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Research Report

Unilateral cleft lip surgery symmetry observation with Millard I and Tennison techniques

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ABSTRACT

Background: In line with the development of Millard I and Tennison cleft lip surgery techniques, there are also advantages and disadvantages to each technique. The Cleft Lip Symmetry Index (CLCSI) was used to measure the symmetry of each measurement variable from the results of unilateral cleft lip surgery so that it could be represented by an objective number. **Purpose:** This study aims to observe the surgery results using Millard I and Tennison techniques in unilateral cleft lip patients. **Methods:** This study used descriptive study by observing the symmetry of lateral philtrum height, vermillion height, cupid's bow width, cupid's bow height, and nostril width after labioplasty using the Millard and Tennison technique in unilateral cleft lip patients in Surabaya, Madura, and Malang. **Results:** The results of the CLCSI modification for the Millard technique can be summarized that nostril width ranged from 78.82 - 195.04. Lateral philtrum height ranged from 62.5 - 107.62. Cupid's bow width ranged from 72.17 - 155.29. Cupid's bow height ranged from 96.43 - 487.5. Vermilion height ranged from 84.62 - 131.11. The results of the CLCSI modification for the Tennison technique can be summarized that nostril width ranged from 88.89 - 171.43. Lateral philtrum height ranged from 48.92 - 109.04. Cupid's bow width ranged from 89.26 - 166.15. Cupid's bow height ranged from 73.81 - 311.11. Vermilion height ranged from 72.14 - 138.46. **Conclusion:** It's difficult to obtain completely symmetrical surgical results because of many factors that affect the outcome of the operation in both Millard I and Tennison methods.

Keywords: Unilateral Cleft Lip; Millard I Technique; Tennison Technique; Cleft Lip Component Symmetry Index; Medicine

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INTRODUCTION

Cleft lip and palate is a congenital disorder that has a major physical and psychological impact on the sufferer.[1] Geometric surgery techniques, such as the Tennison technique, are performed based on mathematical measurements using calipers to achieve symmetrical lips. As a result, however, this technique also becomes less flexible during surgery. The geometric technique also has a disadvantage, namely the incision design, which always results in scar tissue that crosses the anatomical structure.[2,3] While the z-plasty technique, represented in this study by the Millard technique, allows the operator to make flexible modifications during surgery, it is more esthetically advantageous because the suture marks are hidden in the natural structure but tend to produce vertical contractures and small nostrils.[4]

The Cleft Lip Symmetry Index (CLCSI) was used to measure the symmetry of each measurement variable from the results of unilateral cleft lip surgery so that it could be represented by an objective number.[5] The measurements were conducted on the nostril width, nostril height, lateral philtrum height, cupid's bow width, cupid's bow height, and vermilion height. From the index numbers collected, they provided an idea of which technique had a more symmetrical result. The techniques used to correct unilateral cleft lip were the Millard I and Tennison techniques. From the photo documentation of all patients who had been operated on, it was found that the degree of symmetry varied greatly.[6]

Based on these observations, a preliminary study was conducted on the five patients with unilateral cleft lip who were operated on using the Millard technique and the five patients who were operated on using the Tennison technique. The measurements were conducted on the nostril width, lateral philtrum height, cupid's bow width, and cupid's bow height. The measurement results were processed using a CLCSI modification without calculating the nostril height. Based on the results of this preliminary study, further

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research was carried out in order to determine the symmetry of the results of all operations that had been carried out to understand the variations in symmetry of the nostril width, lateral philtrum height, cupid's bow width, cupid's bow height, and vermilion height resulted from the cleft lip operations using the Millard and Tennison techniques that had been performed.

MATERIALS AND METHODS

This study used a descriptive study by observing the symmetry of lateral philtrum height, vermillion height, cupid's bow width, cupid's bow height, and nostril width after labioplasty using the Millard and Tennison technique in patients with unilateral cleft lip in Surabaya, Madura, and Malang. Inclusion criteria included patients with unilateral cleft lip who had labioplasty performed in Surabaya, Madura, and Malang; patients were male or female; patients with complete or incomplete unilateral cleft lip; patients had surgery for at least one month before the procedure measurement; and patients were operated on by the Millard or Tennison technique. The sample used was 25 patients who were operated on by the Millard technique and 15 patients who were operated on by the Tennison technique. This research was conducted at the Oral Surgery Department, Faculty of Dentistry, Airlangga University, Madura General Hospital, and the Dental Clinic at the Military Hospital of Malang City. Instruments used include 0.05-scale Vernier tricycle calipers and digital cameras.

Data were obtained from measurements of patients who had labioplasty surgery at least one month earlier. Clinical photos of patients were recorded with a photo camera. Labioplasty was performed using the Millard or Tennison technique. Measurements using Vernier Tricicle calipers with a scale of 0.05 were carried out once, namely after a period of at least one month after surgery, where maturation of the surgical wound had occurred. The variables measured were philtrum height, vermillion height, cupid's bow width, cupid's bow height, and nostril width from the cleft side and the healthy side. The measurement data was processed using a Modified Cleft Lip Component Symmetry Index (CLCSI). The results of data processing are entered into the CLCSI Modification Results Table as descriptive data.

RESULTS

The data obtained from the measurements are entered in Table 1 for the Millard technique and Table 2 for the

Table 1. The calculation of CLCSI Millard I technique

No	Nostril width	Lateral philtrum height	Cupid's bow width	Cupid's bow height	Vermilion height
1	105.75	97.56	85.71	100	102.27
2	108.98	94.69	83.40	102.38	100.99
3	134.72	101.037	101.23	97.56	99.04
4	130.05	93.45	125.44	173.62	108.29
5	113.82	83.68	128.97	107.41	117.07
6	114.29	102.13	99.01	96.43	91.29
7	91.43	99.42	86.36	108.11	98.125
8	92.13	80	115.13	254.17	105.69
9	98.36	91.92	155.29	106.67	100
10	110.93	73.26	120.62	487.5	110.55
11	92.02	107.62	109.86	146.25	109.27
12	154.14	62.5	120	314.07	131.11
13	195.04	92.31	86.67	145.54	91.95
14	133.60	75	130	400	111.11
15	130.05	93.45	125.44	135.83	108.29
16	78.82	106.5	80.69	278.57	84.62
17	114.10	83.65	117.65	157.89	99.11
18	116.07	84.47	87.41	139.53	109.38
19	136.30	72.31	72.99	190	120
20	114.10	83.65	117.65	157.89	99.11
21	151.72	83.45	101.72	215.56	162.50
22	114.08	109.24	72.17	200	113.64
23	116.79	92.5	103.39	145	122.53
24	97.78	79.69	104.51	186.36	98.79
25	85.37	75.31	106.84	171.41	100

Table 2. The calculation of CLCSI Tennison technique

No	Nostril width	Lateral philtrum height	Cupid's bow width	Cupid's bow height	Vermilion height
1	161.09	101.13	114.59	105	91.52
2	152.17	56	129.44	266.67	125.61
3	108.3	83.19	151.89	217.86	76.22
4	101.67	69.17	119.17	311.11	119.81
5	169.92	102.24	89.26	100	94.5
6	106.96	82.93	104	200	118.64
7	113.33	77.69	164.63	200	114.34
8	88.89	90.5	116.15	168	100
9	156.52	108.33	101.19	73.81	93.04
10	171.43	48.92	120	287.5	72.14
11	114.97	64.06	134.31	210	87.32
12	128	101.85	112.54	170.83	113.39
13	121.09	109.04	109.77	175	118.85
14	137.14	86.15	121.19	160.56	97.94
15	137.41	73.29	104	135.71	138.46

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Tennison technique. The measurement results were then processed with CLCSI modification so that indexes were obtained for nostril width, lateral philtrum height, cupid's bow width, cupid's bow height, and vermilion height.

The results of the CLCSI modification for the Millard technique can be summarized as follows: nostril width ranged from 78.82 to 195.04, and there is no value of 100. Lateral philtrum height ranged from 62.5 to 107.62, and there is no value of 100. Cupid's bow width ranged from 72.17 to 155.29, and there is no value of 100. Cupid's bow height ranged from 96.43 to 487.5 and obtained a value of 100. Vermilion's height ranged from 84.62 to 131.11, and we get two values of 100. The results of the CLCSI modification for the tennis technique can be summarized as follows: nostril width ranged from 88.89 to 171.43, and there is no value of 100. Lateral philtrum height ranged from 48.92 to 109.04, and there is no value of 100. Cupid's bow width ranged from 89.26 to 166.15, and there is no value of 100. Cupid's bow height ranged from 73.81 to 311.11 and got a value of 100. Vermilion's height ranged from 72.14 to 138.46 and got a value of 100.

DISCUSSION

Over the past five decades, several unilateral cleft lip surgery techniques have been developed and are continually being improved upon by experts. The technique of unilateral cleft lip surgery was developed starting from a simple straight line, then it was thought to be able to increase the philtrum height with a full-thickness flap.[7] In the future, experts also paid attention to the importance of maintaining a symmetrical cupid's bow and then developed quadrilateral flap techniques, triangular flaps, and rotation advancement flaps.[8] All these improvements are aimed at creating better techniques and producing experienced surgeons. The goal of all cleft lip surgery, according to Stefensen in 1953 and Musgrave in 1963, is basically to produce symmetrical lips and noses.[9]

Assessment of the results of cleft lip surgery is difficult because aesthetic assessment is strongly influenced by subjectivity.[10] The CLCSI index is used to measure the symmetry of the lips and nose, and the results are converted into numbers so that an objective evaluation can be carried out. In principle, the CLCSI index is used to compare the size of the cleft side with the healthy side and convert it into a percentage form so that it can be used to measure the symmetry of the lips and nose at all ages, not influenced by the size of the lips and nose of the patient.

Several cleft lip surgery social services were carried out in Surabaya, Madura, and Malang. The results of the operation using the Millard I or Tennison technique were observed to see the symmetry of all the results of the cleft surgery that had been carried out. In order to obtain symmetrical operating results, the Millard and Tennison techniques have been developed and refined by experts and have their respective advantages and disadvantages. The Millard technique, with its cut as principle, prioritizes tissue flexibility during operation so that adjustments can be made to obtain a symmetrical finish. While the tennis technique relies on mathematical measurements of the incision design, which aims to produce a symmetrical nose and lip base.[11]

In this paper, a study was conducted on 40 patients with unilateral cleft lip, 15 with the Tennison technique, and 25 with the Millard technique in Surabaya, Madura, and Malang. After one month, postoperative measurements were taken of the nostril width, lateral philtrum height, vermillion height, cupid's bow height, and cupid's bow width from the healthy side and the cleft side. Measurements were made one month after the operation so that the maturation of the surgical wound has been achieved and the measurement results are not affected by tissue edema. The results of this measurement are then processed with a modified CLCSI. The index used in this paper does not measure the nostril height because the Millard I and Tennison techniques cannot correct the nose optimally. Both techniques can only improve the nostril width. Nostril height correction can only be carried out optimally through rhinoplasty, which is not done in social services due to time constraints and the difficulty of performing this procedure under local anesthesia because the patient can still feel pain when manipulated in the nose area.[12]

The CLCSI is an index that is used to process data obtained from measurements of nose and lip variables resulting from unilateral cleft lip surgery into one number.[11] The number 100 means symmetrical; if < 100, it means that the cleft side is smaller than the healthy side, and vice versa. In this study, the modified CLCSI was used because no measurements were made at nostril height. All modified CLCSI scores from the Millard I and Tennison techniques that have been obtained are entered into the measurement table. From the results of this study, an overview of the results of unilateral cleft lip surgery was obtained in Surabaya, Madura, and Malang. On the results of operations using the Millard technique, the nostril width index ranged from 78.82 to 195.04; the lateral philtrum height index ranged from 62.5 to 107.62; cupid's bow width index ranged from 72.17 to 155.29; cupid's bow high index ranged from 96.43 to 487.5; and the high index of vermilion ranged from 84.62 to 131. Millard's technique tends to produce small nostrils. This is due to the interposition of the triangular flap below the nostril floor.[13]

The results of this study indicate that in some patients there is a nostril width index that is greater than the ideal value; this means that the interposition of the triangular flap below the nostril floor is still not positioned laterally. There is also a nostril width index that is less than 100. In the Millard I technique, no nostril width measurement is performed. To form the nostril floor, the triangular flap is rotated and positioned under the cleft side of the alae nasi, with the apex of the flap under the ale nasi. The size of the nostril width is determined by how far the triangular flap is interposed laterally under the alae nasi.[14] In order to achieve a symmetrical nostril width, measurements can be made when suturing the apex of the triangular flap to the base

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of the alae nasi.[15] If a symmetrical size is not obtained, the location of the apex of the triangular flap can be readjusted. Shortening of the lateral philtrum height can also occur in the Millard technique as a result of the contracture because the scar is relatively straight. According to Millard, these contractures can decrease within six to twelve months after the tissue parts soften, and the lateral philtrum height will return to symmetrical, but this was not proven in the previous study, which performed measurements of symmetry after one year postoperatively. [13,16] The cupid's bow high index is more bearable than 100, even up to a value of 487.5. This is also due to the cleft lip not being sufficiently lowered to the horizontal line of the lip. The position of the cleft side of the cupid's bow that is too superior also causes the vermilion height of the cleft side to be greater than the healthy side. This causes a higher vermilion index that is greater than the value 100.[17]

In the operation with the Tennison technique, the nostril width is measured at the time of incision design, the nostril width of the cleft side is the same. Almost all of the nostril width indexes in the results of this study showed values greater than 100. This means that the measurement at the time of the incision design is not accurate, or may be due to tension or soft tissue tension after suturing because the nasal attachment to the maxilla is not freed. This can be prevented by adding a "poker incision" to the labial vestibule, as in the Limberg technique.[19] The height of the lateral philtrum of the cleft side was determined from the magnitude of x' to increase the length of the lip. In the results of the operations that have been carried out, almost all of the lateral philtrum height indexes are less than 100. This is due to inaccurate measurements, so that x' is smaller than what is needed to increase. This can be prevented by not pulling or pressing the lips when taking measurements. From all the results of the operation, most of the bears have a cupid's bow width index greater than 100.[18,19] Almost all of the cupid's bow height index from surgery was greater than 100. This could be due to the lack of descent of the cleft lip to the horizontal line of the lip because the x' wine was not large enough. This also causes the vermilion height index to be greater than 100. In some cases, the vermilion height index is less than 100. This can be due to the lack of release of the orbicularis oris muscle from the mucocutaneous tissue, so that the shape of the cleft edge of the lateral segment mash shrinks in the direction curled lip muscle fibers caused by changes in muscle insertion at the base of the nose.[20]

The drawback of this study is the varying degrees of severity of the cleft lip, thus affecting the degree of difficulty of the operation, which in turn affects the outcome of the operation. The difference in the age of the sample has no effect on the results of the study because all measurement results have been converted into index form. Most operators do not take measurements with wires when creating Millard engineering designs. In the future, further research can be carried out using samples that have the same degree of severity of the cleft, for example, a complete cleft, and the same operator so that there is uniformity in how to perform all stages of the operation. It is difficult to obtain a completely symmetrical surgical result because there are many factors that affect the outcome of the operation, for example, the way to measure the incision when designing the incision, the extent of the release to prevent tension during suturing, or the placement of the flap during suturing. In conclusion, it is not easy to produce symmetrical lips from a cleft lip deformity because basically there is a missing part of the lip due to many factors that affect the outcome of the operation in both Millard I and Tennison methods.

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