



Lingual frenectomy by Diode Laser

KEYWORDS

Ankyloglossia, Tongue Tie, Lingual Frenectomy, Diode Laser

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ABSTRACT *Ankyloglossia, commonly known as tongue-tie, is a congenital anomaly characterized by an abnormally short/tight lingual frenulum, which restricts mobility of the tongue tip. Though the ankyloglossia or tongue-tie is not a serious manifestation, it may lead to a host of problems including infant feeding difficulties, speech disorders, and various mechanical and social issues related to the inability of the tongue to protrude. Lingual frenectomy is advised for the management of ankyloglossia. The present paper discusses one case of successful management of ankyloglossia or tongue tie with diode laser.*

Introduction

At birth the tongue is usually short with the frenulum extending to the tip. During the early weeks of life, the tongue grows longer and thinner, the frenulum stretches and its tongue attachment often recedes to a lower position. Tongue tie or ankyloglossia is the abnormal condition affecting the lingual frenum. The term ankyloglossia was used first in the medical literature in 1960s when Wallace defined tongue tie as "a condition in which the tip of the tongue cannot be protruded beyond the lower incisor teeth because of a short frenulum linguae, often containing scar tissue"^[1]. Partial ankyloglossia refers to congenital shortness of the lingual frenum or frenal attachment extending to the tip of the tongue, binding the tongue to the base of the tongue and preventing its extension^[2]. In ankyloglossia the tongue elevation is restricted and results in eversion of lateral borders.

The term free tongue is defined as the length of the tongue from the insertion of the lingual frenum into the base of the tongue to the tip of the tongue. Clinically acceptable, normal range of free tongue is greater than 16mm. The ankyloglossia can be classified into 4 classes based on Kotlow's assessment as follows; class I-mild ankyloglossia-12-16 mms, class II-Moderate ankyloglossia-8-11 mms, class III-Severe ankyloglossia 3-7mms, class IV-complete ankyloglossia <3mms^[3]. In ankyloglossia, due to restricted tongue movements patients may exhibit speech difficulties in pronunciation of consonants like t,d,n and l and it is difficult to roll an "r".

Ankyloglossia has also been associated with problems with breast feeding among neonates, malocclusion, and gingival recession^[4].

Many surgical techniques have been suggested to manage patients with ankyloglossia. Procedures commonly employed for lingual frenectomy are conventional frenectomy, Z-plasty, electro surgery and use of lasers. In conventional frenectomy curved hemostat should be inserted to the bottom of the lingual frenum at the depth of the vestibule and clamped followed by giving two incisions at the superior and inferior aspect of hemostat. A diamond shaped wound obtained is closed with sutures.

The principle of Z-plasty technique was first described by Denonvilliers in 1856 for the release of eyelid scar^[5]. The standard Z-plasty consists of the cutting of wound edge flap in form of the letter Z or reverse of it. The releasing incision is placed one on the superior boarder of frenum and other on the inferior boarder in opposite directions. The Z flaps are

raised and then interchanged, so that the length of the frenum is increased. The wound edges are closed with sutures.

Electrosurgery was considered better than conventional surgical techniques. The primary mode of tissue interaction with electrosurgical instruments is by heat ablation and produces zone of necrosis. Diode lasers have several advantages when compared to conventional surgeries and electrosurgery units for frenectomies. The present case report describes the diode laser assisted lingual frenectomy procedure.

Case report

A 15 year old male was reported in the Department of Periodontics, Thaimoogambigai dental College, Chennai with a complaint of difficulty in speech since birth. On intraoral examination it was found that the individual had partial ankyloglossia and was classified as class III according to Kotlow assessment and was able to protrude the tongue upto lower lip (Figure 1). Lingual frenectomy by soft tissue laser was planned for the patient after informed consent.

After application of topical anaesthesia, few drops of lignocaine was injected in the frenum. Diode laser (830nm) was used for the frenectomy procedure (Figure 2). After stripping the fibre-optic wire tip, the tip was initiated by firing it into a piece of cork at 1.4W in continuous mode. The tongue was retracted with a mouth mirror. An initiated tip of 300 micrometer was used with an average power of 1.37 W in a pulsed mode. The diode laser was applied in a contact mode with focused beam for excision of the tissue. The tip of laser was moved from the apex of the frenum to the base in a brushing stroke cutting the frenum. The ablated tissue was continuously mopped using wet gauze piece. This takes care of the charred tissue and prevents excessive thermal damage to underlying soft tissue. The attachment of frenum to the alveolar ridge was also excised to prevent tension on the gingiva (Figure 3). Vitamin-E solution was applied to the wound site. Protrusive tongue movement was checked to assess complete elimination of frenum (Figure 4). No suturing was done and the patient was prescribed analgesics and reviewed after one week and healing was satisfactory. Patient was again examined after one and three months, he reported increase in tongue mobility following surgery and healing was satisfactory. The speech articulation was improved following speech therapy.

Discussion

Diode lasers are compact and portable in design with efficient and reliable benefits for use in soft tissue oral surgical

procedure. Diode lasers can be used in continuous wave or gated-pulse modes in contact or out of contact with the tissue. The benefits of using laser in oral surgical procedures are significant, both for the clinician and the patient. Laser light is monochromatic, coherent and collimated; therefore it delivers a precise burst of energy to the targeted area. Laser energy incises tissue more efficiently than the scalpel, generates complete vapourization and coagulates blood vessels. The hemostatic effect created when laser energy interacts with the soft tissue eliminates excessive bleeding, which creates a clean surgical field, allowing increased precision and accuracy and greatly improving visualization of surgical site. Examined histologically, laser wounds have been found to contain significantly lower number of myofibroblasts^[6]. This results in less wound contraction and scarring, ultimately improved healing. As a result of improved healing and hemostasis, intraoral laser wounds can often be left without sutures. Laser assisted frenectomy provides better postoperative perception of pain and function than with the scalpel technique^[7].

Although the conventional surgical frenectomies produce good results, they have their own disadvantages compared to laser assisted frenectomy. Suturing on the ventral surface of tongue at times causes blockage of Wharton's duct and might result in submandibular swelling. Surgical manipulations on the ventral part of tongue may also damage the lingual nerve and cause numbness of the tongue tip. Suturing can also result in contamination of the wound site by wicking effect causing secondary infection which could be avoided by antibiotic prophylaxis.

Laser assisted lingual frenectomy is easy to perform with excellent precision, less discomfort and short healing time compared to conventional technique. Patient was comfortable and there was absolutely no bleeding. We used pulsed mode which provides time for the tissue to cool and prevents collateral tissue damage^[8]. The frenum was completely eliminated and could protrude the tongue up to 15mm. Laser wound results in minimal or no bleeding which is due to sealing of capillaries by protein denaturation and stimulation of clotting factor VII production. The thermal effect of laser seals the capillaries and lymphatics which also reduce the postoperative bleeding and edema^[9]. In addition, sterilization of wound by laser reduces the need for postoperative care and antibiotics.

Conclusion

Ankyloglossia or tongue-tie is a relatively harmless condition and the treatment is relatively simple and safe. In the present case report, lingual frenectomy was done by diode laser technique which provides practical benefit to the patient as it reduces bleeding, postoperative pain and swelling. In future patients could be benefited by the laser assisted surgery.



Figure 1 preoperative view showing ankyloglossia



Figure-2 –Diode laser Unit



Figure-3- lingual frenectomy done using diode laser



Figure 4- Protrusion of tongue after lingual frenectomy

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