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Untying a tongue tie using diode laser: A case report

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Abstract

Tongue tie or ankyloglossia, causes the tongue to become fused to the floor of the mouth. The tongue's mobility is slightly hampered by the short, thick lingual frenulum. This developmental aberration has an impact on speech, oral hygiene maintenance, and other areas. The salivary gland duct at the mouth's floor and other crucial tissues must be protected from damage during surgery in this situation. As a result, LASERs have been employed frequently in a variety of soft tissue surgeries, simplifying them and improving their results. Our case focuses on the most effective management of ankyloglossia using a 980 nm diode laser.

Keywords: Ankyloglossia, lingual frenectomy, diode laser

Introduction

The tongue is a crucial oral component that has an impact on speech, tooth positioning, periodontal tissue, and swallowing. The lingual frenum is the term for the soft tissue that connects the tongue's underside to the floor of the mouth. This addition secures the tongue's tip to the mandibular posterior (rear) surface (lower jaw) ^[1]. According to its etymology, "ANKYLOGLOSSIA" comes from the Greek terms "AGKILOS", which means "curved," and "GLOSSA" (tongue). A frenum is defined as a "membranous fold that linked two components and inhibits the separate movement of each," according to Miller's definition from 1950. Wallace defined tongue tie as "a condition in which the tip of the tongue cannot be protruded beyond the lower incisor teeth due to a short lingual frenulum". In the 1960s, the word "ANKYLOGLOSSIA" was first used in the medical literature. Ankyloglossia is typically diagnosed based on speech impairment and the inability to extend the tongue's tip above the vermilion border of the lips or a line connecting the commissures of the lips. It is categorized according to "free tongue." The length of the free tongue is determined by measuring it from where the lingual frenum enters the base of the tongue to its tip ^[2].

Kotlow's assessment ^[3] is one of the commonly used diagnostic criteria in the case of Ankyloglossia which is as follows:

- **Class I:** Mild Ankyloglossia: 12 to 16 mm
- **Class II:** Moderate Ankyloglossia: 8 to 11 mm
- **Class III:** Severe Ankyloglossia: 3 to 7 mm
- **Class IV:** Complete Ankyloglossia: Less than 3 mm.

Patients with limited mobility display speech problems when pronouncing specific consonants and diphthongs. Speech flaws can affect the letters t, d, n and l as well as sounds and words like ta, te, time, water and cat as well as general speech intelligibility. Midline diastema, oral motor dysfunction, and gingival recession have all been linked to ankyloglossia. Due to the inability to elevate the tongue to the roof of the mouth, there is limitation in the formation of a typical swallowing pattern, and may also contribute to the development of an anterior open bite. Additionally, it has been suggested that some ankyloglossia cases may be accompanied with an upward and forward displacement of the larynx and epiglottis, which may cause dyspnea to varying degrees. Ankyloglossia occurs in 4.8% of cases, and males are more affected than females in approximately a 3:1 ratio ^[3].

Many methods have been proposed to treat ankyloglossia. Bipolar diathermy, lasers, and surgical blades are some of the methods used. The wavelengths of diode lasers range from 655 to 980 nm and they offer superior hemostasis, good wound sterilization, and decreased postoperative discomfort. The present case report was completed in the treatment of mild ankyloglossia, taking into account the range of benefits of soft tissue lasers for the treatment of lingual frenectomy [2].

Case Report

A 24-year-old male patient reported to our outpatient department with the chief complaint of difficulty in movement of the tongue since childhood. He gave a history of difficulty in the pronunciation of certain words when spoken with others. He also gave a medical history of skeletal

tuberculosis 2 years back and was on medication for it and has since recovered. He is currently on pain medication for pain in his left lower limb. Dental history was not relevant with any history of previous dental treatment reported. However, he had the deleterious habit of chewing betel nuts occasionally for 8-9 years. On intraoral inspection, it was found that the frenulum linguae was thick and short, limiting tongue protrusion up to the lingual surface of the lower incisors, and according to Kotlow's criteria, a diagnosis of Class 2 Ankyloglossia was determined. Both gingival recession and malocclusion were absent. To prevent difficulties from implicating the deep lingual veins and arteries and any injury to the duct apertures of the major and minor salivary glands located there, the case was listed for lingual frenulectomy utilizing the diode laser technique.



Fig 1: (a) Frontal view, (b) Lateral view with minimal tongue protrusion, (c) Intraoral view with short lingual frenum attachment

The patient was informed about the current clinical setting, the treatment strategy, and the procedure. Blood investigations were done and treatment was started after getting the patient's consent. Near the frenum attachment, a topical anesthetic spray was administered followed by 2% lignocaine (1:80,000) to the lateral surface of the lingual frenum. Suture was applied to hold the tongue for retraction after showing signs of full anesthesia, and a frenectomy utilizing a diode (Biolase epicX 10 W, 940 + 10 nm) laser was started. To cut the frenum, a contact mode laser tip was used to provide brushing strokes from the frenum's apex to its base. Using a piece of damp gauze, the ablated tissues were continually mopped. By doing this, the burned tissues are treated and the underlying tissue is shielded from severe

thermal injury. To ensure that the frenum had completely vanished, protrusive tongue movement was examined. There was no visible bleeding, and no suturing was performed. Antibiotics were provided for the patient, along with a non-steroidal anti-inflammatory drug (NSAID) tablet of ibuprofen (400 mg) + paracetamol (325 mg) three times daily for three days in order to prevent postoperative infection and pain. The patient was then reevaluated one week later. The healing was satisfactory. After surgery, the patient noted improved tongue mobility and was at ease. For the patient's speech improvement, a speech therapist was recommended. After the treatment, the patient noticed a noticeable improvement in tongue protrusion along with improved word pronunciation.



Fig 2: (a) Anesthesia given, (b) Tongue retraction, (c) Intra-operative laser excision



Fig 3: Immediate post-operative picture represents the restricted free tip of the tongue touching the maxillary central incisors



Fig 4: (a) 15 days post-operative image with improved tongue movement; (b), (c) Increased tongue protrusion

Discussion

Even though tongue tie appears to be a very benign condition, it has a significant impact on the affected person's day-to-day existence since birth. The tight frenulum interferes with bottle feeding and even breastfeeding because it inhibits the tongue from passing over the lower gum and lips. Lack of capacity to touch the roof of the mouth may cause issues with adult deglutition, and the compensatory mandibular protrusion may cause prognathism and maxillary hypo-development which may result in malocclusion and periodontal issues [3]. Speech challenges emerge as he begins to speak, making it challenging to enunciate consonants and sounds like "s, z, t, d, l, j, zh, ch, and th." As numerous minor salivary gland ducts open around the base of the linguae, including the Wharton's duct, the disease causes excessive salivation that could compromise oral hygiene [4]. The affected person's disease had such a significant social influence on their lives that it raised the possibility of social retreat and other psychological problems. The degree of the problem that ankyloglossia presents determines the management strategy to be used [7]. A generally asymptomatic condition may be followed up conservatively, but if it is interfering with the person's daily activities or causing health risks, it needs to be carefully addressed [5]. A lingual frenectomy, in which the frenulum is surgically separated using a knife, electrocautery, or laser surgery, is the most popular treatment for tongue tie. In some circumstances, speech therapy and postoperative exercise sessions may be necessary after the procedure [6].

Conclusion

This case study intends to increase surgical and dental specialists' awareness and knowledge of the benefits of employing Diode lasers in the treatment of ankyloglossia while emphasizing the hidden numerous dimensions of this issue, which at first look appears to be extremely benign. It also emphasizes the necessity of a multidisciplinary approach to the resolution of the issue [5, 7].

Authors' contribution

AD initiated the paper and each author contributed to writing and review of the entire paper. All authors edited, read and reviewed the paper prior to submission.

Competing interests

The authors declare that they have no competing interests.

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