Different modalities of tongue tie management

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ORIGINAL STUDY

Different Modalities of Tongue-tie Management

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Abstract

Background: Tongue-tie or ‘ankyloglossia’ is a congenital anomaly characterized by the presence of an abnormally tight lingual frenulum—a string-like membrane—that attaches the tongue to the floor of the mouth. It affects the movement of the tongue. For symptomatic ankyloglossia, surgical treatment with different surgical techniques such as frenotomy, frenectomy/frenulectomy, and frenuloplasty is the treatment of choice that gives satisfactory results.

Objectives: We built our study to compare the different surgical techniques used for the management of ankyloglossia.

Patient and method: In this study 60 patients were included: 33 were female and 27 were male with ages ranging from 0 d to 12 yrs. They were divided equally according to the used surgical technique into three groups, 20 patients per group. Patients were managed by frenotomy signed as group (I), while those managed with frenectomy/frenulectomy were group (II), and frenuloplasty patients were group (III).

Results: Regarding significant value, intraoperative bleeding was much higher in G (III) (n = 20). Pain was moderate to severe in both G II & III (19/40); intolerable pain was recorded in seven cases. Breastfeeding difficulties were much higher in G III (19/20), as well wound dehiscence was higher in the same group (7/20). Recurrence was higher in G I (3/20). Operative time was longer in G III (39.50 ± 7.82 min), shorter for G II (14.90 ± 2.9 min), and shortest for G I (2.35 ± 1.50 min). Most patients of G I and II were operated without anesthesia or some time with topically applied or less frequent local infiltration anesthesia. While G III patients were operated under GA due to the complexity of the procedure. Rapid healing was recorded for G I (5.7 ± 0.8 d). It was noticed that (46/60) of the patients or their relatives were satisfied with the results and they were comfortable with frenotomy rather than the other two techniques.

Conclusion: Frenotomy is characterized by being an easy and safe procedure with fewer complications in comparison with the other two techniques but with a higher recurrence rate and not suitable for all types of tongue-tie.

Keywords: Ankyloglossia, Breastfeeding, Frenotomy, Frenectomy/frenulectomy and frenuloplasty, Speech, Tongue-tie

1. Introduction

1.1. Background

Lingual frenulum is a mucous membrane fold that extends between the floor of the mouth to the midline of the undersurface of the tongue. Normally it helps in tongue base stabilization and does not interfere with the movement of the tongue tip [1]. Tongue-tie, or ankyloglossia, is a congenital anomaly characterized by the presence of a short lingual frenulum; it occurs in 4%–11% of newborns [2]. Attachment of the lingual frenulum may be any point from at or near the tongue tip to the posterior aspect of the tongue undersurface, but if it is thickened and/or short, it may interfere with normal mobility, and protrusion of the tongue [3].

There are two types of tongue-ties. Both can interfere with breastfeeding.

1) Anterior tongue-ties are closer to the tip of the tongue and can be seen clearly.
2) Posterior tongue-ties are not always seen, thicker, and are further back, felt with the fingers [4].

Tongue-tie in older children and adults causes speech delay, abnormal dentition, bad oral hygiene, and difficulty to play wind musical instruments. Tongue-tie may also cause problems to lactating...
mothers such as non-healed nipple ulceration or nipple pain due to short intervals between ineffective feeds and irritability with feeding [5].

1.2. Tongue-tie classification

There is no standard classification system for ankyloglossia. Classification systems vary from simple visual inspection and/or palpation of the frenulum to a more complex multi-scale classification system such as Hazelbaker Assessment Tool for Lingual Frenulum Function (ATLFF) [6]. Several studies have proposed variable criteria that could be used for different classification systems.

(1) Frenulum length [7,8].
(2) Upward tongue mobility (difficulty in lifting the tongue to the upper dental alveolus) [2,9].
(3) Limited protrusion of tongue ≤1–2 mm past lower central incisors [10].
(4) Impaired mobility of tongue laterally, ‘heart-shaped tongue appearance’ and thick fibrous cord palpated on physical examination [11].

There are four different types of tongue-ties according to Coryllos classification. Type 1 is the most severe type with the whole tongue (>100%) attached to the lingual frenulum. Type 4 is the least extensive type with the most distal posterior portion of the tongue attached to the lingual frenulum (Tables 1 and 2).

Modified Coryllos classification system is more descriptive and more applicable clinically.

Treatment: Tongue-tie could be managed surgically by:

(1) Frenotomy/frenulotomy (release of frenulum by blunt or sharp dissection). Frenotomy is usually performed in an office setting with the use of a grooved retractor and scissors, laser, or electrocautery.

(2) Frenectomy/frenulectomy (excision of the wedge of the frenulum).

(3) Frenuloplasty (release and repositioning of frenulum tissue that elongates the lingual sulcus).

An improvement in breastfeeding, speech articulation, and dentofacial development is observed in symptomatic cases following treatment [14].

Table 1. Coryllos classification [12,13].

<table>
<thead>
<tr>
<th>Type</th>
<th>Characteristics of frenulum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1</td>
<td>Most extreme types, the whole tongue is attached to the lingual frenulum and is tethered to the mouth floor anteriorly.</td>
</tr>
<tr>
<td>Type 2</td>
<td>75% of the tongue is tethered with restricted tongue elevation and extension.</td>
</tr>
<tr>
<td>Type 3</td>
<td>50% of the tongue is tethered. Tongue appears normal, with limited mobility.</td>
</tr>
<tr>
<td>Type 4</td>
<td>Posterior, fibrous limitation of the tongue mobility</td>
</tr>
</tbody>
</table>

Table 2. Modified Coryllos classification [14].

<table>
<thead>
<tr>
<th>Type</th>
<th>Superior attachment</th>
<th>Inferior attachment</th>
<th>Characteristics of frenulum</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 or 100% tongue-tie</td>
<td>Anterior or at the tongue tip &lt;2 mm from the tip</td>
<td>To the alveolar ridge or infrequently ridge base</td>
<td>Thin or thick and restricted or elastic</td>
</tr>
<tr>
<td>2 or 75% tongue-tie</td>
<td>2–5 mm just behind the tongue tip (mid-tongue)</td>
<td>Alveolar ridge or base of ridge/floor of the mouth</td>
<td>Thin or thick and restricted or elastic</td>
</tr>
<tr>
<td>3 or 50% tongue tie</td>
<td>6–10 mm from tip (mid-tongue)</td>
<td>The base of the alveolar ridge/floor of the mouth</td>
<td>Thin or thick but less restricted</td>
</tr>
<tr>
<td>4 or 25% tongue-tie</td>
<td>11–15 mm from the tip (posterior tongue)</td>
<td>The floor of mouth/base of alveolar ridge/on the ridge</td>
<td>Thin or thick but less restricted (more free tongue)</td>
</tr>
<tr>
<td>5 or submucosal tongue-tie</td>
<td>&gt;15 mm from tip (posterior tongue)</td>
<td>The floor of the mouth/base of the alveolar ridge</td>
<td>Usually thin and shiny (when the tongue is elevated)</td>
</tr>
</tbody>
</table>
1.3. Indications for surgery

Recently, there has been an upsurge in the surgical management of ankyloglossia to improve breastfeeding. Surgical treatment is directed mainly to symptomatizing cases such as:

(1) Feeding difficulty (poor latch in breastfeeding babies, poor weight gain and nipple ulcers or pain for lactating mothers).
(2) Decreased mobility of the tongue.
(3) Speech difficulties.
(4) Parent’s request in most cases.

For symptomatic type 3 and 4 cases frenotomy is appropriate, while frenulectomy and frenoplasty are suitable for type 1 and 2 ankyloglossia.

2. Aim of the work

To compare different surgical techniques (frenotomy, frenectomy, and frenoplasty) to identify the optimum method for the management of ankyloglossia with the best result and least complications.

Ethic: Written consent had been signed by the parents of all participants, but oral acceptance is considered as an approval form, especially for cases operated in the outpatient clinic (OPC).

3. Patient and methods

This study had been carried out in Banha Teaching Hospital and Dar Elteb private hospital on 60 patients from the age of 0 d−12 yrs.

3.1. Inclusion criteria

Age: 0 d−12 yrs.
Symptomatic tongue-ties.

(1) Breastfeeding problems;
(2) Poor latching, with frequent feedings.
(3) Poor weight gain.
(4) Nipple ulcers of lactating mothers.
(5) Speech difficulties.

Non-symptomatic tongue-ties upon parent request.

3.2. Exclusion criteria

(1) Patients with other associated congenital anomalies.
(2) Patients with bad oral hygiene.
(3) Patients with acute oral infection, acute tonsillitis, and pharyngitis.
(4) Patients with high temperature (>38 °C) on the day of enrollment.

3.3. Methods

The participants had been subjected to the following:

(1) Full personal data including maternal history and socioeconomic level.
(2) Full medical history including frequency and pattern of suspected streptococcal infections per year (tonsillitis, pharyngitis, and impetigo) and types of antibiotics used.
(3) Full investigations including ESR, CRP, and CBC (not routinely done in all patients).
(4) Full medical examination for other congenital anomalies.

3.4. Frenulotomy

Frenulotomy had been carried out as an outpatient procedure. The patient in a supine position swaddled and restrained by an assistant, the head is placed in neutral position with the mouth kept open. Most cases of frenulotomy had been operated without anesthesia, but if anesthesia was needed we used either local infiltration of Lignocaine HCl 1% m/v with adrenaline 1:100 000 at a dose of 7 mg/kg, which had been injected on either side of the frenulum (about 1.5–2 ml), or soaked swab with local anesthesia pressed against the frenulum. A grooved retractor had been then applied to retract the tongue (Figs. 3–5). A straight hemostat had been used to crush the frenulum before release, which had been either done by bipolar diathermy or sharply by scissors. We keep close to the ventral surface of the tongue to avoid injury to the ductal orifices of submandibular and sublingual salivary glands. Index
finger of the surgeon or a piece of gauze had been pushed gently against the deep end of the frenulum to ensure an adequate release. Compression had been done for a few minutes to ensure hemostasis, with the mother having been asked to start breastfeeding to soothe and calm down the baby.

3.5. Frenectomy

For frenectomy, we preferred to do it in the operating theater with all facilities, especially anesthesia had been available. Most cases had been operated under local anesthesia, especially those below 6 months while older patients >6 months had been candidates for GA as we found that their incisor teeth were prominent and can cause bite injury for the operating surgeon with difficult control of bleeding if occurred during the procedure. Ventilation had been applied by mask, oral, or nasal intubation, which had been our choice in most cases as it provides a wide operating field that allowed us to operate freely without interruption by anesthesiologists. Position had been the same as for frenotomy with the patient in a supine position with the head placed in the neutral position and the mouth kept open. A straight hemostat had been used to crush the frenulum, but in this technique, we crush twice one near the ventral aspect of the tongue and the other at the root of the frenulum just above the orifice of the salivary glands by a sharp straight scissor wedge between previously crushed lines had been excised and then hemostasis had been assured by compression, bipolar diathermy, or less commonly used by sutures as early as possible after recovery from anesthesia. The mother had been asked to start breastfeeding to soothe and calm down the baby. For older patients, instillation of a few drops of dextrose 50% or drinking of a sugary fluid had been suitable for pain control.

3.6. Z-frenuloplasty

Z-frenuloplasty is recommended for severe, complete, and revision cases. It was appropriate for older children with speech difficulties as well. It is done in the operating room, under GA; nasal intubation had been inserted with the patient in a supine position and head placed neutral and the mouth kept open. We used a silk suture at the tongue tip to retract and hold it in place (Fig. 8) Local infiltration anesthesia in the form of lignocaine with adrenaline injection of 1:100,000 or topical pledgets to either side of the frenulum had been applied to decrease postoperative pain. Z-plasty had been then designed (Fig. 8); a vertical incision along the length of the frenulum had been created. Another 2 incisions at 90° to the first vertical limb are then applied; this will result in the creation of a Z-plasty (Fig. 9) by

Fig. 3. Grooved retractor tenting the frenulum.

Fig. 4. Haemostat clamped parallel to the tongue.

Fig. 5. Middle finger lower lip to avoid injuring it while the lingual frenulum is released retracting.
interrupted 5.0 Vicryl sutures (Fig. 12a, b); instillation of a few drops of dextrose 50% or drinking of a sugary fluid had been suitable for pain control (Figs. 1, 2, 6 and 7).

3.6.1. Postprocedure pain control

We used the categorical visual pain scale to evaluate the degree of pain as most of our patients were children. This scale depended mainly on the patient facial expression in relation to the pain degree. So, pain was divided into 4 different types (mild, moderate, severe, and intolerable pain) depending on 6 facial expressions. In most cases, pain was tolerable and nearly all babies stopped crying just by starting breastfeeding. In patients with moderate to severe pain, paracetamol was effective. NSAID (nonsteroidal anti-inflammatory) was appropriate for intolerable pain. We found that early breastfeeding for babies and dextrose 50% or sugary fluids for older patients was effective for pain lessening and decreasing its severity (Fig. 13).

3.7. Complications

Recorded complications were discomfort, bleeding, infection, swelling, wound dehiscence, injury to Wharton’s duct, and scarring requiring revision) were of rare incidence.

4. Results

4.1. Demographic data

Frequency of age and sex among the study groups:

This study groups included 60 patients, who were divided into three groups: Group I: 11 males and 9 females. Group II: 9 males and 11 females. Group III: 7 males and 13 females (Fig. 14).

The mean age for group I (mean ± SD) was 1.51 ± 0.82D, while it was 66.20 ± 26.87D for group II and was 68.50 ± 41.63D for group III (P value 0.001*) with significant difference between the three groups as illustrated in Table 3 and Fig. 15.

4.2. Family history

As regards presence of family history (Table 4).

4.2.1. Grade of tongue-tie

In comparing the results statistically significant difference between the three groups was observed throughout the study period as shown in Table 5.

4.2.2. Type of anesthesia

In comparing the type of anesthesia used for the three groups statistically significant difference was observed throughout the study period as shown in Table 6 and Fig. 16.

4.3. Intraoperative bleeding

Table 7.

Comparison between the three groups showed that a statistically significant difference was observed between the three groups throughout the study period as regards the occurrence and control of intraoperative bleeding.

4.3.1. Need for suturing

Comparison between the different three groups regarding the need for sutures: No statistically significant difference was recorded between the three groups throughout the study period as shown in Table 8 and Fig. 17.

4.4. Pain

Statistically significant difference was found between the three groups throughout the study period as shown in Table 9 and Fig. 18.

4.4.1. Post op. bleeding

Regarding the incidence of Post op. bleeding in the three groups: a statistically significant difference
was found between the three groups throughout the period as shown in Table 10 and Fig. 19.

4.4.2. Feeding
Postoperative feeding: Statistically significant difference between the three groups was recorded throughout the study periods as shown in Table 11 and Fig. 20.

4.4.3. Parent satisfaction
Statistically, there was no significant difference between the three groups throughout the study period as shown in Table 12 and Fig. 21.

4.4.4. Wound dehiscence
Incidence of wound dehiscence: Statistically significant difference was found between the three groups as shown in Table 13 and Fig. 22.

Fig. 8. Incisions outlined.

Fig. 9. (a) Two incisions at 90° to the vertical incision. (b) Two flaps are elevated.

Fig. 10. Hemostasis by the locally applied gauze soaked by adrenaline.
Fig. 11. Transpose the 2 flaps adjacent to each other to close in the form of a Z-plasty.

Fig. 12. (a, b): Sutures flaps to complete the Z-plasty.

Fig. 13. Wong-baker FACES® pain rating scale (FACES scale) [15].
4.4.5. Recurrence

Incidence of recurrence: results were nonstatistically significant (Table 14 and Fig. 23).

4.5. Operative time

Operative time: Statistically significant difference was found between the three groups as shown by (Table 15 and Fig. 24).

4.6. Time of healing

Healing time: Statistically significant difference was found between the three groups as shown in Table 16 and Fig. 25.

5. Discussion

Diagnosis and management of ankyloglossia remain controversial. It is uncertain whether tongue-tie is a congenital oral anomaly that requires treatment or a normal variant. Most lactation consultants consider tongue-tie as a frequent cause of infant breastfeeding difficulties that can be solved by frenotomy [16].

Cochrane reviews have found that frenotomy reduces nipple pain and have positive short-term effects on breastfeeding [17].

Meanwhile, 90% of pediatricians and 70% of otolaryngologists believe that ankyloglossia never, or rarely, causes a feeding problem [18]. Medical organizations such as the American Academy of Pediatrics [12] and the National Institute for Health and Care Excellence [19] now acknowledge that tongue-tie, or ankyloglossia, is a significant clinical entity that should be treated as early as possible to minimize breastfeeding problems. Given that breastfeeding helps both infants and mothers, the clinician needs to address any condition that may impair breastfeeding [20].

Not like other studies that concentrated on the feasibility and safety of the different surgical techniques, in our study we extended comparative items to clarify actual differences between these surgical techniques.

5.1. Regarding demographic data

5.1.1. Sex

It is found that in all three groups, 27 patients were males and 33 were females, with a slightly higher incidence in females, but in the other study, the male incidence was much higher; so, this point may be in need of future evaluation by large-
5.1.2. Age

The mean age for group (ІП) was (68.50 ± 41.63D), which is higher than group (І) (1.51 ± 0.82 D) and group (П) (66.20 ± 26.87D). Our explanation was that patient in group (ІП) need to be an older cooperative patient with good oral hygiene.

5.1.3. Family history

It was positive in 24 patients with one of the previous family member being affected. Thirty-six patients were negative regarding their family history. There was no great difference between both items but we cannot tell that family history of no role except after more future studies with a great number of patients involved. Our observation was that tongue-tie is mainly related to some traditions and social beliefs rather than actual medical problems. Those with low socioeconomic levels and who live in the rural area are more adopting these beliefs, as parents with a previous history of tongue-tie of one of their children came to us asking for an evaluation of their newly born baby and insist on the management of any present tongue-tie, even if not symptomatizing.

5.1.4. Grades

Most patients of groups І and ІІ were of types 3 and 4, and were of types 1 and 2 for group (ІІІ); this difference was due to our selection of the technique for each group as we employed frenotomy for easy less complicated cases while recurrent, more complicated and high-grade cases were in need for a more complicated technique as frenectomy or frenoplasty.

Table 6. The type of anesthesia used for the three groups.

<table>
<thead>
<tr>
<th>Type of anesthesia</th>
<th>G1 (%)</th>
<th>G2 (%)</th>
<th>G3 (%)</th>
<th>X²</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No anesthesia</td>
<td>9 (45.0%)</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>67.714</td>
<td>0.001*</td>
</tr>
<tr>
<td>Locally applied</td>
<td>7 (35.0%)</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local infiltration</td>
<td>4 (20.0%)</td>
<td>12 (60.0%)</td>
<td>0 (0.0%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General anesthesia</td>
<td>0 (0.0%)</td>
<td>8 (40.0%)</td>
<td>20 (100.0%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 7. Incidence of intraoperative bleeding in the three groups.

<table>
<thead>
<tr>
<th>Intraoperative bleeding</th>
<th>G1 (%)</th>
<th>G2 (%)</th>
<th>G3 (%)</th>
<th>X²</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compression</td>
<td>2 (10.0%)</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>74.264</td>
<td>0.001*</td>
</tr>
<tr>
<td>Bipolar</td>
<td>3 (15.0%)</td>
<td>13 (65.0%)</td>
<td>0 (0.0%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suturing</td>
<td>0 (0.0%)</td>
<td>7 (35.0%)</td>
<td>20 (100.0%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>15 (75.0%)</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 8. The need for suturing in the three groups.

<table>
<thead>
<tr>
<th>Need for suturing</th>
<th>G1 (%)</th>
<th>G2 (%)</th>
<th>G3 (%)</th>
<th>X²</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>0 (0.0%)</td>
<td>7 (35.0%)</td>
<td>20 (100.0%)</td>
<td>1.667</td>
<td>0.435</td>
</tr>
<tr>
<td>No</td>
<td>20 (100.0%)</td>
<td>13 (65.0%)</td>
<td>0 (0.0%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 9. The incidence of pain in the three groups.

<table>
<thead>
<tr>
<th>Pain</th>
<th>G1 (%)</th>
<th>G2 (%)</th>
<th>G3 (%)</th>
<th>X²</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>15 (75.0%)</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>43.714</td>
<td>0.001*</td>
</tr>
<tr>
<td>Moderate</td>
<td>5 (25.0%)</td>
<td>7 (35.0%)</td>
<td>7 (35.0%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe</td>
<td>0 (0.0%)</td>
<td>10 (50.0%)</td>
<td>9 (45.0%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intolerable</td>
<td>0 (0.0%)</td>
<td>3 (15.0%)</td>
<td>4 (20.0%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fig. 16. The type of anesthesia used in the three groups.

Fig. 17. The need for suture in the three groups.
5.1.5. Anesthesia

A significant $P$ value was found between the result of the different groups. In group (I), frenotomy is a simple procedure that could be done by topically applied or local infiltration anesthesia. In group (II), the procedure is much more complicated that the patient needs to be operated under GA. Group (III) patients can be operated under either local infiltration or GA as well. We found that it is appropriate to do the procedure under GA for those babies over 6 months regardless of the tongue-tie type as we found that their incisor teeth were prominent and can cause bite injury for the operating surgeon with difficult control of bleeding if occurred during the procedure.

5.1.6. Intraoperative bleeding and hemostasis

Significant results were found between the three different groups. With less incidence of bleeding in

| Table 10. Post operative bleeding in the three groups.                                      |
|-----------------------------------------------|---|---|---|---|---|
|                                              | G 1 | G 2 | G 3 | $X^2$ | $P$ value |
| Post op. bleeding Compression 0 (0.0%)       | 0   | 4   | 0   | 18.824 | 0.001*     |
|                                               | N (%)|     |     |       |         |
| Suturing 0 (0.0%)                             | 0   | 0   | 5   |       |           |
|                                               | N (%)|     |     |       |         |
| No N (%) 20 (100.0%)                          | 16  | 80  | 15  |       |           |

| Table 11. Postoperative feeding in the three groups.                                       |
|-----------------------------------------------|---|---|---|---|---|
|                                              | G 1 | G 2 | G 3 | $X^2$ | $P$ value |
| Feeding 1 N (%) 18 (90.0%)                   | 11  | 15  |   | 29.880 | 0.001*     |
|                                               | 2 N (%)| 2   | 6  | 15 | 75.0%) |
|                                               | 3 N (%)| 0   | 3  | 4  | 20.0%) |

| Table 12. Parent satisfaction in the three groups.                                          |
|-----------------------------------------------|---|---|---|---|---|
|                                              | G 1 | G 2 | G 3 | $X^2$ | $P$ value |
| Parent satisfaction Yes N (%) 16 (80.0%)     | 15  | 15 |   | 0.186 | 0.911     |
|                                               | No N (%)| 4   | 5  | 5  | 25.0%) |

Fig. 18. The incidence of pain in the three groups.

Fig. 19. Incidence and control of bleeding in the three groups.

Fig. 20. Postoperative feeding in the three groups.
group (I) (only 5 pt. with hemostasis done simply by compression or by the use of bipolar). In group (III), 20 patients showed intraoperative bleeding and all of them required suturing. In group (II), 20 patients showed intraoperative bleeding; most of them (13) controlled by bipolar and only 7 required sutures.

5.1.7. Pain

Using visual pain scale, we divided our patients into 4 subgroups (mild, moderate, severe, and intolerable pain) with statistically significant results. As most patients in group (I) presented with mild pain (15/20) and nearly most of them stopped crying just when feeding started. While in patients in group (II) and (III), the pain was much higher ranging from moderate to severe (19/40); those patients were in need of analgesics such as paracetamol or more potent NSADs for more intolerable pain (7/40).

5.1.8. Feeding

The results were statistically significant as most patients in group (I) showed no feeding difficulties, while nearly all patients within group (II) showed tolerable pain with feeding, while patients within group (III) (19/20) showed feeding difficulty, but were relieved simply by oral analgesics.

5.1.9. Satisfaction

By reviewing the results of all three groups (46/60) were satisfied (parents and patients), special notes for group (II) and (III) were recorded, as most parents were worried about the results of frenectomy and frenoplasty as they were familiar and had sufficient information about frenotomy but with no experience about frenectomy or frenoplasty. So, they were in need for assurance with detailed illustrations and clarification about the other two procedures.

5.1.10. Wound dehiscence

Results were statistically significant with group (III) (7/20) showing higher incidence of wound dehiscence rather than group (II) (4/20), with no
incidence of wound dehiscence recorded in group (І) (0/20).

5.1.11. Recurrence

Despite simplicity and safety of frenotomy it was associated with higher recurrence (3/20) than frenectomy (2/20) and frenoplasty (0/20).

5.1.12. Operative time

Statistically significant results were recorded with operative time found to be long for group (ІІ) (39.50 ± 7.82 min), short for group (І) (14.90 ± 2.90 min), and shortest for group (ІІІ) (2.35 ± 1.50 min).

5.1.13. Healing

Results were statistically significant with post-operative healing being rapid for group (І) (5.70 ± 0.80 d), but extended for a long time for both groups (ІІ) and (ІІІ): (12.70 ± 2.18 d) and (18.80 ± 3.68 d), respectively.

5.2. Conclusion

We conclude that frenotomy is an easy safe technique suitable for tongue-tie types 3 and 4, and can be done safely without anesthesia or with topically applied or local infiltration anesthesia. It is suitable for neonates and young children below 6 months. But it is not suitable for older children and for high-grade tongue-tie types 1 and 2. It is associated with a high recurrence rate as well. We are in need for large-volume studies with a well-designed protocol for patient selection depending on referral from a pediatrician or those concerned with speech therapy; so, we can deal with symptomatizing problems with functional impairment rather than depending on the anatomical evaluation by surgeons or traditional beliefs.

Institutional Review Board (IRB) Approval Number

HB000114.

Table 16. Time of healing in the three groups.

<table>
<thead>
<tr>
<th>Time of healing</th>
<th>G 1</th>
<th>G 2</th>
<th>G 3</th>
<th>f. test</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>5–7</td>
<td>10–17</td>
<td>12–25</td>
<td>136.223</td>
<td>0.001*</td>
</tr>
<tr>
<td>Mean ± SD</td>
<td>5.70 ± 0.80</td>
<td>12.70 ± 2.18</td>
<td>18.80 ± 3.68</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Conflicts of interest

None declared.

References


