Evaluation of the Millard technique associated with zetaplasty in the treatment of patients with unilateral cleft lip

Avaliação da técnica de Millard associada à zetaplastia no tratamento de portadores de fenda labial unilateral

Introduction: Cleft lips are very common congenital deformities that affect, in varying degrees, the soft tissues and bone structures of the middle third of the face. Surgical treatment should be performed early and a protocol must be followed, which varies according to the reference center. There are numerous surgical techniques for lip repair, and among them, the Millard technique is the most used. The objective is to evaluate the association of the Millard type I with zetaplasty mucosal technique (used by the author) as the surgery of choice for primary lip repair in patients with unilateral cleft lip, and to understand whether the techniques are appropriate when the number of second surgeries (reoperation) is low. Methods: Sixty-five patients underwent operations by this technique from January 2007 to December 2012 in Santos, all of whom were followed for at least four years. Results: Of the 65 patients, 10 (15%) were considered to present “unsatisfactory results” and underwent reoperation. Conclusion: Primary cheiloplasty with zetaplasty-associated Millard type I is appropriate when the number of reoperations is low, and our results agree with the current literature.

Keywords: Cleft lip; Reconstructive surgical procedures; Congenital abnormalities.

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Article received: September 29, 2016.
Article accepted: July 10, 2017.

Conflicts of interest: none.

DOI: 10.5935/2177-1235.2018RBCP0012
INTRODUCTION

Cleft lips are common congenital deformities that affect, in variable degrees, the soft tissues and bone structures of the midface\(^1\). The incidence of cleft lip ranges from 1/500 to 1/1000 live births, and this disorder is more frequent in the yellow race than in Caucasians and blacks.

The etiology of this disease is multifactorial. The genetic factors are identified in 35% of patients with this disease, and 65% of cleft lip incidences are due to mutations in embryogenesis that are caused by environmental factors, such as maternal endocrine factors (diabetes, hypothyroidism, increased secretion of the suprarenal glands), infections during pregnancy (influenza virus, rubella, toxoplasmosis), nutrient deficiency (follic acid), medication use during pregnancy (anticonvulsants, aspirin, corticosteroids, antiblastic, vitamin A), and exposure to radiation.

The treatment for patients with cleft lip is multidisciplinary\(^5\). The surgical steps are fundamental and must be practiced in accordance with the reference center’s protocols\(^5\). Cleft lip surgery is recommended, and while there are several surgery techniques\(^4\) (Fisher\(^5\), Le Mesurier\(^6\), Spina\(^7\), Randall\(^8\), and others) today, the Millard I technique remains most frequently used\(^9,10\).

In 1955, Ralph D. Millard Jr.\(^11\) introduced the advancement and rotation of the lip flap technique, with final scar minimization of the philtral crest and respecting of the bow cupid, which are very important anatomical details in labial aesthetics (Figure 1). His technique quickly became popular, and today, it is the most used technique worldwide.

OBJECTIVE

The aim of this study was to evaluate the association of the Millard I technique\(^12\) with mucosalzetaplasty (author’s adopted technique) as major surgeries in primary cleft lip repair in patients with unilateral cleft lip. We concluded that both techniques are appropriate when the number of secondary surgeries (reoperations) is low.

METHODS

Of the 1,354 patients with facial malformations registered at the Centro de Tratamento de Malformações Craniofaciais (CTMC) in Santos, 65 patients with unilateral cleft lip were selected, who underwent operations between January 2007 and December 2012 and were followed-up for at least four years. This study was previously approved by the ethics committee in human research of the University Center Lusíada - CEPSH UNILUS, on November 25, 2013, with protocol number: 208/2013 and CAAE: 24482513.4.0000.5436.
As inclusion criteria, patients with unilateral cleft lip were exclusively selected, and those with cleft palate or associated syndromes were excluded. All patients were monitored in the CTMC from birth, made regular use of lip tape, and underwent Millard I lip repair with mucosal zetaplasty (procedure adopted by the author that prevents the formation of late mucosal retraction).

The CTMC protocol involves performing cleft lip repair when the patient is six months of age. In addition, the patients must accord to the “rule of ten”\(^ {13} \), which has three basic requirements: 

- hemoglobin ≥ 10,
- weight ≥ 10 lbs (4.5 kg), and 
- age ≥ 10 weeks.

Monitoring and treatment are carried out from birth to early adulthood (21 years).

The surgical technique consists of an incision on the limits of the cleft lip, concocting an infracolumelar triangular fasciocutaneous flap in the medial portion of the lip, which will undergo rotation, and performing a perialar incision on the lip of the lateral portion of the cleft, which will make an advancement. Then the lip orbicularis muscles are dissected, disinserted from their anomalous position, rotated, and sutured with an absorbable surgical suture 3-0. The mucosa synthesis is made with a 4-0 suture, and the skin is closed with a surgical suture 6-0 (Figures 2 to 6).

At this moment, zetaplasty is performed in the transition between the dry and wet mucosa (Figure 7), which can fix the aretraction in this place that is often caused by the lack of remaining tissue (Figure 8 to 10).
All patients who evolved a labial notch (Figure 11), mucus retraction, mucocutaneous line break, or enlarged scar, which can arise in immediate or late postoperative periods and are considered “unsatisfactory results,” underwent a secondary cleft lip surgery in this study.

Patients who achieved an adequate aesthetic lip, without the mentioned deformities, and did not require secondary surgery were considered to achieve “satisfactory results” (Figures 12 to 14).
RESULTS

From 2007 to 2012, 65 patients, from a total of 1,354 patients who are registered in CTMC and underwent operations, were selected according to the inclusion criteria. Of these 65 patients, 39 (60%) were men and 26 (40%) were women (Figure 15). Most of them (45, 69%) had left cleft lip, and 40 (61.5%) patients underwent operations before one year of age (Figure 16) (Table 1).

From the 65 patients, 10 (15%) were considered to achieve “unsatisfactory results” and underwent reoperation. Of these, seven (70%) presented a labial notch and three (30%) had an enlarged scar (Table 2). The remaining 55 (85%) patients did not require secondary surgery and were considered to achieve “satisfactory results” (Figure 16).

DISCUSSION

The search for the best aesthetic and functional results and the need to evaluate surgical techniques are common modern problems for plastic surgeons. A
Evaluation of the Millard technique associated with zetaplasty

After operation, these 65 patients were followed-up for at least four years. Ten (15%) of the patients required a secondary lip repair due to “unsatisfactory results.”

This percentage of reoperations is similar to that of Cheema e Asim\textsuperscript{15}, who published an analysis of their surgeries in 2014. They operated on 1,907 patients and performed secondary lip repair for 189 (10%) of cases, after using Millard I as the first technique. This study showed that 65% of the corrections were due to a lip notch, which is similar to our 70% frequency of notches.

Another similar result was obtained by Rossell-Perry\textsuperscript{16} in 2008, who used a combination Reichert-Millard technique in 112 cases, and 14.2% of the patients required secondary lip repairs.

Baek et al.\textsuperscript{17} also reported that 14.4% of his 145 patients who underwent a new technique called “Start,” a Millard variation, required secondary surgeries.

### Table 1. Profile of the study patients and the degree of satisfaction with the surgical results.

<table>
<thead>
<tr>
<th>Patient age</th>
<th>Satisfactory results</th>
<th>Unsatisfactory results</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>34 (62%)</td>
<td>5 (50%)</td>
<td>39</td>
</tr>
<tr>
<td>Female</td>
<td>21 (38%)</td>
<td>5 (50%)</td>
<td>26</td>
</tr>
<tr>
<td>Age at cheiloplasty (months)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-6</td>
<td>11 (20%)</td>
<td>3 (30%)</td>
<td>14</td>
</tr>
<tr>
<td>7-12</td>
<td>22 (40%)</td>
<td>4 (40%)</td>
<td>26</td>
</tr>
<tr>
<td>13-24</td>
<td>13 (24%)</td>
<td>1 (10%)</td>
<td>14</td>
</tr>
<tr>
<td>&gt;24</td>
<td>9 (16%)</td>
<td>2 (20%)</td>
<td>11</td>
</tr>
<tr>
<td>Type of cleft</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complete</td>
<td>32 (58%)</td>
<td>4 (40%)</td>
<td>36</td>
</tr>
<tr>
<td>Incomplete</td>
<td>23 (42%)</td>
<td>6 (60%)</td>
<td>29</td>
</tr>
<tr>
<td>Laterality of the cleft</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unilateral to the right</td>
<td>17 (31%)</td>
<td>3 (30%)</td>
<td>20</td>
</tr>
<tr>
<td>Unilateral to the left</td>
<td>38 (69%)</td>
<td>7 (70%)</td>
<td>45</td>
</tr>
<tr>
<td>Total</td>
<td>55</td>
<td>10</td>
<td>65</td>
</tr>
</tbody>
</table>

### Table 2. Incidences of secondary cheiloplasty in the postoperative period and complications in patients with unsatisfactory results.

<table>
<thead>
<tr>
<th>Unsatisfactory results</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondary cheiloplasty</td>
<td></td>
</tr>
<tr>
<td>&lt;6 months after surgery</td>
<td>1 (10%)</td>
</tr>
<tr>
<td>From 6 months to 4 years after surgery</td>
<td>3 (30%)</td>
</tr>
<tr>
<td>&gt;4 years after surgery</td>
<td>6 (60%)</td>
</tr>
<tr>
<td>Complications</td>
<td></td>
</tr>
<tr>
<td>Lip groove</td>
<td>7 (70%)</td>
</tr>
<tr>
<td>Dystrophic scar</td>
<td>3 (30%)</td>
</tr>
<tr>
<td>Total</td>
<td>10 (100%)</td>
</tr>
</tbody>
</table>

Figure 15. Relationship between gender and degree of satisfaction with the surgical results.

Figure 16. Relationship between patient age at the time of surgery and the degree of satisfaction with the surgical results.
In Brazil, the study of Alonso et al. showed that of 108 procedures, 17.5% required secondary surgical revision of the lip/nose.

However, there are also studies in the literature that used the Millard unilateral lip repair technique and showed lower rates of secondary surgeries, between 6% and 8%, and larger indices, between 35% and 46%.

**CONCLUSION**

This study showed that the Millard I with zetaplasty mucosa lip repair technique is exclusively suitable for patients with unilateral cleft lip.

**COLLABORATIONS**

**DCL** Conception and design of the study; writing the manuscript; analysis and/or interpretation of data; completion of surgeries and/or experiments.

**AFCC** Conception and design of the study; writing the manuscript; analysis and/or interpretation of data; completion of surgeries and/or experiments.

**LG** Analysis and/or interpretation of data; completion of surgeries and/or experiments.

**MRM** Completion of surgeries and/or experiments.

**OS** Critical review of its contents; final approval of the manuscript.

**REFERENCES**


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