (years)		9.9 ± 7.7
Fisher	Complete UCL	15 (83,3%)
	Incomplete UCL	3 (16,6%)
Modified Millard-Onizuka	Complete UCL	16 (88,8%)
	Incomplete UCL	2 (11,2%)
Time of data collection	1-2 years post-op	30 (83,3%)
	>2 years post-op	6 (16,7%)

Results from the ICC test showed good agreement (0.7–0.9) among all five evaluators across all aspects, except for lip length, which fell into the moderate category. Internal consistency assessment of the Steffensen criteria also demonstrated good results, except for the lip length aspect, as indicated by Cronbach's alpha (>0.6). We decided to present the assessment results from all of the assessors combined.

Overall, the lip appearance, assessed based on lip length, scar appearance, cutaneous roll symmetry, vermilion, and Cupid's bow, showed good to moderate results. The number of poor outcomes in each criterion was higher in the Fisher technique, but none were statistically significant. For the nasal appearance, the majority fell into the moderate category for both surgical techniques. A considerable number of poor nasal outcomes were observed in both techniques (16.7%–44.4%). Average converted scores from all five assessors for each criterion were slightly higher in the Millard group, although none were significant ($p>0.05$). Average converted scores across all criteria combined were 69.72±15.84% for the Fisher group and 74.0±15.34% for the Millard group, with no statistically significant difference ($p=0.752$), as shown in Table 2.

***Table* 2.** *Surgery outcomes in UCL patients based on the Steffensen criteria.*

		Average Score From All Assessors				**P-value**
		Fisher (n)	**Av.* Score**	**Millard (n)**	**Av.* Score**	
Cutaneous roll symmetry	Good	7	2.2	10	2.5	0.194[MW]
	Moderate	7		7		
	Poor	4		1		
Vermillion symmetry	Good	8	2.2	8	2.3	0.731[MW]
	Moderate	6		8		
	Poor	4		2		
Scar appearance	Good	9	2.4	11	2.6	0.367[MW]
	Moderate	7		7		

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		Average Score From All Assessors				P-value
		Fisher (n)	Av.* Score	Millard (n)	Av.* Score	
	Poor	2		0		
Cupid's bow symmetry	Good	7		9		
	Moderate	9	2.3	8	2.4	0.449MW
	Poor	2		1		
Lip length	Good	6		8		
	Moderate	11	2.3	9	2.4	0.540MW
	Poor	1		1		
Nostril symmetry	Good	2		3		
	Moderate	13	1.9	11	1.9	0.985MW
	Poor	3		4		
Alar dome symmetry	Good	5		5		
	Moderate	7	1.9	5	1.8	0.662MW
	Poor	6		8		
Alar base symmetry	Good	2		7		
	Moderate	11	1.8	7	2.2	0.163MW
	Poor	5		4		
Average Converted Scores for All Criterias Combined**		**69.72±15.84%**	**2.1**	**74.0±15.34%**	**2.2**	**0.752IT**

IT= independent T-test, MW= Mann-Whitney U test

***The average (Av.) score** is calculated by assigning 3 points to 'Good,' 2 points to 'Moderate,' and 1 point to 'Poor' for each criterion. The total points from all five assessors for each criterion are summed and averaged, yielding a score range of 1–3.

****The overall average converted score for all criteria** is determined by assigning 3 points to 'Good,' 2 points to 'Moderate,' and 1 point to 'Poor' for each criterion. The total score across all eight criteria (ranging from 8 to 24) is then divided by 24 and multiplied by 100% to obtain a percentage score for each subject. Finally, the scores from all five assessors for the 18 subjects in each group are averaged.

Patients' or Guardians' satisfaction regarding surgery outcomes was assessed using the CEP, which evaluates nasal, dental, lip, and facial appearance. According to the CEP questionnaire results, nearly all patients who underwent labioplasty with either the Millard or Fisher technique were categorised as satisfied or very satisfied with their facial appearance. The Fisher group reported higher satisfaction with dental appearance (p=0.004), as shown in Table 3.

Table 3. *Patient satisfaction after labioplasty in UCL patients using the CEP Questionnaire*

		CEP Questionnaire Results, n(%)		*p value**
		Fisher	Millard	
Facial appearance	**Very satisfied**	8	9	0.742
	Satisfied	10	9	
	Dissatisfied	0	0	
	Very dissatisfied	0	0	
Lip appearance	**Very satisfied**	8	8	1.000
	Satisfied	10	10	
	Dissatisfied	0	0	
	Very dissatisfied	0	0	
Nasal appearance	**Very satisfied**	1	3	0.324
	Satisfied	15	8	
	Dissatisfied	2	7	
	Very dissatisfied	0	0	
Dental appearance	**Very satisfied**	5	1	**0.004**
	Satisfied	13	11	
	Dissatisfied	0	6	
	Very dissatisfied	0	0	

*Analysed using Mann Whitney-U test.

DISCUSSION

Surgical techniques for cleft lip repair continue to evolve to achieve optimal outcomes. Fisher's technique has gained popularity due to its improved postoperative results. This study involved 36 cleft lip patients, divided into two groups that underwent labiaplasty using either

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the Fisher technique or the Modified Millard-Onizuka technique. There was no statistically significant difference in surgical outcomes based on Steffensen's criteria between labioplasties performed with the Fisher technique and those performed with the Millard technique.

This study found generally good outcomes for both Fisher and Modified Millard-Onizuka techniques. When all evaluations from the five assessors were converted to numerical scores, the Millard technique yielded a higher overall score (74.0 ± 15.34%) than the Fisher technique (69.72 ± 15.84%), although the difference was not significant ($p = 0.752$). Fisher's technique showed more cases with poor results in various aspects, while the Millard-Onizuka technique had fewer poor outcomes. In unilateral cleft lip cases, the defect on the upper lip affects both the pathological and normal sides, necessitating a balanced surgical approach for optimal outcomes.[13] Symmetrical postoperative lips are characterised by a natural-looking philtrum, Cupid's bow, and minimal scarring.[14] The Millard Modification aims to preserve natural philtrum and Cupid's bow characteristics with minimal scarring[15] , while Fisher's technique focuses on anatomical subunits to achieve ideal scar placement.[16] Studies by Ammar H. and Patel et al. also support the superior lip appearance and length outcomes of the Millard Modification.[17,18] . Regarding nasal outcomes, this study found similar nostril symmetry between the two groups, a slightly higher average nostril symmetry score in the Fisher group, and a higher average alar base symmetry score in the Millard group, although none of these differences was statistically significant. Previous studies by Patel et al.,[18] Hoffmann D. et al.,[19] and ElMaghraby et al.,[15] reported superior nasal outcomes with the Fisher technique compared to Millard's.

The slightly higher scores in the Millard group may be due to differences in subjects' treatment settings. All of the subjects in the Fisher group were treated at a single cleft centre. As a teaching hospital, our cleft centre comprises three craniomaxillofacial consultants and plastic surgery residents or trainees who perform cleft lip surgery, strictly using Fisher's labiaplasty technique. In contrast, the Modified Millard-Onizuka group consisted of patients from a general hospital and an aesthetic clinic, where surgeries were performed exclusively by board-certified plastic surgeons. Many of these surgeons were not trained in the Fisher technique, having primarily studied and performed Millard's technique and its modifications during their residency and practice. The difference in surgical experience and familiarity with each technique among individual surgeons may explain the higher (though statistically insignificant) outcome scores observed in the Millard group. Moreover, there were four adults in the Millard group with moderate-to-good surgical outcomes, whereas none were in the Fisher group. Over time, natural facial growth, scar tissue softening, and muscle adaptation can enhance overall facial appearance,[20,21] which may have contributed to the higher scores in the Millard group.

The psychosocial aspect is crucial in managing cleft lip cases, as affected individuals often struggle with low self-confidence, learning difficulties, and increased anxiety or depression due to facial aesthetics. Parent-reported satisfaction, assessed using the CEP, showed that most were satisfied or very satisfied with the surgical outcomes. However, dissatisfaction was noted with nasal appearance among subjects in the Fisher group and with nasal and dental appearance among subjects in the Millard group. Studies from Malaysia by Noor et al.[12] and Lian LK et al.[22] found high dissatisfaction with dental and nasal appearance, respectively, which align with this study's findings. Additionally, dissatisfaction with dental appearance was statistically higher in the Millard group ($p=0.004$) than in the Fisher group. Since there is no direct correlation between the Fisher method and dental anatomy, this result may be attributed to differences in treatment settings. Patients who underwent labiaplasty using the Fisher technique were treated at a multidisciplinary cleft centre comprising orthodontists, a medical rehabilitation team, ear, nose, and throat specialists, and paediatricians. This multidisciplinary approach may explain the more holistic treatment experience, including dental treatment. Satisfaction may also be influenced by multiple factors, including parental background and perception,[12,22] which were not analysed in this study.

This study has several limitations, including a small sample size and the presence of confounding factors that were not statistically analysed, such as the patient's age at the time of assessment, the timing of cleft lip repair, the surgical expertise of the operating surgeon, treatment settings, and additional treatments received aside from lip revision surgery. In particular, variability in operator experience may have influenced the outcomes, as the Fisher

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repairs were performed in an academic teaching hospital by both senior craniomaxillofacial surgery consultants and plastic surgery residents under supervision, whereas the Millard–Onizuka procedures were performed by board-certified plastic surgeons. This difference in operator composition may have introduced variability in surgical execution and could partially explain differences observed between the two techniques. Additionally, most data were secondary, and there were inconsistencies in standardised patient photography techniques. Some of the hospital records were also poorly integrated, limiting data accessibility for a single- point assessment.

CONCLUSION

Surgical outcomes and patient satisfaction after cleft lip surgery in UCL patients using Fisher's technique are comparable to those using the modified Millard-Onizuka technique. Further research with a larger, multi-centre sample is needed to establish more robust surgical guidelines for unilateral cleft lip repair.

Correspondence regarding this article should be addressed to:
Kristaninta Bangun. Division of Plastic Reconstructive and Aesthetic Surgery, Department of Surgery, Faculty of Medicine, Universitas Indonesia dr Cipto Mangunkusumo General Hospital, Jalan Diponegoro No. 71, Salemba, Central Jakarta, 10310, Indonesia. E-Mail: kristaninta.s3@gmail.com

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