

RESEARCH ARTICLE

MANAGEMENT OF TONGUE-TIE USING 980 NM DIODE LASER - CASE SERIES

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Abstract

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..... The lingual frenulum is a vertical fold of mucous membrane that connects the tongue to the mouth floor. This congenital defect can result in diastema, difficulty moving the tongue, feeding problems, speech problems, and other mechanical and social challenges. A person\'s social communication and mechanical issues are exacerbated if this abnormality is not diagnosed early. Speech issues can be resolved by speech therapy if doctors discover and repair this aberration in early childhood via frenectomy, however owing to the ignorance of the individual\'s parents and clinicians, this anomaly occasionally goes unnoticed and causes speech problems throughout life. As a result, ankyloglossia treatment should be addressed at any age based on a risk-benefit analysis. The current study looks at two case reports of ankyloglossia, or tongue-tie, that were successfully treated using a diode laser.

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Introduction:-

The tongue is a multifaceted organ made up of eight muscles that help in feeding, breathing, speaking, sleeping, posture, and a variety of other critical tasks. Ideal tongue function and muscle rest postures also serve as a template for healthy dental arches and facial/airway development. After the fetus's oral development is complete, a thin membrane behind the tongue called frenum or frenulum remains. The length, thickness, location, and flexibility of this string of tissue vary. If the frenum is too short, too thick, too high up on the tongue, or too inelastic (or a combination of these variables), the newborn, child, or adult may have eating, speech, and other problems.¹

Ankyloglossia is a condition that has existed for thousands of years. There have been hundreds of classifications presented, and the majority of them share aspects such as visual criteria, developmental origins, and functional limits. The International Affiliation of Tongue-Tie Professionals (IATP) recently agreed on a concise description that incorporates the various tongue-tie presentations. A tongue-tie, according to the definition, is "an embryological remnant of tissue in the midline between the under surface of the tongue and the floor of the mouth that inhibits normal tongue mobility."²This indicates that there is a tight band of tissue under the tongue that might inhibit the tongue from working normally. Because most people have some form of frenum or string beneath their tongue, many specialists regard a tongue-tie to be normal or a variety of normal. For the oral structures to satisfy the requirements for a tongue tie, there must be a functional impairment in addition to an anatomical finding when looking beneath the tongue.¹

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Embryology

A tongue-tie occurs when the tissue behind the tongue fails to resorb fully during development, a process known as apoptosis (programmed cell death), which occurs during the 12th week in utero.^{3,4}The frenum is formed as the tongue advances posteriorly (backward) from the primitive jawbone, and it anchors the tongue in place. It is then expected to dissipate.³A failure in the apoptotic process might result in the formation of a string beneath the tongue that is attached too high on the gum and under the surface of the tongue.

History of Tongue-Ties

Frenotomy was well-known in the 1600s. Although it used to be significantly more popular than it is now, tongue release looks to be one of the oldest surgical procedures still being performed today. Nursing difficulties and speech disorders such as stuttering, speech delay, and lisping were also considered tongue-tie issues, which were handled by cutting the string without hesitation.

Management:

Several strategies for treating ankyloglossia patients have been proposed. These methods include traditional frenectomy, Z-plasty, electrocautery, and laser usage⁵. Although conventional surgical frenectomies yield excellent results, they have drawbacks as compared to laser-assisted frenectomy. Suturing on the ventral surface of the tongue can sometimes block Wharton's duct. Surgical manipulations to the ventral region of the tongue may potentially induce lingual nerve injury and numbness of the tongue tip.⁶

The laser-assisted surgery has several advantages such as:^{7,8}

- 1. Precise tissue removal with improved visibility.
- 2. A clean, dry field due to blood vessel and lymphatic closure.
- 3. Minimises the risk of bloodborne infection transmission.
- 4. Because the wound is sealed with a biological dressing, there is less postoperative infection.
- 5. Healing of wounds without the creation of scars or contracture.
- 6. Less damage to normal tissue next to the wound.
- 7. Improved access to the oral cavity, such as the mandibular lingual, retromolar, and parapharyngeal regions.
- 8. Reduces the need for antibiotics.

Case Report 1:

A male patient of age 11was referred to the department of periodontics, Coorg institute of dental sciences, Virajpet,Karnataka regarding difficulties in chewing and talking related to reduced tongue movement. An intraoral examination revealed severe ankyloglossia, with a characteristic W-shaped tongue protrusion. There was very little tongue movement. The child's parents were suggested to get frenulum surgery with a diode laser. A soft tissue diode laser was used to design a lingual frenectomy, and the patient's parent provided informed written consent. The region was anaesthetized with local infiltration in the lingual mucosa next to the lingual frenum and into the tip of the tongue. The tongue was firmly retracted using a traction suture placed at the tip of the tongueafter topical anaesthetic application. The frenectomy was performed using a diode laser (Doctorsmile ® Simpler- 980 nm). After stripping the fibre-optic wire tip, it was initiated by firing it at 2.5 W in continuous mode into a piece of cork. For tissue excision, the diode laser was employed in contact mode with a focussed beam. In a brushing stroke, the laser point was moved from the frenum's apex to its base, severing the frenum. A moist gauze piece was used to continually mop the ablated tissue; this takes care of the charred tissue and prevents excessive thermal injury to the underlying soft tissue. The connection of the frenum to the alveolar ridge was also removed to reduce stress on the gingiva. The dentist, assistant, and patient all wore the necessary protective eyewear as a precaution. The surgery was painless and did not result in any bleeding. To determine if the frenum had been eliminated, protrusive tongue movement was examined. The patient was given analgesics, and a warm saline rinse instead of suturing. After 1 week of follow-up, the healing was satisfactory, with the creation of a "white soft scab." After 3 and 6 weeks of follow-up, there was full healing and enhanced tongue mobility. Speech issues were alleviated as a result of the speech treatment.



Figure 1:- Doctorsmile ® Simpler - 980 nm.



Figure 2:- Pre operative.



Figure 3:- Post operative.



Figure 4:- Follow up after 3 months.

Case Report 2:

A 40-year-old systemically healthy male patient complained of trouble speaking and projecting his tongue entirely since childhood, as well as problems with the pronunciation of a few phrases. The patient had ankyloglossia, which was discovered during an intraoral examination (tongue-tie). There was no relevant medical or dental history. The procedure was explained to the patient, and written consent was obtained. Topical anaesthetic gel was administered to the tip and bottom of the tongue. On the tip of the tongue and along the sides of the frenum, % lignocaine 1:80,000 was applied. Suturing was done to the tip of the tongue for retraction purpose after symptoms of full anaesthesia, and frenectomy was started using a diode laser (980 nm). As in case 1, a comparable method and safeguards were followed.



Figure 5:- Pre operative.



Figure 6:- Post operative.

Discussion:-

Ankyloglossia can be effectively managed with prompt and adequate surgery, followed by effective speech therapy. Ankyloglossia is a multidisciplinary dental condition that involves periodontists, paediatric dentists, orthodontists, and oral surgeons. It can affect new-borns, toddlers, and adults. It has a slight male predilection and has a frequency ranging from 0.1 % to 10.7%.^{9,10}

- A normal range of motion of the tongue is indicated by the following criteria:
- 1. Without clefting, the tip of the tongue should be able to extend outside the mouth.
- 2. Without straining, the tip of the tongue should be able to sweep the upper and lower lips.
- **3.** The tongue should not blanch the tissues lingual to the anterior teeth when it is retruded; and
- 4.A diastema between the mandibular central incisors should not be created by the lingual frenum.

Malocclusion, gingival recession, improper dental hygiene, and speech difficulties in pronunciation of consonants like t, d, n, and l, as well as difficulty rolling an "r," are all problems connected with mechanical restriction of the tongue. As a result, depending on the patient's history of speech, eating, mechanical, or social challenges, ankyloglossia care should be provided at any age.

Diode lasers are small and portable, offering effective and dependable results in soft tissue oral surgery operations. Because laser light is monochromatic, coherent, and collimated, it delivers a precise burst of energy to the desired location. Laser wounds were shown to have a much-decreased quantity of myofibroblasts on histological examination.¹¹As a result, wound contraction and scarring are reduced, and healing is enhanced. Because protein denaturation seals capillaries and stimulates clotting factor VII, laser wounds have less bleeding. The laser's heat impact closes capillaries and lymphatic vessels, reducing postoperative bleeding and oedema. After laser therapy, some myofibroblasts are observed to be smaller. This aids in the reduction of wound contracture and scarring. Laser wounds can typically be left without sutures due to enhanced healing and hemostasis.^{11,12}

Conclusion:-

Ankyloglossia, often known as tongue-tie, is a congenital ailment with a simple and safe treatment. Because of the hypermobility of the tongue and its closeness to the submandibular ducts and the highly vascular floor of the mouth, lingual frenectomy treatments are more difficult.

In the current research paper, lingual frenectomy was performed using a diode laser approach, which benefited the patient by lowering bleeding, improving asepsis, reducing operating and postoperative discomfort, swelling, and eliminating the need for sutures as well as antibiotics.

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