

Management of Ankyloglossia by Diode Laser: A Case Series

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ABSTRACT

Background: Ankyloglossia or tongue-tie is an ongoing controversy among professionals as well as speciality groups. It appears as a short lingual frenum or unusual attachment of lingual frenum. It causes restricted tongue mobility which in turn causes feeding difficulties and speech problems. A range of techniques like scalpel, laser, and electro-surgery have been performed for the past few decades in treating tongue-tie. Though, each method has got its own advantages and disadvantages, all aimed at relieving the high muscle attachment to improve the movement of the tongue. In this case series diode laser 810nm have been preferred for treating ankyloglossia.

Keywords: Tongue-tie, Ankyloglossia, lingual frenectomy, Diode laser-810nm.

INTRODUCTION

The lingual frenum is a fibro mucosal fold it connects the ventral side of the tongue to the mucosa of the floor of the mouth. Because of developmental disturbances, lingual frenum remains small and wide, which leads to the union of tongue to the floor of mouth resulting in restricted tongue movement ankyloglossia.^[1] Lingual frenum classified according to different levels of gravity which is presents at an alveolar and a lingual placing & insertion from the tip of the tongue to little away (<2 cm) or very far (>2 cm) from the tip.

The prevalence of tongue-tie varies from 0.2%-5%, with a male infant predilection. It also occurs with increased frequency as a clinical feature with syndromes such as Smith-Lemliopitz syndrome, Orofacial digital syndrome, Beckwith Weidman syndrome, Simpson-Golabi-Behmel syndrome and X-linked cleft palate.^[2]

The term ankyloglossia was primarily used in the medical literature dates back to near the 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” .^[3] In many individuals, ankyloglossia is asymptomatic; the situation can resolve spontaneously or affected individuals might learn to compensate sufficiently for their decreased lingual mobility. Some individuals, though advantageous in commencing surgical intervention frenotomy, frenectomy and Frenuloplasty used for the tongue tie. Patients must be educated regarding the possible extended-term effects of tongue-tie so as to they might create an informed option about the potential therapy.

Different levels of gravity of the anomalies of the lingual frenum on the basis of the type of lingual insertion are as follows.^[4]

Level F0 - The frenum is absent

Level F1 - The frenum goes from sublingual caruncle to the lower portion of the tongue, with an insertion at the lingual tip

Level F2 - The frenum goes from sublingual caruncle at half the distance between the plane of

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the lips and the plane of the tongue, that is, not far from the lingual tip

Level F3 -The frenum has marginal alveolar insertion and lingual connection to the median raphe of the tongue away from the tip of the tongue itself.

Ankyloglossia can limit feeding, speech, and oral hygiene as well as have mechanical/social effects.^[3] Ankyloglossia can also prevent the tongue from contacting the anterior palate. This can then promote an infantile swallow and affect the progression to an adult-like swallow which can result in an open bite deformity. In older individuals, it may cause ill-fitting of dentures. Another clinically acceptable Koplow's (Table 1) assessment most commonly used to classify ankyloglossia depending on the movement of the tongue (in mm), as follows.^[1]

Table 1: Kotlow's classification based on free tongue

<i>Classification of ankyloglossia</i>	<i>Range of free tongue*</i>
Normal	>16mm
Class I: Mild Ankyloglossia	12-16mm
Class II: Moderate	8-11mm
Class III: Severe	3-7mm
Class IV: Complete Ankyloglossia	< 3mm

* Free-tongue is measured from the insertion of the lingual frenum into the base of the tongue to the tip of the tongue

Case Report

This series of case report describes the management of 2 cases with partial ankyloglossia, treated by means of surgical excision with diode laser 810nm and the potential outcome of the treatment showing enhanced tongue movement.

CASE 1

A 33-year old male patient reported to the Department of Periodontics, with the chief complaint of bleeding from gums. During initial communication, it was observed with the intention of the patient had difficulty in speaking. An intraoral examination is done and establishes that the patient had short lingual frenum, with restricted tongue movements along with poor oral hygiene [Fig.1a].

Restricted tongue movement may possibly be the cause of a patient's inability to maintain oral hygiene. Difficulty in tongue projection was observed. According to Kotlow's measurement, this nature of ankyloglossia is diagnosed as class II by measuring the tongue protrusion with a measurement of 10 mm. [Fig.2 a].

CASE 2

A 24-years old male reported to the Department of Periodontics, with the chief complaint of difficulty in speech and was diagnosed with class III ankyloglossia [Fig.1b] with the measurement of 7 mm tongue protrusion . [Fig. 2b]



Fig 1a & b: Pre-operative view of Ankyloglossia.



Fig 2a & b: Measurement of tongue protrusion on the basis of Kotlow's classification.

Treatment

The circumstances, treatment need, and the process were disclosed to the patient. The patient was advised for routine laboratory investigations such as bleeding time, clotting time, hemoglobin count, and complete blood count. Once the informed consent was obtained from the patient, management was started. Management was performed with a diode laser wavelength 810 nm (AMD Laser Picasso) (Fig. 3).



Fig 3: Picasso Diode Laser 810 nm (AMD)

The surgeries for both the above mentioned cases were carried out in the same manner. Management was performed by means of topical anaesthesia (lidocaine spray 15%) & irradiation was delivered by flexible quartz fiber that was made in contact with the lingual frenum, from 1.5 to 2.0 W average power in continuous wave mode, for 5-10s [Fig.4a & 4b].

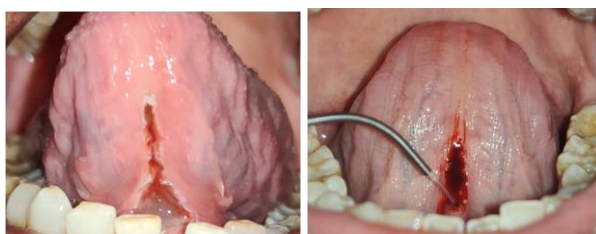


Fig 4a & 4b: Diode laser 810 nm application on the tongue tie area

Tip of laser was applied beginning from the apex of the frenum to the base in a brushing stroke, to cut the frenum. The removed tissues were cleaned continuously using wet gauze piece. This takes care of the charred tissues and prevents unnecessary thermal damage to the underlying tissue. After the procedure, hemostasis was obtained rapidly with no requirement of suturing & protrusive tongue movement was checked to access the absolute removal of frenum [Fig.5a & 5b]. The phonetics of the patients was better and was kept on antimicrobials along with NSAIDS to alleviate pain for 10 days with instructions to move the tongue slowly to avoid recurrence.



Fig 5a & 5b: Post-operative view of tongue protrusive movements

The following exercises were advised:

- 1) Stretch the tongue up towards the nose, then down towards the chin and repeat,
- 2) Open the mouth widely and touch the big front teeth with the tongue with mouth still open,
- 3) Close the mouth and poke the tongue into the left and right cheek to make a lump: for 3 to 5 minute bursts, once or twice daily for 3 or 4 weeks post-operatively.

The patient was followed up for 3 months with no recurrence and difficulty in phonetics and during intake of food.

DISCUSSION

In pediatric patient, frenectomy is carried out if having feeding problems. Surgery done in infants by means of less than 3 months had greatest benefits in improving tongue movements; infants were feed in an improved way.^[5] Ankyloglossia is a uncommon congenital disorder characterized through the attachment of tongue to the floor of the mouth. It can occur due to failure in cellular degeneration leading to longer anchorage connecting the tongue and floor of the mouth.^[2]

Speech problems can occur due to limited tongue movements i.e. ankyloglossia. The difficulty in pronunciation are clear for consonants and sounds like "s, z, t, d, l, j, zh, ch, th, d" and it is particularly complex to roll an "r".^[6]

Surgical techniques intended for the treatment of tongue-tie can be classified into 3 procedures:

- 1) Frenotomy is a simple cutting of the frenulum.
- 2) Frenectomy is defined as complete excision, i.e., removal of the whole frenulum.
- 3) Frenuloplasty

involves various methods to release the tongue-tie and correct the anatomic situation.

There is inadequate evidence in the literature about the surgical management options for ankyloglossia to support any one of the 3 main techniques. [7] Complications after frenotomy, frenectomy, and Frenuloplasty are rare.

In some individual's appearance of tongue-tie might be abnormal. Inappropriate chewing and swallowing of food might enhance the gastric suffering and bloating, and snoring and bedwetting at sleep which are frequent amongst tongue-tied children. Besides, it affects the children who would like to contribute to routine play which involves tongue movements, gestures, and speech. Because of the limited movement of tongue surrounding the teeth & inability of spreading of saliva, the chances of dental caries is increased due to the accumulation of food debris.[8]

Lalakea suggested the measuring of lingual mobility and tongue elevation to define the level of limitation and ankyloglossia. Mobility is measured in millimetres, the tip of the tongue extended past the lower dentition, while elevation is measured by recording interincisal distance with the tongue tip maximally elevated and in contact with the upper teeth.[9]

To manage the lingual frenectomy, there are many surgical techniques which are scalpel frenectomy, electrocautery, and laser frenectomy. In lasers, most commonly used are Er: YAG, CO2 laser, and diode laser. The diode laser has gained the benefit that it can be used without local anaesthesia. Lasers can be effectively used in the treatment of lingual frenectomy. Lasers overcome the fear of blood, scalpel, and local anaesthesia. Hemostatic, coagulant and cicatrizing effects are really important. Laser surgery is less invasive, avoids bleeding and suture, and eliminates complications and post-operative problems. The laser has a significant role in the antibacterial effect that reduces the risk of infections and avoiding the swelling and the inflammation that occurs after surgery.

The laser-assisted surgery has numerous advantages as follows:[9,10]

- Specific tissue elimination with better visibility, a clear, dry field due to sealing off the blood vessels, and lymphatic
- Reduces the risk of bloodborne transmission of disease due to its sterilization effect when it cuts
- Less pain and swelling have been reported after surgery
- Wound gets sealed with a biological dressing, so less postoperative infection has been reported
- Wound healing without scar formation and contraction
- Less damage to adjacent healthy tissue
- Better access to parts of the oral cavity, e.g., the mandibular lingual, retromolar, and parapharyngeal areas.

The use of lasers in frenectomy has advantages such as minimal invasiveness, with a micro traumatic technique and reduced bleeding and scarring; the option of instant postoperative speech therapy in most cases; the use of topical anaesthesia, that it is frequently sufficient, instead of anaesthesia by infiltration; and the reduction of the operative time.

The rationale of post-operative exercise after surgery is to develop new muscle movements, mostly those concerning the tongue tip elevation and protrusion, inside and outside of the mouth. It also increases aesthetic awareness of the full range of movements the tongue and lips can perform. It encourages the tongue movements related to cleaning of the oral cavity including sweeping the insides of the cheeks, fronts and backs of the teeth and licking around both lips. [11,12,13]

CONCLUSION

Ankyloglossia in adults leads to an apparent limitation of the tongue protrusion, elevation and especially speech problems could be improved by surgical intervention. It may be interesting that simple corrective therapy can resolve multiple problems associated with ankyloglossia. But it is essential that correct information and guidance is given to parents with regard to the indications and potential benefits of tongue-tie revision, and those suitable provisions are in place for those infants and

children who require revision. The results show that diode laser surgery is highly effective, and may provide a valid alternative to conventional surgical procedures.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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