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Minimally Invasive Lingual Frenectomy with Diode Laser in a Paediatric patient: A Case Report

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Abstract

Background: Ankyloglossia, commonly referred to as tongue-tie, is a congenital condition characterized by an abnormally short lingual frenulum, which can restrict tongue movement and affect oral functions such as speech, eating, and oral hygiene. Traditional surgical methods for frenectomy often involve scalpel or scissors, leading to significant bleeding, discomfort, and longer healing times. The use of diode lasers in oral surgery offers a minimally invasive alternative with benefits such as reduced bleeding, less postoperative pain, and faster recovery.

Case Presentation: This case report details the management of a 12-year-old female patient diagnosed with ankyloglossia. The patient presented with difficulty in articulating certain sounds and discomfort during tongue movements. A thorough clinical examination confirmed the diagnosis, and a lingual frenectomy using a diode laser was planned.

Procedure: Under local anaesthesia, a diode laser was used to perform the frenectomy. The procedure was completed within a few minutes with minimal intraoperative bleeding. The laser's coagulative properties helped achieve excellent haemostasis, and no sutures were required. The patient tolerated the procedure well and reported minimal discomfort postoperatively.

Results: Postoperative follow-up showed significant improvement in tongue mobility and speech articulation. The patient experienced a swift recovery with no complications, and the surgical site healed uneventfully within two weeks. The use of the diode laser provided a favourable outcome, with minimal pain and excellent patient satisfaction.

Conclusion: Diode laser frenectomy is an effective and patient-friendly technique for managing ankyloglossia in paediatric patients. This case report demonstrates the advantages of using diode lasers, including reduced

intraoperative bleeding, decreased postoperative discomfort, and rapid healing. Further studies with larger sample sizes are recommended to establish standardized protocols and long-term outcomes of this technique.

Keywords: Frenectomy, Ankyloglossia, Frenulum.

Introduction

Ankyloglossia, also known as tongue-tie, is a congenital anomaly characterized by an abnormally short lingual frenum. Its prevalence is around 4.4% to 4.8% in newborns, with a male to female ratio of 3:1. Clinically, the term has been used to describe different situations, such as a tongue that is fused to the floor of the mouth as well as a tongue with impaired mobility due to a short and thick lingual frenum. There is continuing controversy over the diagnostic criteria and treatment of ankyloglossia. Diagnosis is generally based on Kotlow classification for ankyloglossia (Table 1).[2] A normal motion range of tongue is indicated when the tip of tongue is able to protrude outside the mouth without clefting, when lingual frenum allows a normal swallowing, when there is no speech difficulties due to limitation of the tongue movement, and when it can sweep the upper and lower lips easily, without straining.[1] Any condition restricting free movement of the tip of the tongue and preventing it from touching the anterior palate, may interfere with the development of an adult swallow and may result in an open bite deformity.[3] Several other studies establish diagnostic criteria based on the length of the lingual frenulum, amplitude of tongue movement, heart-shaped look when the tongue is protruded and thickness of the fibrous membrane. In children, ankyloglossia can lead to breastfeeding difficulties, speech disorders, poor oral hygiene and bullying during childhood and adolescence. Nowadays, several surgical techniques have been described to correct an abnormal frenulum. Therefore, the purpose of the present article is to describe a clinical case of ankyloglossia, approached by laser technique.

Table 1: Kotlow's classification

Class	Severity	Measurement
1	Mild	12-16mm
2	Moderate	8-11mm
3	Severe	3-7mm
4	complete	-

Case Report

A 12 years old female patient reported to Department of Paediatric Dentistry with a chief complaint of difficulty in complete protrusion of tongue and slight impairment of speech and difficulty in swallowing since childhood, parents had taught that as the child grows the tongue will change from heart shape to normal. But due to lack of improvement in the child's condition the parents had reported to Paediatric Department. On intraoral examination she was diagnosed with class II Ankyloglossia using Kotlow assessment -10mm of protrusion was seen with fibrotic and thick frenum. She also had difficulty in speech like to roll an r or other consonants t, n, s. After thorough evaluation and clinical examination, lingual frenectomy with diode laser was planned.

Figure 1-Pre-Operative images A- Pre Op maxillary arch B-Occlusal view C- Pre-Op Mandibualr arch

Fig 2- Pre-Op evaluation of ankyloglossia

After routine blood investigation the surgical procedure has been started, lingual frenectomy under Diode laser (2,780nm wavelength, ZOLAR). Diode laser with power settings variable from 0.8 W, pulse rate or frequency of 10 to 50 Hz with continuous wave and initiated type of tip was selected manually.

Procedure has been priorly explained to patient. Protective eye-wear was given to patient. Local anaesthetic gel (LOX 2%) was applied on both the sides of frenum using gauze and after 2minutes LA infiltration was given using lignocaine (2% lignocaine/1:80,000 adrenaline) with a self-aspirating syringe adjacent side to lingual frenum. The tip of the tongue was stabilized with 3-0 braided natural silk non-absorbable suture, for retraction of frenum and to improve the visibility. The frenum was held with a small curved haemostat with the convex curve facing the ventral surface of the tongue for knowing the extent of thick fibers. Marking was done prior to the use of laser. The Zolar Proton plus laser was used with a power of 0.8W, continuous wave, S mode was used to ablate the connective tissue in the frenum following the markings. Laser is runned over the markings with an initiated tip. As all the markings are joined it leaves a rhomboid or diamond shaped wound. Using a haemostat any attached connective tissue fibres were removed. Betadine irrigation was done using 21gauge syringe. Immediately after the procedure the Zolar laser mode was changed manually to Haemostatic mode0.8-watt power and continuous wave but with uninitiated tip to control the bleeding. Since haemostasis was achieved by using laser there was no requirement of suturing. Post-operatively protrusion of the tongue was changed from 10mm to 14mm and there was absence of heart shaped cleft. There was immediate improvement in tongue tip mobility, extension, elevation and protrusion. Post-operative instructions to avoid hot and spicy foods for a span of 3days and tongues exercises should be started immediately within 6 hrs after surgery.

Fig 3- Treatment under diode laser(3A) and immediate post operative images 3B & 3C Post Operative healing after 2weeks -2D

The procedure was followed by 7days and 14days review and 3months review for evaluating tongue extension, mobility and protrusion. Healing was uneventful and after 7days follow-up Proper collagen tissue formation was seen along with closure of the wound during 14days follow-up. Patient was happy with her speech improvement and tongue movements.

Generally lingual frenectomy is a safe procedure with very rare complications such as infection, bleeding, ulcer formation under the tongue or damage to tongue. If no sutures are placed a rhomboid shaped wound will remain under the tongue and will heal in 5-7days.

Result

The patient was monitored periodically to check for any discomfort and also monitor the movements of her tongue. Month after surgery the patient had a free tongue tip and her movements improved drastically. Lip closure, phonetics was improved

Discussion

In the present a case report of child diagnosed with ankyloglossia and approached with laser techniques was

presented. The choice of the technique was based on appropriate circumstances carefully evaluated preoperatively. The exact cause of ankyloglossia is unknown, although it is likely to be due to abnormal development of the mucosa covering the anterior two-thirds of mobile tongue. In most of cases, ankyloglossia is seen as an isolated finding in children. However, several syndromes are associated with this physical finding, including Ehlers-Danlos syndrome, Beckwith-Wiedemann syndrome, Simosa syndrome, X-linked cleft palate and orofaciodigital syndrome. The examination of lingual frenulum should consider the morphological and functional aspects of the tongue. The indication of surgery for functional limitations due to ankyloglossia should occur if evaluation shows that function may be improved by surgery. Correct diagnosis of ankyloglossia and early intervention are imperative, since several consequences ranging from restriction of tongue movement to impairment of mandibular growth may occur. In nursing mothers, it may cause breastfeeding difficulties, poor milk transfer and nipple damage, resulting in early weaning and low weight gain in babies. Speech articulation problems are the most common indications for lingual frenulum surgery in preschool children.

Frenectomy corresponds to the complete excision of the frenulum. This procedure is more invasive and difficult to be performed in young children, although the results are more predictable, decreasing the recurrence rate. There are no conclusive parameters regarding the timing of frenectomy in the literature. However, surgery should be performed before the child develops abnormal swallowing and speech patterns. When the procedure is performed in older children, they should be referred to a speech therapist in order to re-establish the normal functions of the tongue.

Laser technology has been considered as an alternative to the conventional techniques, presenting several advantages such as: shorter operative working time, tissue cauterization and sterilization, haemostasis, less local anaesthesia requirement, and fewer postoperative complications (pain, swelling and infection). Laser also enhances access and visualization due to the lack of interposed instruments and bleeding at the operative field. Additionally, the need for suture is eliminated and a uniform depth in the surgical site is maintained, reducing unnecessary damage to tongue muscle. For all these features, laser is well tolerated by children

Conclusion

Tongue-tie becomes difficult for the patient due to limitation of tongue mobility and speech problem. So, it is necessary to treat it on correct time which can be improved by surgical interventions.

References

1. Wallace AF. Tongue tie. Lancet 1963;2(7304):377–378. DOI: 10.1016/ s0140-6736(63)93057-5.
2. Kotlow LA. Ankyloglossia (tongue-tie): a diagnostic and treatment quandary. Quintessence Intl 1999;30(4):259–262.
3. Whitman CL, Rankow RM. Diagnosis and management of ankyloglossia. Amer J Orthod 47(6):423–428. DOI: 10.1016/0002-9416(61)90221-4 1961.
4. Ballard JL, Auer CE, Khoury JC. Ankyloglossia: assessment, incidence, and effect of frenuloplasty on the breastfeeding dyad. Pediatrics 2002;110(5):e63. DOI: 10.1542/peds.110.5.e63.
5. Segal LM, Stephenson R, Dawes M, et al. Prevalence, diagnosis, and treatment of ankyloglossia: methodologic review. Can Fam Physician 2007;53(6):1027–1033.

6. Ayer FJ, Hilton LM. Treatment of ankyloglossia: reported of a case. ASDC J Dent Child 1977;44(3):69–71.
7. Chaubal TV, Dixit MB. Ankyloglossia and its management. Indian Soc Periodontal 2011;15(3):270–272. DOI: 10.4103/0972-124X.85673.
8. Messner AH, Lalakea ML. The effect of ankyloglossia on speech in children. Otolaryngol Head Neck Surg 2002;127(6):539–545. DOI: 10.1067/mhn.2002.129731.
9. Reddy NR, Marudhappan Y, Devi R, et al. Clipping the (tongue) tie. J Indian Soc Periodontal 2014;18(3):395–398. DOI: 10.4103/0972-124X.134590.
10. Patil HP, Bhoir SS. Treatment of ankyloglossia by diode laser. J Dent Lasers 2017;11(2):65–68. DOI: 10.4103/jdl.jdl_17_17.