

ORIGINAL ARTICLE

EVALUATION OF PRIMARY UNILATERAL CLEFT LIP REPAIR. A PROPOSED SCORING SYSTEM

By

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Aim: The cleft lip and/or palate considers the second most common congenital anomaly (after club foot) accounting about 13 percent of all Congenital anomalies and the overall incidence is 1 in 1,000 live births.

The ideal operation for the repair of a unilateral cleft lip would result in a symmetrical upper lip with the philtral column length on either side equal. The scar should mirror to the opposite side. There should also be no peaking at the Cupid's bow at the cleft side or notching of the vermilion.

Methods: Different methods have been described for repair of the cleft lip. The most popular method in primary unilateral cleft lip repair is Millard technique.

Results: Modified Millard technique gave us good results in comparison with other techniques done by us despite these techniques achieved good results when they were done by their own.

Evaluation by review of the patient charts, photographic analysis and patient-satisfaction questionnaire has revealed acceptable long term results.

Conclusion: Many scoring systems have been proposed for evaluation of success of cleft lip repair. However, they are all lacking some aspects for evaluation. In our study, a system for evaluation was tried aiming to fulfill all parameters either subjective or objective.

Keywords: Cupid's bow, Philtrum, Vermilion, Orbicularis.

INTRODUCTION

Cleft lip and/or palate is the second most common congenital anomaly (after club foot) accounting about 13% of all congenital anomalies and the overall incidence is 1 in 1,000 live births.⁽⁷⁾

Cleft lip repairs have been documented for more than 3000 years, but it is only in the past half century that cleft care has become more team oriented, with outcomes that are better and more predictable. To some extent, these surgical advances have corresponded to advances in pediatric and neonatal intensive care and anesthesia, but beyond this there has been a gradual and incremental addition of technical improvements that have resulted in much improved appearance and function in patients with cleft lips.⁽⁷⁾

In 1952, Tennison started a more sophisticated repair with actual preservation and positioning of the cupid's bow. After becoming frustrated by still having contractures with the previously mentioned techniques, he resorted to a type of Z-plasty using a triangular flap.⁽²⁴⁾

In the 1950s and 60s the Le Mesurier and Tennison repairs were the most widely used techniques; however, a new method, that was destined to become even more popular, was on the horizon.⁽⁵⁾ In 1952 Cardoso focused attention on preserving the Cupid's bow.⁽²⁾

The most common procedure to repair a cleft lip is the Millard procedure presented in 1955 which entails a lateral flap advancement into the upper portion of the lip, combined with downward rotation of the medial segment. Dr Ralph Millard performed the first procedure at a Mobile Army Surgical Hospital (MASH) unit in

Korea. He published this method for the first time in 1957, made another historical presentation in 1958.^(14,15)

In 1958, Skoog advocated repairs involving a combined upper and lower lip flap (two triangular flaps from the lateral lip element are inset into the medial lip element to lengthen it).⁽²³⁾

In 1959, Randall popularized Tennison method.⁽²¹⁾ and in 1960 and 1966 Wynn and Davies described variations of triangular flaps introduced into the upper lip.^(6,26)

In 1967, Trauner and Trauner described procedure that involves a combination of flaps in the upper and lower portions of the lip from lateral lip to fill a medial deficit, a concept that can be accredited to Mirault.⁽²⁵⁾

In 1976, Millard published his definitive repair. Since its introduction by Millard, the R-A lip repair has undergone a great number of modifications and refinements, including its author and others, Pool 1980,⁽²⁰⁾ Lindsay 1986,⁽¹³⁾ Mohler 1987,⁽¹⁶⁾ Lewis 1993,⁽¹²⁾ LaRossa 1995.⁽¹¹⁾

1993, Nakajima et al raised a triangular flap at the alar base on the cleft side and advance it to the bottom of the columella achieving a straight suture line.⁽¹⁷⁾ In 2005, Fisher reported his anatomical subunit approximation technique for unilateral cleft lip repair.⁽⁸⁾ In 2006 Nakajima et al designed a semi-circular flap above the white skin roll.⁽¹⁸⁾

The aim of unilateral cleft lip repair is to achieve a functional and aesthetically acceptable upper lip scar.⁽⁴⁾

The ideal operation for the repair of a unilateral cleft lip would result in a symmetrical upper lip with the philtral column length on either side equal. The scar should mirror to the opposite side and should not transgress the philtral column. There should also be no peaking at the Cupid's bow at the cleft side or notching of the vermilion. The Cupid's bow should be of adequate proportions.⁽⁴⁾

So primary unilateral cleft lip repair focuses on repositioning the orbicularis oris, preserving the Cupid's bow, achieving adequate lip height, obtaining nasal symmetry and projection.⁽¹⁾

The aim of this work is to propose a system for evaluating different techniques for repair of unilateral primary cleft lip. Therefore, the surgeon who use a technique can evaluate himself so that he can master it or to shift to another way that can give a better outcome.

PATIENTS AND METHODS

Surgery was performed for 36 patients. 26 males and 10 females. 25 complete cleft lips and 11 incomplete cleft lips.

The average age of the patients on admission ranged from 2.5 to 9 months. Patients who were operated upon

after 6 months of age was due to their late presentation. These cases were operated upon over 2.5 years since 2006 in Kasr El-Aini (Abo EL Reish) Hospital.

Pre-surgical infant orthodontics was performed in 2 cases. Naso-alveolar moulding was performed in 4 cases.

The following techniques were done each for 6 patients, Millard technique, modified Millard rotation-advancement technique, Tennison technique, Song technique and Fisher technique (Fig. 1). In the first 5 cases the previous techniques were done alone but in case number 6 each technique was done after previous adhesion cheilo-plasty.

All patients underwent extensive preoperative evaluation in the form of history taking from the parents, physical examination, complete laboratory investigations and tests for assessment of general health and associated co morbidities.

Preoperative photographs were helpful in addressing the areas for concern to the patient and are important from a medico legal perspective. Postoperative photographs were also taken, mimicking the preoperative photos in view, lighting, expressions, and lack of makeup for easier comparison whenever possible.

RESULTS

This study included 36 patients with primary unilateral cleft lip. This included 26 males and 10 females (Fig. 2). 25 with complete cleft lip and 11 with incomplete cleft lip.

Surgeon panel judgment: A proposed scoring system was suggested to evaluate the technique using several parameters like parent's satisfaction, the vermilion, the Cupid's bow alignment, the scar, and nostril symmetry Table 1. This proposed scoring system is according to Christofides et al, Pieter et al, Yuzurih et al and Chait et al studies.

The results clarified that modified Millard technique had the highest score (17/18) and the highest average score (13.33/18) and the Fisher technique had the lowest score (6/18) but the Song technique had the lowest average score (10.33/18). (Fig. 3).

In table 2 we can find the results of each case done by Millard technique (Figs. 4,5), modified Millard technique in Table 3 (Figs. 6,7). Tennison technique in Table 4, Song technique in Table 5 (Fig. 8) and Fisher technique in Table 6.

The score of case 6 in each technique which followed adhesion cheilo-plasty was not higher than the score of any case in the same technique.

The modified Millard technique attained the highest average score in all parameters of the proposed scoring system.

Table 1. A proposed scoring system.

Parents	The vermilion	The Cupid's bow	Scar of philtral column	Orbicularis function	Nostril symmetry	Score
Happy	Smooth	Aligned	Elevated	Good	Symmetrical	3
Okay	Irregular	Peaked<3mm	Level	Not bad	Near symmetrical	2
Unhappy	Notched	Peaked>3mm or drooping	Depressed	Bulging with contraction	Asymmetrical	1

Table 2. Score of cases operated upon by Millard technique.

Millard	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6
Parents satisfaction	3	2	3	2	2	3
The vermilion	2	3	1	2	2	2
Cupid's bow alignment	2	3	1	2	3	2
Scar of philtral column	2	3	2	2	2	3
Orbicularis oris function	2	2	2	2	2	2
Nostril symmetry	3	2	2	2	2	3
Total score	14	15	11	12	13	15

Table 3. Score of cases operated upon by modified Millard technique.

Modified Millard	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6
Parents satisfaction	3	3	3	2	3	3
The vermilion	3	3	3	2	3	3
Cupid's bow alignment	3	2	2	3	3	2
Scar of philtral column	2	2	3	2	3	3
Orbicularis oris function	3	3	3	3	3	2
Nostril symmetry	3	3	2	2	2	3
Total score	17	16	16	14	17	16

Table 4. Score of cases operated upon by Tennison technique.

Tennison	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6
Parents satisfaction	2	2	3	2	2	2
The vermilion	2	2	3	1	1	2
Cupid's bow alignment	2	1	2	3	1	1
Scar of philtral column	2	2	2	2	2	2
Orbicularis oris function	2	3	3	2	3	2
Nostril symmetry	1	2	2	1	2	2
Total score	11	12	15	11	11	11

Table 4. Score of cases operated upon by Tennison technique.

Tennison	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6
Parents satisfaction	2	2	3	2	2	2
The vermilion	2	2	3	1	1	2
Cupid's bow alignment	2	1	2	3	1	1
Scar of philtral column	2	2	2	2	2	2
Orbicularis oris function	2	3	3	2	3	2
Nostril symmetry	1	2	2	1	2	2
Total score	11	12	15	11	11	11

Table 5. Score of cases operated upon by Song technique.

Song	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6
Parents satisfaction	1	2	2	2	1	1
The vermilion	2	2	3	1	2	1
Cupid's bow alignment	1	1	2	3	3	2
Scar of philtral column	1	2	1	1	2	1
Orbicularis oris function	1	2	2	2	3	3
Nostril symmetry	1	2	1	2	2	1
Total score	7	11	11	11	13	9

Table 6. Score of cases operated upon by Fisher technique.

Fisher	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6
Parents satisfaction	1	3	2	1	1	2
The vermilion	2	2	1	2	1	3
Cupid's bow alignment	1	3	2	2	1	3
Scar of philtral column	3	2	2	1	1	2
Orbicularis oris function	2	2	3	2	1	2
Nostril symmetry	1	2	1	1	1	2
Total score	10	14	11	9	6	14

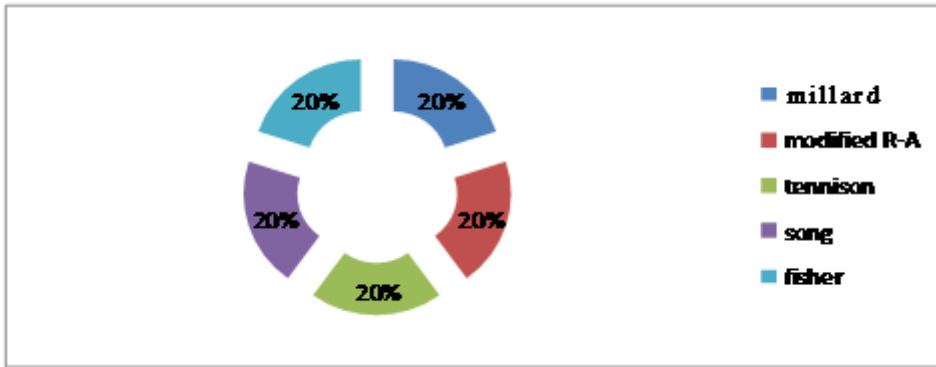


Fig 1. Chart showing different techniques used in the study.

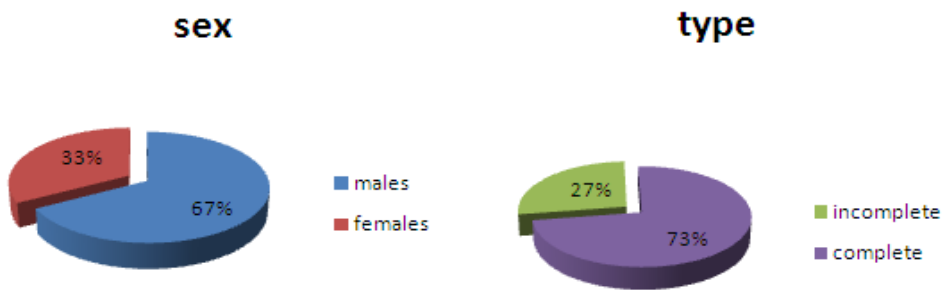


Fig 2. Distribution of sex and type of cleft included in the study.

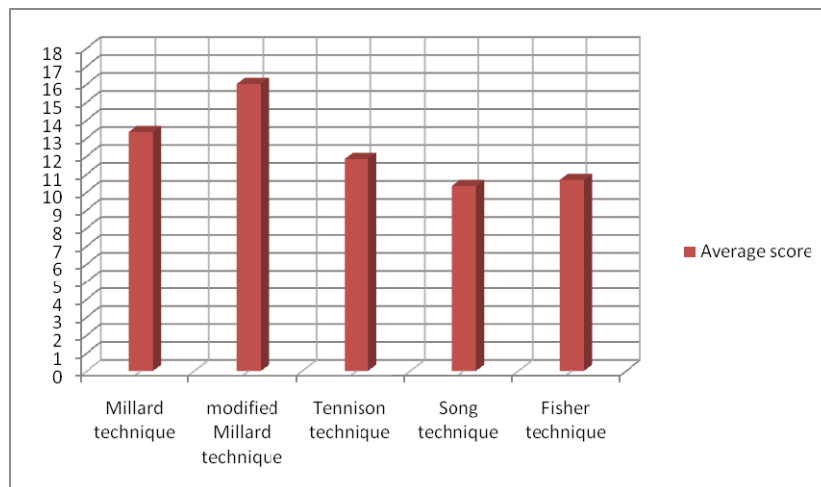


Fig 3. Chart showing different techniques used in the study.



Fig 4. Preoperative left incomplete cleft lip (left) and post operative result (right) done by Millard technique after 3 months. Note peaking of the Cupid's bow and non smooth vermilion.



Fig 7. Preoperative left incomplete cleft lip (left) and post operative result (right) done by modified Millard technique after 9 months. Note the mirror image of the philtrum, alignment of Cupid's bow, smoothing of the vermilion and nostril symmetry.



Fig 5. Preoperative left complete cleft lip (left) and postoperative result (right) done by Millard technique. Note notching of the vermilion.

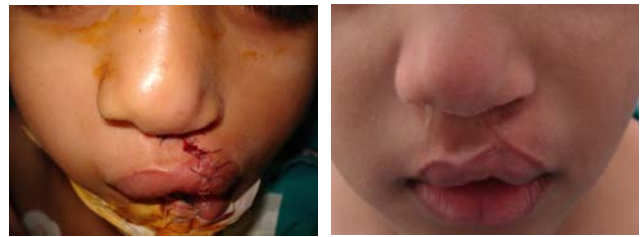


Fig 8. Immediate postoperative appearance (left) and postoperative appearance (right) done by Song technique at a year.



Fig 6. Preoperative left incomplete cleft lip (left) and post operative result (right) done by modified Millard technique after 9 months. Note elevation of philtrum and functioning of orbicularis oris muscle.

DISCUSSION

The ideal operation for the repair of a unilateral cleft lip would result in a symmetrical upper lip with the philtral column length on either side equal. The scar should mirror to the opposite side and should not transgress the philtral column. There should also be no peaking at the Cupid's bow at the cleft side or notching of the vermilion. The Cupid's bow should be of adequate proportions.⁽⁴⁾

Primary unilateral cleft lip repair focuses on repositioning the orbicularis oris, preserving the Cupid's bow, achieving adequate lip height, obtaining nasal symmetry and projection.⁽¹⁾

Herter and Jaretzki, 2003 advised to "fit the operation to the patient and not the patient to the operation.

It is more appropriate to say 'What principle do you follow?' rather than 'Which technique do you use?'.⁽¹⁰⁾

In 2006, Christofides et al. used thickness of scar representing philtrum column (elevated, level, depressed) as a part of his study for assessment of scar in unilateral cleft lip repair using Millard technique. To identify satisfaction of parent with cleft lip repair Christofides et al., asked them many questions. According to their degree of satisfaction, his parameters were very happy, happy, okay and unhappy. So in our study we used these parameters of philtrum scar (elevated, level, depressed) in our proposed scoring system. And parents satisfaction happy, okay, unhappy) in our proposed scoring system.

In 2007 Pieter et al. used an index developed by Asher-McDade et al. in 1991. In this index four naso-labial components (nasal form, nose symmetry, vermilion border, and nasal profile) are rated separately on five point scales where score 1 means a very good appearance, score 2 a good appearance, score 3 a fair appearance, score 4 a poor appearance and score 5 a very poor appearance. No primary nose surgery was performed at the time of lip surgery. In our study we used nose symmetry (symmetrical, near symmetrical, a symmetrical) in our proposed scoring system.

In 2008, Yuzurih et al. considered the extent of disruption at the vermilion-cutaneous junction defines minor-form (3 mm or more above the normal Cupid's bow peak), microform (less than 3 mm above the normal Cupid's bow peak), and mini-microform cleft lip (slightly disrupted and the peaks are level). These anatomical designations determine the method of naso-labial repair and correlate with types and frequency of revision. So in our study, the peaking of Cupid's bow (level, less than 3mm, more than 3mm included in our proposed scoring system.

In 2009, Chait et al. found that other techniques in

comparison with his technique resulting in the problem of notching at the vermilion border. This parameter also assessed by Christofides et al in objective evaluation in patient underwent Millard technique. In a number of very wide cleft lip repairs, the vermilion border appeared thin at the end of his procedure. Over time, structure this problem resolved. So in our study we used these parameters of vermilion (smooth, thin or irregular, notched) in the proposed scoring system.

In conclusion management of patients with unilateral cleft lip remains controversial. The difficult challenge is to obtain elevated mirror image philtrum column without peaking of cupid' bow.

Modified Millard technique including the principles of rotation-advancement flap of Millard with modified incision of LaRossa for C flap, back cut of Mohler, vermilion triangular flap of Noordhoff and modified minimal nose repair of Salyer in addition to small skin triangle from the lateral lip to the medial one above the Cupid's bow if it is needed after orbicularis oris muscle overlapping reconstruction achieved the best results in comparison with other techniques included in our study inspite of having satisfying results by other techniques included in our study and despite these techniques achieved good results when they were done by their own.

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