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Enhancing Pediatric Outcomes through LASER Frenectomy and Peri-Surgical Myotherapy: A Case Report

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Abstract

Ankyloglossia, or tongue-tie, is characterized by a restricted lingual frenum, which can impair speech, feeding, and orofacial development. This case report describes the management of a 9-year-old male presenting with limited tongue mobility and speech articulation difficulties due to Class II moderate ankyloglossia (Kotlow's classification). A diode LASER-assisted frenectomy was performed under local anesthesia, followed by a peri-surgical and postsurgical myofunctional therapy. At follow-up, the patient demonstrated improved tongue mobility, clearer speech articulation, and no signs of reattachment. This case highlights the effectiveness of combining LASER frenectomy with myofunctional therapy for functional rehabilitation in cases of ankyloglossia.

1. Introduction

The lingual frenum is a mucous membrane fold that connects the underside of the tongue to the floor of the mouth. While it plays a role in limiting tongue movement to some extent, an abnormally attached or tight lingual frenum, often referred to as ankyloglossia or tongue-tie, can lead to a wide range of functional difficulties.

In infants, one of the earliest signs of a problematic frenal attachment is feeding difficulty, which may affect breastfeeding efficacy and infant weight gain. As the child grows, this restriction can contribute to non-nutritive sucking habits such as thumb sucking or tongue thrusting, further affecting orofacial development. Additionally, breathing, swallowing, and speech may be

adversely impacted due to reduced mobility of the tongue. These impairments can ultimately result in an overall functional limitation, affecting oral health, social interaction, and quality of life.

Recent advances have shown that LASER-assisted frenectomy is an effective technique for relieving the restriction caused by the abnormal frenal attachment. LASERs offer several clinical advantages over conventional scalpel surgery, including:

- Minimally invasive procedure
- No or minimal bleeding
- Lower postoperative pain
- Faster healing
- No sutures required

However, surgical release alone is often not sufficient to ensure optimal outcomes. Perisurgical care, particularly the use of myofunctional therapy, plays a critical role in retraining tongue posture, improving orofacial muscle function, and preventing reattachment. Thus, a multidisciplinary approach involving both surgical intervention and myotherapy is essential for achieving long-term successful treatment outcomes.

2. Patient Information

- **Age/Gender**: 9-year-old male
- **Chief Complaint**: The patient presented with a primary complaint of difficulty in moving his tongue freely. This restriction was reportedly affecting his speech, particularly in pronouncing certain words clearly.
- **Medical History**: Non-contributory
- **Dental History**: The patient had previously undergone dental treatment involving placement of stainless steel crowns and restorations in multiple teeth.

3. Clinical Examination

Intraoral examination revealed a restricted tongue movement due to a short lingual frenum. The tip of the tongue could not extend beyond the lower incisors and showed a characteristic heart-shaped appearance on protrusion. Speech articulation was affected, particularly with lingual consonants.

FIG. 1.

4. Intraoral Examination

- 53,73,83- smooth surface caries
- 54- multi surface caries
- 55- occlusal caries
- 64,84,85- secondary caries
- 26,36- pit caries
- 74,75- Stainless steel crown
- Lips were competent
- Reduced jaw growth
- Class II moderate ankyloglossia (Kotlows classification)

FIG.2. **Pre-operative Intraoral photographs.**

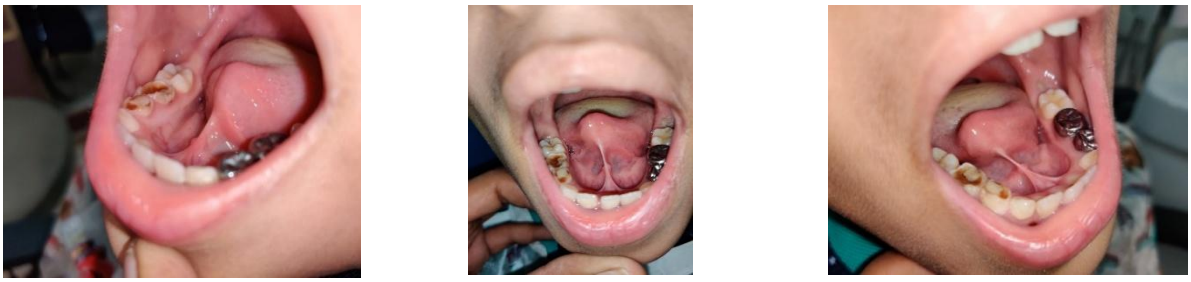

FIG. 3. **Pre-operative photograph of the tongue and frenum.**

5. Treatment Plan

The decision was made to perform a LASER-assisted frenectomy to release the restricted frenum and improve tongue mobility and speech function. The procedure was planned with appropriate behavioral management and local anesthesia.

Other treatment as suited were planned and performed

FIG. 4. **Diode laser 980nm 3.0 W.**

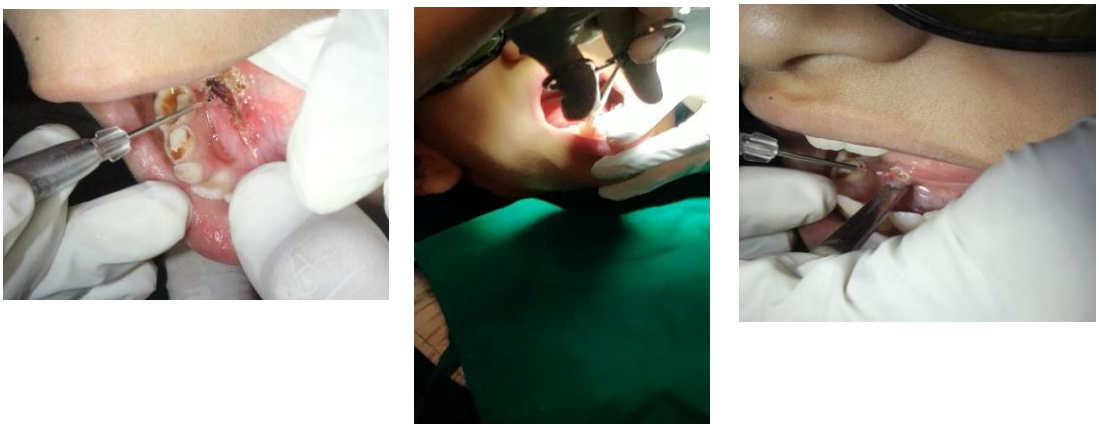

FIG. 5. **Intraoperative photograph.**

FIG.6. **Immediate post operative.**

6. Method

6.1 Frenectomy procedure description

1. **Local Anesthesia (LA) Infiltration**

   The procedure begins with the administration of local anesthesia to ensure the child experiences no pain or discomfort. Proper infiltration helps achieve adequate numbness in the area around the lingual frenum.

2. **Protective Eyeglasses**

   As a safety protocol, protective eyewear is provided to both the patient and the operator to shield the eyes from the LASER beam during the procedure.

3. **Tongue Immobilization**

   The tongue is gently retracted and stabilized using gauze or a tongue retractor to provide better access and visibility of the frenal area. This also ensures precision while using the LASER.

4. **Use of Diode LASERS**

   A diode LASER is used to perform the frenectomy. The activated LASER fiber is applied in a controlled sweeping motion to ablate the fibrous frenal tissue. The LASER cauterizes as it cuts, resulting in a bloodless surgical field and improved patient comfort.

5. **Saline Irrigation**

   After completing the LASER excision, the area is gently irrigated with normal saline to cool the tissues and remove any debris or residue from the site.

6. **Post-Operative Instructions Given**

   Once the procedure is completed, the patient's guardian is provided with detailed post-operative instructions. These typically include:

- Avoiding hot/spicy foods for 24 hours
- Maintaining good oral hygiene
- Performing prescribed tongue exercises (myofunctional therapy)
- Use of mild analgesics if required

7. **Follow-Up**

   The patient is scheduled for follow-up visits to assess healing, monitor improvement in tongue mobility and speech, and ensure there is no reattachment of the frenum. Continued myofunctional therapy is reinforced during these visits.

FIG. 7. **1 week follow-up.**

7. Postoperative Care and Follow-Up

After the LASER-assisted frenectomy, a comprehensive post-operative care regimen was followed to ensure smooth healing and patient comfort.

1. **Medications Prescribed**

The patient was prescribed:

- Ibuprofen (Tab. Ibugesic 200 mg) for pain relief, to be taken as needed.
- 0.2% Chlorhexidine mouth rinses**,** twice daily, to maintain antiseptic oral conditions and prevent secondary infection.

2. **Topical Gel Application**

- Mucopain gel (topical anesthetic/anti-inflammatory) was advised to be applied at the surgical site using a clean cotton bud for localized pain relief and to soothe the wound area.

3. **Dietary Instructions**

- The parents were instructed to provide a soft and cold diet, avoiding spicy or hot foods for at least 3 days post-surgery. This helps minimize irritation at the surgical site and promotes better healing.

4. **Oral Hygiene Maintenance**

- Emphasis was placed on maintaining adequate oral hygiene to prevent plaque accumulation and infection. Gentle brushing was advised, avoiding trauma to the surgical area.

5. **Follow-Up Protocol**

- The patient was reviewed at the following intervals:
  - 1-day post-surgery
  - 1-week post-surgery
  - 2 weeks post-surgery

At each follow-up visit, healing was assessed. The wound exhibited uneventful healing, with no signs of delayed hemorrhage, no infection, and normal tissue repair. Tongue mobility was improved, and the child was able to articulate speech more clearly.

8. Discussion

Laser-assisted frenectomy, particularly using diode lasers, has emerged as a preferred method for managing ankyloglossia due to its efficiency, precision, and patient comfort. The procedure offers several advantages, such as a clean surgical field**,** minimal or no bleeding**,** reduced post-operative discomfort**,** and elimination of sutures, all contributing to a shorter and smoother recovery period.

Although CO_2 lasers offer even greater soft tissue benefits — such as deeper penetration, more efficient tissue vaporization, and better coagulation — their high cost and equipment requirements limit their feasibility in routine dental practice, especially in resource-limited settings.

For optimal outcomes following frenectomy, functional rehabilitation of the tongue and jaw muscles is essential. Ankyloglossia often leads to compensatory movements and poor oral habits, which need to be addressed post-surgically. Therefore, retraining

the tongue muscles through myofunctional therapy is crucial. These exercises help in improving tongue posture, mobility, speech articulation, and swallowing efficiency.

While laser procedures are generally safe, clinicians must remain vigilant for complications, which can be immediate (e.g., pain, swelling, infection) or delayed (e.g., reattachment, scar formation, or persistent speech difficulties if therapy is not followed through). Proper surgical technique, patient selection, and comprehensive postoperative care significantly reduce these risks.

9. Conclusion

Combining frenectomy with peri-surgical myofunctional therapy exercises proves to be an effective approach for enhancing tongue and jaw muscle function, improving speech clarity, and supporting the overall developmental growth of the child.

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