

# Cleft-palate Repair by Modified Millard's Technique with Premaxilla Shortening in Bilateral Labioplasty: A 5-Year Clinical Study

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## To cite this article

Muhammad Jailani. Cleft-palate Repair by Modified Millard's Technique with Premaxilla Shortening in Bilateral Labioplasty: A 5-Year Clinical Study. *Medicine Journal*. Vol. 6, No. 4, 2019, pp. 101-109.

**Received:** November 14, 2019; **Accepted:** February 12, 2020; **Published:** March 2, 2020

## Abstract

Bilateral cleft lip is one type of cleft lip classification. Because of a central lack of soft tissue and the anterior displacement of the premaxilla, this case then contributes to some challenging issues for surgeon in performing surgical operation. Surgery technique performed in this study was bilateral labioplasty using modified millard technique with premaxilla shortening. This technique was considered easier and could restore the anatomical feature of the lip. Muscle in the cleft lip can be rotated to near normal lip and twisted. In such situation premaxillary shortening is beneficial to reduce the tension of the suture wound and also reduce the scar formed in bilateral labioplasty after surgery process. This research was a 5 years cohort study from 2015 until 2019, with a retrospective approach conducted among labioplasty patients at Malahayati Hospital in Banda Aceh city. The number of sample recruited was 23 participants. The data obtained were analyzed by using frequency distribution table. This study overcame with several results. First, most of the participants were males (60.9%), the highest age group was 2 years and above (69.6%), the most frequent evaluation period was 6-9 months (87.0%), most of patients were diagnosed with complete bilateral labioplasty (65.2%), and lastly, most the outcomes gained after the bilateral labioplasty using modified millard technique with premaxilla shortening was good (73.9%). Based on those findings, it can be concluded that the majority of participants were male, the highest group for age was 2 years and above, the most frequent evaluation period was 6-9 months, the most common diagnosis was complete bilateral labiolasty, and the outcome found after the surgical intervention with modified millard techniques with premaxillary shortening was dominantly good

## Keywords

Gender, Age, Evaluation Period, Complete Bilateral Labioplasty, Modified Millard Techniques with Premaxillary Shortening

## 1. Introduction

Labioschizis or Cleft Lip is the most common case of craniofacial anomaly defects. Cleft lip with or without the palate (CL / P) and palate (CP) is a congenital abnormality that occurs on the lips that can be accompanied by abnormalities on the palate [1]. In classification, the cleft lip can hit both sides called bilateral labioschizis or one side called unilateral. Or it can also be followed by accompanying defects such as cleft palate and other accompanying defects [2].

This research focused on the cleft lip on both sides and commonly known as bilateral labioschizis. Efforts to improve

through surgery have been attempted with various techniques. One of them is a surgery technique initiated by Millard (Rotation Advancement Flap). This technique is considered easier and can restore the lip points to an anatomical point. Muscles in the cleft lip can be rotated to near normal lip muscles [3]. Repositioning the maxillary and alveolar segments into a more anatomic position allows the surgeon to repair the lip and associated nasal deformity under more optimal conditions [4].

But often prominent conditions are found in bilateral labioplasty premaxilla, this causes difficulty for the surgeon because the lip muscles cannot be directly met or when it is forced there will be tension and result in loose stitches a few days later. Millard modification technique with premaxillary

shortening is a technique used in this study in order to shorten or reduce premaxilla, so the suture wound tension and scar formed in bilateral labioplasty after surgery would be reduced [5].

**2. Materials and Methods**

Retrospective reviews from all cases of bilateral cleft lip were performed between September 2015 and September 2019 at Malahayati Hospital. All cases were done under general anaesthesia with orotracheal intubation. Data retrieved from the hospital record which then included into the analysis were sex of patients, month of birth; type cleft deformity, Bermudez Score, and evaluation outcome. A total of 1258 patients were managed for cleft lip and palate deformity during the period. 23 (2%) of these were bilateral cleft lip. There were 9 females and 14 males. Age of patients at time of surgery ranged between 8 and 490 months. Surgical technique employed was Modified Millard's with premaxillary shortening. Surgical outcome was considered

satisfactory if there were: Adequate length of the upper lip, symmetrical nostrils, reconstituted philtrum and adequate columella length. There were 17 surgical interventions (73%) which were found to be satisfaction out of 23 cases.

Data collected was subjected to simple statistical analysis using the Statistical Package for Social Sciences (SPSS), SPSS ® for Windows, version 25.0 (SPSS Inc., Chicago, IL) statistical software package. Frequencies and means of the variables were estimated. Some pre-operative, intra operative and post-operative clinical photographs were also retrieved and were presented.

**3. Modified Millard Operation Techniques with Premaxillary Shortening**

After having installed the mouth-gag on the vomer bone in front of the center of growth, septumnasal bone, reduction process performed about 1 cm.

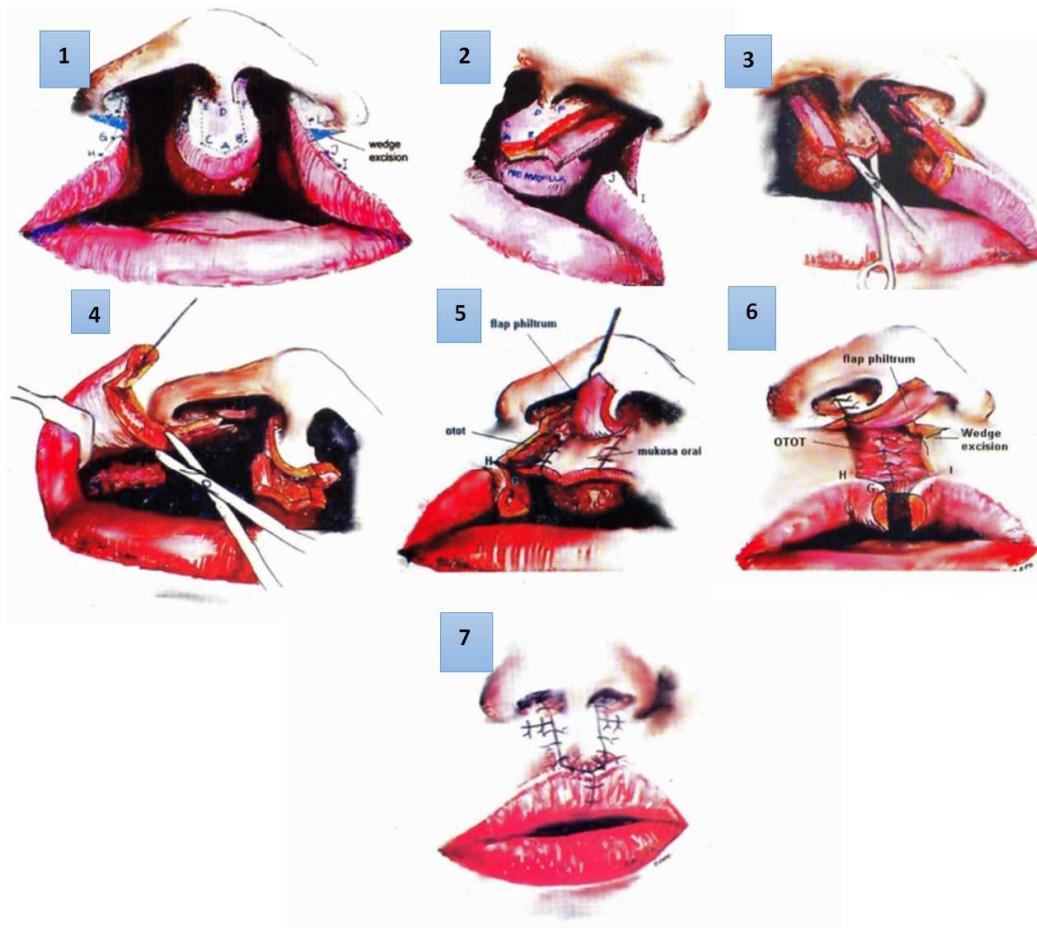


Figure 1. Modified Millard's Technique [1].

- 1. Cheiloplasty Bilateral Design
- 2. Incision in Bilateral Cheiloplasty
- 3. Philtrum correction
- 4. Muscles correction
- 5. Mucosal Suturing
- 6. Wedge Excision
- 7. The Result of Cheiloplasty Bilateral

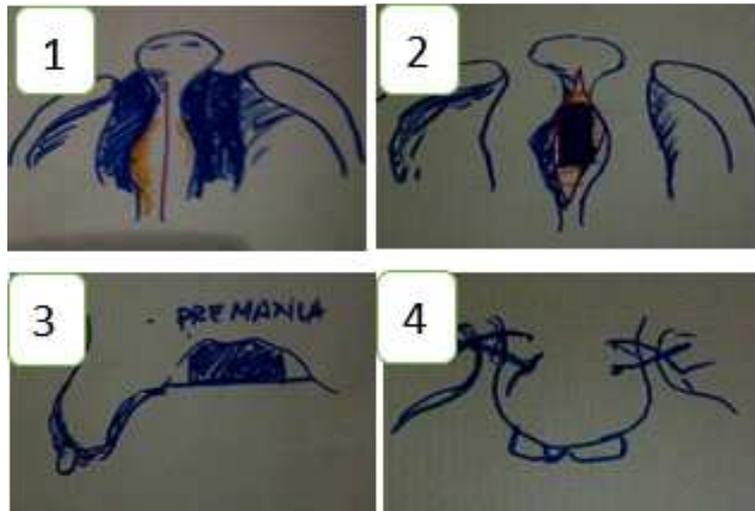


Figure 2. Premaxillary Shortening Surgery Process [1].

1. Mucosal incision is made more or less 2 centimeters to the bone.
2. Using a small raspatorium, through mucosal incision wounds in the right and left elevation enough,
3. Premaxillary bone will appear clear and enough space to do the reduction with the knife No. 11. The bones along 1 cm are removed until the premaxilla can be pushed posteriorly.
4. Premaxilla should be fixed by using vicryl yarn 3-0 with suture technique, figure of 8 to the right and left Alveolar. [1]

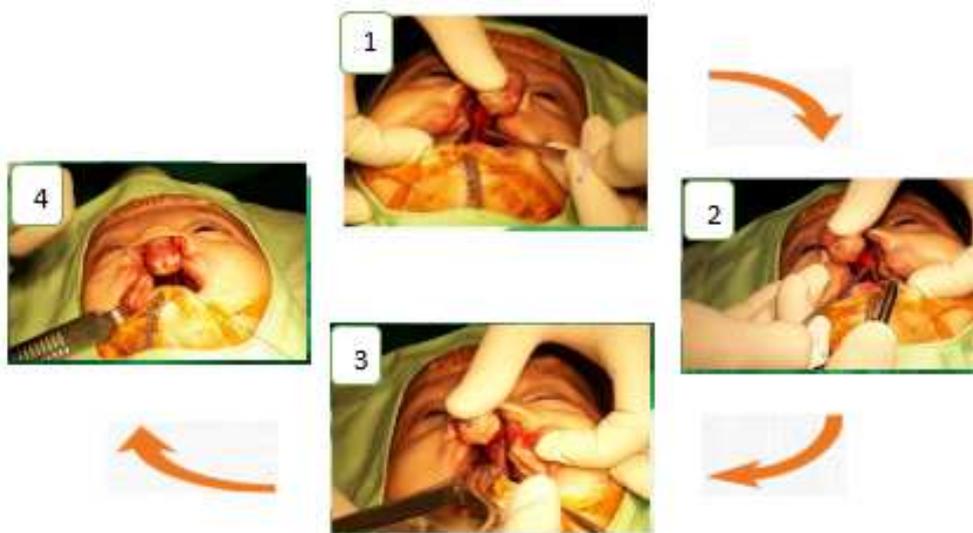


Figure 3. A 7 months male with labioplasty using modified millard's technique with premaxilla shortening [1].

1. Preoperative anterior view.
2. Occlusal intra-oral view, incision process at the edge of the premaxilla bone
3. Occlusal intra-oral view, showing vomero-premaxillary suture and the site of the wedge osteotomy of the vomer with a bone cutter.
4. Occlusal intra-oral view, showing the gap after the withdrawal of the wedge osteotomized vomer

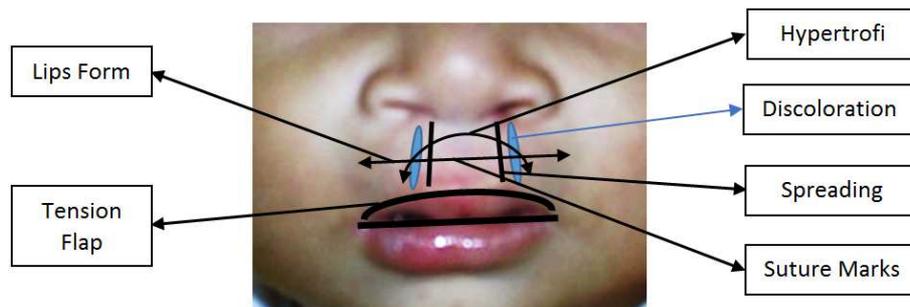


Figure 4. Repaired Bilateral Cleft Lip [13].

Table 1. Variable of Evaluation Post Labioplasty [13].

Variable of Evaluation	0 Poor	1 Fair	2 Good
<p>Lips Form Distance from commissura dextra to sinistra and vilmetrion thickness shows symmetrical. Perfome cupid bows looks good</p>	 <p>Completely asymmetrical between vilmetrion thickness, Huge discrepancy of more than 2 mm (about).</p>	 <p>Less symmetrical, distance columella to cupid bows seems different, There is some discrepancy between about 1-2 mm.</p>	 <p>There is not discrepancy or it is less than about 1 mm.</p>
<p>Tension Flap The result after surgery makes filtrum look extracted, cupid bows not performed.</p>	 <p>Flap looks tense and so extracted and the vilmetrion looks thin</p>	 <p>A little tense but does not interfere with smile when smiling.</p>	 <p>No tension, vilmetrion form not thin and not interested</p>
<p>Hipertrofy Swelling in the filtrum so that the protrusion piles over the skin</p>	 <p>Swelling was seen above the filtrum, protrusion was evident</p>	 <p>Protrusion appears but does not interfere with vilmetrion</p>	 <p>No visible protrusion of the collum filtrum, formed properly.</p>
<p>Discoloration Color discrepancy changes the former stitches</p>	 <p>Color discrepancy of the former stitches due to the process of healing the wound</p>	 <p>Discoloration is seen but does not occur in all former stitches</p>	 <p>There is no discoloration on the stitches, the results are good</p>
<p>Spreading Widening of the stitches appears</p>	 <p>widening of the actual stitches due to the process of healing wounds</p>	 <p>Widening is seen but does not occur in all stitches</p>	 <p>No widening of the stitches, better results</p>
<p>Suture Marks Suture marks appear in the area of the filtrum and vilmetrion</p>	 <p>There are visible stitches in the area of the filtrum and vilmetrion</p>	 <p>Suture marks appear but not all stitches</p>	 <p>No visible form of collum filtrum, suture is formed properly.</p>

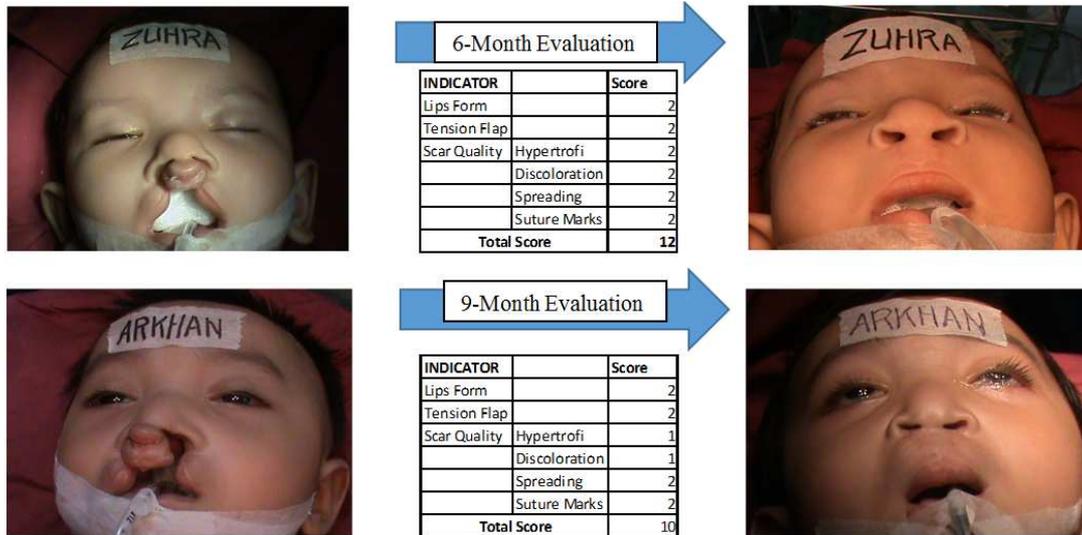


Figure 5. Patient with Repaired Bilateral Cleft Lip after evaluation within 6-12 month.

### 4. Result

#### 4.1. Outcome Post Labioplasty

The frequency distribution of post labioplasty outcomes with the modified millard technique with premaxillary shortening of bilateral labioschizis patients who have been operated. The result obtained through poor, moderate and good outcome.

Table 2. Post labioplasty outcome with modified millard technique with premaxillary shortening of bilateral complete labiopalatoschizis patients at Malahayati Hospital Banda Aceh.

Outcome Post Labioplasty	Frequency (n)	Percentage (%)
Poor	0	0,0
Fair	6	26,1
Good	17	73,9
Total	23	100

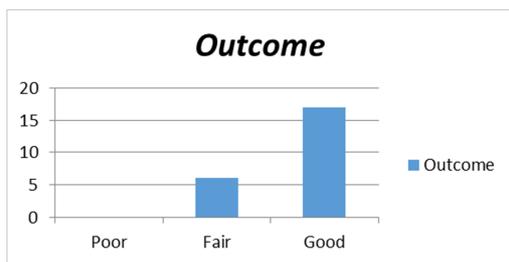


Figure 6. Post labioplasty outcome with modified millard technique with premaxillary shortening of bilateral complete labiopalatoschizis patients at Malahayati Hospital Banda Aceh.

Based on Table 2 and Figure 6 it was found that the post labioplasty outcome with the modified millard technique with premaxillary shortening of bilateral complete patients was moderate as many as 6 respondents (26.1%), Good as many as 17 respondents (73.9%).

#### 4.2. Age

The frequency distribution of post labioplasty patients

based on age, obtained in this study can be seen in Table 3 and Figure 7.

Table 3. Frequency Distribution of Post Labioplasty Patients by Age at Malahayati Hospital Banda Aceh.

Age	Frequency (n)	Percentage (%)
6-12 Month	4	17,4
1-2 Year	3	13,0
>2 Year	16	69,6
Total	23	100

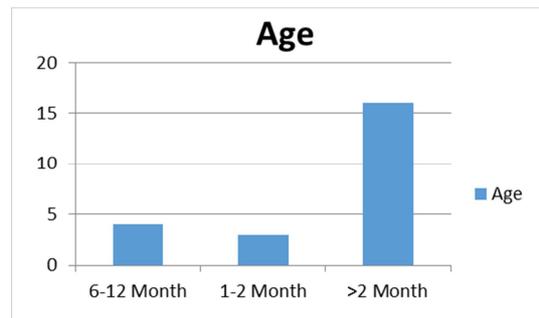


Figure 7. Frequency Distribution of Post Labioplasty Patients by Age at Malahayati Hospital Banda Aceh.

Based on Table 3 and Figure 7 it was found that the most post labioplasty patients were found at age > 2 years as many as 16 respondents (69.6%), 6-12 months as many as 4 respondents (17.4%), 1-2 years as many as 3 respondents (13.0%).

Table 4. Age Frequency for Outcome Distribution of Post Labioplasty Patients by Malahayati Hospital in Banda Aceh.

Age	Outcome				Total	
	Fair		Good		n	%
	n	%	n	%	n	%
6-12 Month	3	13,0	1	4,3	4	17,4
1-2 Month	1	4,3	2	8,7	3	13,0
>2 Month	2	8,7	14	60,9	16	69,6
Total	6	26,1	17	73,9	23	100

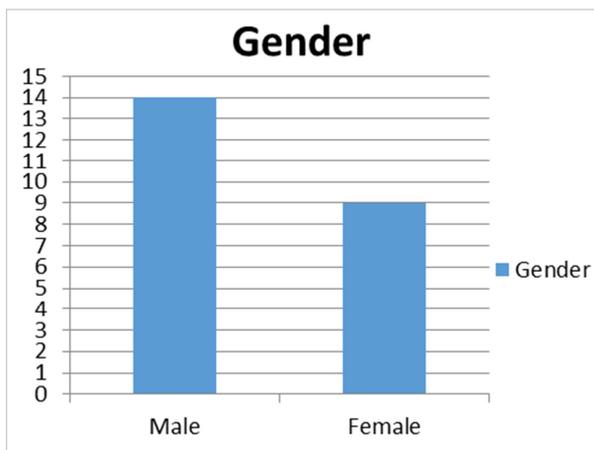
Based on Table 4, it was found that the most post labioplasty patients were found at age > 2 years as many as 16 respondents (69.6%). The results obtained were moderate respondents (8.7%) and good as many as 14 respondents (60.9%) aged 6-12 years as many as 4 respondents (17.4%) the results obtained are moderate outcomes of 3 respondents (13.0%) and good as many as 1 (4.3%) and at the age of 1-2 years as many as 3 respondents (13, 0%) the result of moderate outcome is 1 respondent (4.3%) and good is 2 (8.7).

**4.3. Gender**

The frequency of gender distribution patient with labioplasty, obtained in this study can be seen in Table 5 and Figure 8.

*Table 5. Frequency Distribution of Post Labioplasty Patients by Gender at Malahayati Hospital, Banda Aceh.*

Gender	Frequency (n)	Percentage (%)
Male	14	60,9
Female	9	39,1
Total	23	100



*Figure 8. Frequency Distribution of Post Labioplasty Patients by Gender at Malahayati Hospital, Banda Aceh.*

Based on Table 5 and Figure 8 it was found that most post labioplasty patients were male as many as 14 respondents (60.9%) and females as many as 9 respondents (39.1%).

*Table 6. Distribution of Outcome Frequency of Patients with Labioplasty by Gender at Malahayati Hospital, Banda Aceh.*

Gender	Outcome				Total	
	Moderate		Good		n	%
	n	%	n	%		
Male	6	26,1	8	34,8	14	60,9
Female	0	0,0	9	39,1	9	39,1
Total	6	26,1	17	73,9	23	100

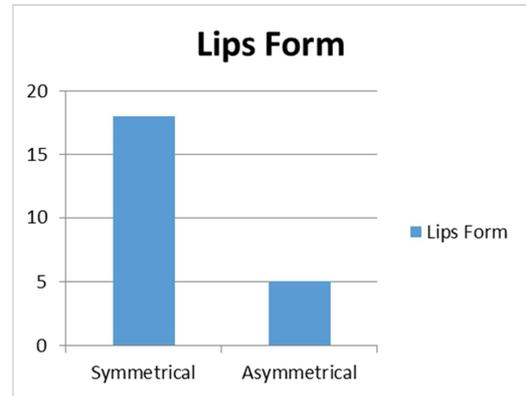
Based on Table 6, it was found that post labioplasty patients were found most in the male gender as many as 6 respondents (26.1%) obtained moderate and good outcome as many as 8 respondents (34.8%) and women as many as 9 respondents (39.1%) good outcome is obtained.

**4.4. Lips Form**

The frequency distribution of the lip shape of post labioplasty patients obtained in this study can be seen in Table 7 and Figure 9.

*Table 7. Distribusi Frequency Pasien Post Labioplasty berdasarkan Bentuk Bibir di Rumah Sakit Malahayati Banda Aceh.*

Lips Form	Frequency (n)	Persentase (%)
Symmetrical	18	78,3
Asymmetrical	5	21,7
Total	23	100



*Figure 9. Frequency Distribution of Post Labioplasty Patients based on Lip Shape in Malahayati Hospital Banda Aceh.*

Based on Table 7 and Figure 9 it was found that the lip shape of labioplasty was found most symmetrically as many as 18 respondents (78.3%), and asymmetrical as many as 5 respondents (21.7%).

*Table 8. Distribution of Outcome Frequency of Patients with Labioplasty by Lips Form at Malahayati Hospital, Banda Aceh.*

Lips Form	Outcome				Total	
	Fair		Good		n	%
	n	%	n	%		
Symmetrical	1	4,3	4	17,4	5	21,7
Asymmetrical	5	21,8	13	56,5	18	78,3
Total	6	26,1	17	73,9	23	100

Based on Table 8 it was found that the lips form in post labioplasty patients was found to be most symmetrical as many as 18 respondents (78.3%). symmetrical as many as 5 respondents (21.7%) with moderate outcome as much as 1 respondent (4.3%) and good as many as 4 respondents (17.4%).

**4.5. Tension Flap**

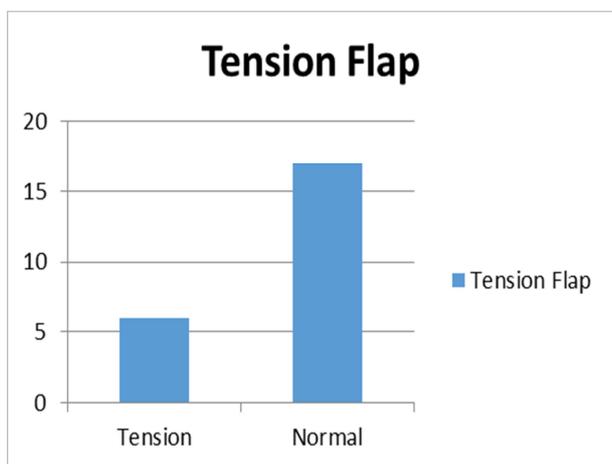
The frequency distribution of tension flaps in post labioplasty patients obtained in this study can be seen in Table 9 and Figure 10 as follows.

*Table 9. Frequency Distribution of Post Labioplasty Patients based on Tension Flap at Malahayati Hospital Banda Aceh.*

Tension Flap	Frequency (n)	Persentase (%)
Tension	6	26,1
Normal	17	73,9
Total	23	100

**Table 10.** Distribution of Outcome Frequency for Labioplasty Patients based on Tension Flap at Malahayati Hospital, Banda Aceh.

Tension Flap	Outcome				Total	
	Fair		Good		n	%
	n	%	n	%		
Tension	2	8,7	4	17,4	6	26,1
Normal	4	17,4	13	56,5	17	73,9
Total	6	26,1	17	73,9	23	100



**Figure 10.** Frequency Distribution of Post Labioplasty Patients based on Tension Flap at Malahayati Hospital Banda Aceh.

Based on table 9 and figure 10 it was found that the most frequent tension flap in labioplasty was not tense as many as 17 respondents (73.9%), and tense as many as 6 respondents (26.1%).

Based on table 10, it was found that the tension flap in post labioplasty patients was found to be the least tense of 17 respondents (73.9%). The moderate outcome was 4 respondents (17.4%) and good was 13 respondents (56.5%) and tense as many as 6 respondents (26.1%) with moderate outcome as much as 2 respondents (8.7%) and good as many as 4 respondents (17.4%)

#### 4.6. Scar Quality

The quality of the scar using the bermudes score in post labioplasty patients can be seen in Table 11 and Figure 11.



**Figure 11.** Frequency Distribution of Scar Quality in Post Labioplasty Patients at Malahayati Hospital Banda Aceh.

**Table 11.** Frequency Distribution of Scar Quality of Post Labioplasty Patients in Malahayati Hospital Banda Aceh.

Scar Quality	Frequency (n)	Percentage (%)
Poor	0	0
Fair	6	26,1
Good	17	73,9
Total	23	100

Based on Table 11 and Figure 11, it was found that the quality of scars in post labioplasty patients was found to be at good 17 respondents (73.9%), and 6 respondents (26.1%) fair.

**Table 12.** Distribution of Frequency Outcome of Labioplasty Patients based on Scar Quality at Malahayati Hospital, Banda Aceh.

Scar Quality	Outcome				Total	
	Fair		Good		n	%
	n	%	n	%		
Fair	3	13,1	3	13,0	6	26,1
Good	3	13,1	14	60,9	17	73,9
Total	6	26,1	17	73,9	23	100

Based on Table 12, it was found that the quality of scar in post labioplasty patients was found to be at most good as many as 17 respondents (73.9%) obtained fair outcome results as many as 3 respondents (13.1%) and good as many as 14 respondents (60.9%) and fair as many as 6 respondents (26.1%) with fair outcomes as many as 3 respondents (13.1%) and good as many as 3 respondents (13.1%).

## 5. Discussion

The follow-up period ranged between 6 and 12 months. We examined the shape of the lips, tension flaps along with an assessment of the quality of the scar using Bermudez Score. None of the patients had any major complication, such as loss of the premaxilla for any ischemic episode or vascular compromise of the premaxilla or skin dehiscence of the lip. During followup, it was noted that the premaxilla was minimally mobile in all patients. 17 of 23 patients achieved good lip repair and 6 of them had fair results, in all cases with adequate muscle repair, with excellent lip symmetry, prolabium and Cupid bows and good scars. No fistula was found. Evaluation such as speech is recommended for the next research to assess the possibility of hypernasal or articulation disorders. However, as expected, it has not been recommended because there are should need any improvements to the palate and also the effects of postoperative treatment itself.

## 6. Conclusion

Treatment as early as possible is the best course of surgery because surgical scars are less visible after surgery in infants. [7]. In addition, bone tissue and soft cartilage can be formed in infants make correction easier with surgery, and normal oral function can be formed after the lip structure has been repaired anatomically.

Premaxilla protrusion in complete bilateral labioschizis can be seen at 10 weeks gestational age [8]. Growth of the anterior septum and anterior vomero-premaxillary is

uncontrolled, combined with a lack of continuity of bone and soft tissue, and impaired balance between oral muscles and tongue is thought to result in deformity in bilateral premaxilla [9]. Uncontrolled growth in the premaxilla can result in significant functional problems such as the absence of proper anterior occlusion, lateral mobility of the premaxillary segment and labial oronasal fistula or palate causing a problem that results in disruption of speech and cleanliness mouth [1]. Repair of bilateral cleft lip with prominent premaxilla remains one of the most challenging problems for surgeons. To our knowledge, there are reports of one-stage surgery with premaxillary shortening or vomerine osteotomy to repair complete bilateral labioschizis with protruding premaxilla [10].

Followed by premaxilla shortening or vomerine osteotomy, followed by gingivoperiosteoplasty become a technique to achieve adequate stability of the premaxilla in its new position, so that it can close the alveolar gap bilaterally, followed by sewing the orbicular muscle then using modified Millard technique to repair the lips. Primary nasal correction is not performed because it increases the risk of damaging the philtrum and premaxilla vascularization that has been performed surgery [11].

The possibility of displaced premaxilla is very possible. treatment alone is not possible. On the other hand, surgical repositioning is technically recommended to prevent disruption of the premaxilla blood supply. A two-stage procedure is recommended in subsequent studies. [12] Premaxilla shortening, in combination with correction of lip slits, has also been reported to be successful in certain cases, especially in older patients. This procedure allows closure of large fistulas (increasing the likelihood of successful lip reconstruction without tension on the skin of the lips), facilitating overjet and overbite correction. [12].

In the case of a projected premaxilla, primary labioplasty must be undertaken in a staged manner [13]. in some research that anterior osteotomy may potentially damage the septal cartilage, which is the key structure for midface growth; may risk the vascularity of the premaxilla; and may also limit the extent of concurrent rhinoplasty [14]. This technique might be associated with a few potential complications. The major complication might be disturbance in growth, which can take place in two situations. First, if the nasal septum is damaged by the surgical drill or screw, it might interfere with the

vascularity of the premaxilla, and can potentially lead to premaxillary necrosis and growth retardation [15].

Studies comparing unrepaired to repaired adult patients with cleft lip and palate have shown that unrepaired maxillae have a normal to slightly protrusive upper jaw, protruded maxillary anterior dentition, and a normal or slightly hypoplastic mandibular relation [16]. The only way to prevent maxillary retrusion is to leave a bilateral cleft lip and palate unrepaired until full skeletal maturity [17]. A bone graft can be carried out in combination with an osteotomy of the premaxilla or at a separate session following the osteotomy. Without an osteotomy of the premaxilla, the clefts can also be closed in

one or two stages [18] Preoperative orthopedics is a basic element in reconstruction. A prominent premaxilla does not allow a free closure of muscle and skin tension [19].

Evaluation by assessing the shape of the lips, tension flaps and scar quality becomes an important correction for the surgeon to be a reference in conducting further operations. Researchers use a modified scoring system in cases of bilateral labioschizis complete with premaxillary shortening. The need for standardization in assessing the results of labioplasty is very important to improve health services by an organization, hospital or medical expert so that it gives better recommendations and actions for labioplasty in the future. Good aesthetic results and functional results like absence of nasovestibular fistulae and indirectly more hygiene and better conditions to posterior procedures, validate the use of this technique [20].

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