

Lingual Frenectomy Using Diode Laser Therapy - A Case Report

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Abstract: *Ankyloglossia, often known as tongue - tie, is the result of a short, tight lingual frenulum that restricts the movement of the tongue, making speech articulation difficult. This article details the laser surgical treatment of a 13 year old male patient, who had ankyloglossia, which was accompanied by decreased tongue mobility and trouble speaking. A diode laser frenectomy was used in conjunction with speech therapy and tongue training exercises as part of the treatment. After a month, the patient's tongue movements improved, and uneventful healing process was seen.*

Keywords: Ankyloglossia, Frenectomy, diode Laser, Tongue tie

1. Introduction

A frenum, or frenulum, is a band of tissue connecting the lips to the gums or the tongue to the floor of the mouth. Ankyloglossia, also known as tongue tie, is a birth defect in which a child's tongue remains attached to the bottom of their mouth. It is frequently linked to challenges with breastfeeding and can be treated surgically with a frenectomy which involves removing the frenulum and its attachment entirely. ⁽¹⁾

The prevalence in infants is 4.4 - 4.8%, with a male - to - female ratio of 3: 1. In clinical settings, the phrase has been used to describe a variety of conditions, including tongue attached to the floor of the mouth and tongue with limited mobility due to a thick and short lingual frenulum. ⁽²⁾

Untreated tongue tie can cause weight problems in babies and failure to thrive in childhood. In addition to feeding difficulties, untreated tongue tie can cause dental problems and speech errors. Delayed or impaired speech development is also associated with a short and fibrotic lingual frenum. Toddlers with tongue tie often pronounce consonants such as "t", "d", "n" and "l" in the development of anterior and lateral tongue tie. ⁽³⁾ This case report focuses on the management of tongue tie using a soft tissue diode laser.

Kotlow's classification of ankyloglossia ⁽⁴⁾

According to Kotlow's observation, Ankyloglossia is classified into four types depending on clinically available free tongue (protrusion of tongue):

- 1) Class I: Mild ankyloglossia: 12–16 mm
- 2) Class II: Moderate ankyloglossia: 8–11 mm
- 3) Class III: Severe ankyloglossia: 3–7 mm
- 4) Class IV: Complete ankyloglossia: <3 mm

2. Case Report

A 13 year old male patient reported to the department of Pedodontics, VS Dental College and Hospital, Bangalore, Karnataka, India with a chief complaint of difficulty in speech and impaired tongue mobility. No relevant medical and family history was reported. Intraoral examination revealed a high frenal attachment [Figure 1] and limited

tongue movements [Figure 2, 3]. Plaque deposits were noted at the lingual surface of the mandibular central incisors and on the last molars. On examination it was understood that the patient had limited tongue movements. He was diagnosed with ankyloglossia class II according to the Kotlow classification. There was no gingival recession on the lingual surface of the mandibular anteriors. The routine blood test report was analyzed and found to be within normal limits. A laser frenectomy of the lingual frenum was planned and the patient was informed about the procedure and informed consent was obtained.

3. Surgical Procedure

The lingual frenectomy was performed under local anesthesia with 2% lignocaine and 1: 80000 adrenaline. After the achievement of the anesthesia the lingual frenum was held using a hemostat, frenectomy was initiated using a diode LASER (Photon plus Soft Tissue Diode LASER, 0.8W, 980nm). LASER tip was applied in brushing strokes from the apex of frenum to the base to cut the frenum [Fig.4, 5]. The ablated tissues were continuously wiped with a wet gauze piece to protect against thermal damage to the underlying tissues. Protrusive tongue movement was assessed to ensure the complete detachment of frenum [Fig.6]. There was no postoperative bleeding and hence any need of suturing. Extreme care was taken to protect various underlying anatomical structures of the tongue such as bilateral lingual arteries, genioglossus muscle, Wharton ducts and the sensory nerve supply. After the fibrous attachment was removed from the lingual frenum, hemostasis was achieved. Postoperative instructions and pain medications were given to the patient. Complete healing was seen after a month. [Fig.7]

Postoperative care and the follow up results

The patient was prescribed antibiotic amoxicillin (500 mg) and a non - steroidal anti - inflammatory tablet containing Ibuprofen (100 mg) and Paracetamol (125 mg) thrice a day for 5 days to prevent postoperative infection.

The following exercises were recommended for a week to the patient

- Stretching of the tongue towards the chin and then upwards towards the nose.

- Trying to touch the maxillary anterior teeth with mouth wide open.
- Licking of the upper lip from one side to the other, then the lower lip from one side to the other and the vice versa.
- Poking the sides of the cheeks as far as the patient can keeping the mouth closed

The observation time was set for reassessment after a week, during which uneventful healing and adequate tongue movement was observed during the examination. The patient was then referred to speech therapist for improvement of speech.



Figure 1: Preoperative photograph showing high lingual frenum attachment

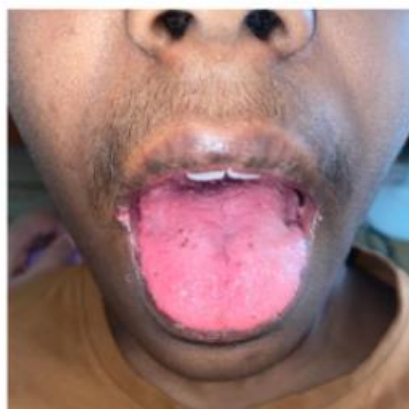
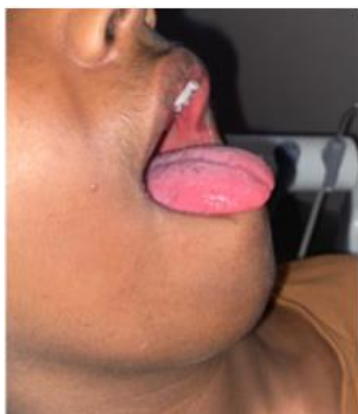


Figure 2 and 3: Preoperative tongue projection; the patient was unable to protrude the tongue



Figure 4 and 5: Frenectomy using laser



Figure 7: Postoperative healing after a month

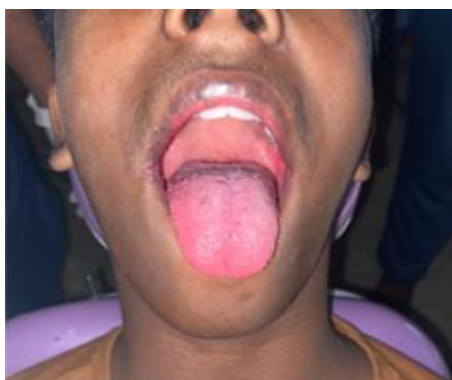


Figure 6: Postoperative projection of tongue

4. Discussion

In Pediatric patients, frenectomy is considered as an early intervention to avoid the difficulties during breastfeeding which can affect the nutritional status of a child. Early intervention in a newborn with <3 months had shown maximum benefit in improving the mobility of tongue. ⁽⁵⁾

There are many conflicting beliefs about the casual association between ankyloglossia and speech impairments. Many authors have criticized the idea that speech is impaired by ankyloglossia. Certainly, children with Ankyloglossia do not often have speech problems. Therefore, it is recommended that frenectomy should be considered only as part of the solution to a speech problem. ^(6, 7)

However, some children benefit from tongue surgery. Frenotomy/ frenectomy is an effective treatment for ankyloglossia. Several complications can occur with frenotomy, such as bleeding (floor of mouth - eg damage to the lingual artery), secondary infection during the healing phase, and in rare cases hyperopia due to the tongue falling down.⁽⁸⁾

Frenectomy is not done in all cases, but is done only if the benefit outweighs the risk of the procedure. In general, it is desirable that there is no bleeding, but it is also best to keep the clotted area as thin as possible. Localized denaturation of the peripheral tissue of blood vessels, hemoglobin and plasma proteins causes hemostasis. In addition, hemostasis occurs through coagulation through contraction of the vessel wall. This hemostasis may explain the low fluid extravasation observed, as there is a low inflammatory response surrounding the surgically treated tissues. A clotted layer that forms over the raw area prevents visible bleeding, but it may take some time to heal.⁽⁹⁾

Butchibabu et al. proposed that LASER - assisted frenectomies increase patient acceptance due to decreased pain perception during and after the procedure.⁽¹⁰⁾

Patel et al. reported significantly less intraoperative bleeding with LASER - assisted frenectomy. This may be due to the coagulation of soft tissue proteins at the high ablation temperature of the tissue.⁽¹¹⁾

5. Conclusion

Due to speech difficulties and limited mobility of the tongue, communication becomes a challenge for the patient. Dental surgeons must routinely evaluate tongue ties, and should perform frenectomies to give patients a mobile tongue that allows them to maintain effective oral hygiene.⁽¹²⁾ Recent advancements in LASER technology, coupled with a deeper understanding of the bio - interactions of various LASER systems, have significantly expanded their application in dentistry. These systems offer a compelling alternative to conventional scalpel surgery, characterized by a bloodless operative field, diminished pain perception, and reduced postoperative discomfort.⁽¹³⁾

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient (s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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