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Surgical management of ankyloglossia using diode laser

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Abstract

Ankyloglossia is congenital anomaly characterized by an abnormally short lingual frenum. In children, ankyloglossia results in breast feeding difficulties, speech disorders and complex malocclusion. This can be managed by performing lingual frenectomy. In this article we will be reporting two cases of ankyloglossia in 5 & 12year old children with speech problems and restricted tongue mobility respectively, which were managed successfully using diode laser and followed up without any postoperative complications. Diode laser has advantages over scalpel method such as shorter operative working time, tissue cauterization and sterilization, hemostasis, less local anesthesia requirement, elimination of suturing and few postoperative complications like pain swelling and infection, which is well tolerated by children. Diode lasers are exclusively used for soft tissue surgeries with no risk of enamel damage since their wavelength doesnot interact with tooth structure, compact and economical giving them edge over CO2 lasers & scalpel.

Keywords: Ankyloglossia, lingual frenectomy, diode laser

Introduction

Lingual frenum is a fold of mucous membrane which attaches the tongue to the floor of the mouth. Ankyloglossia also known as “Tongue Tie” is a congenital anomaly characterized by short lingual frenum. The term ankyloglossai originates from the Greek words “agkilos” (curved) and “glossia” (tongue). Prevalence rate of ankyloglossia is around 0.2-5%. It affects more male patients than females in the ratio of 3:1.

In year 1999, Kotlow classified ankyloglossia based on the length of the free tongue. (Normal length should be greater than 16mm).

- Class I: Mild ankyloglossia (12-16mm)
- Class II: Moderate ankyloglossia (8-12mm).
- Class III: Severe ankyloglossia (4-8mm).
- Class IV: Completer ankyloglossia less than 4mm.

Clinically ankyloglossia presents with limited tongue mobility, inability to protrude or elevate the tongue, clefting of the tongue tip. Ankyloglossia can result in difficulty in breast feeding, difficulty in in speech as it affects articulation of certain consonants like “s”, “t”, “d”, “l”, “th”, “zh”, “ch” and specially to roll on “r”. Restricted tongue mobility results in poor oral hygiene and development of gingival recession in mandibular incisors. Since the tongue is positioned at the lower level, it causes downward and forward pressure which favors mandibular prognathism. Inability of the tongue to lift upward also results in unrestricted buccinators muscle activity, which can lead to constriction of the maxillary arch.

The best recommended treatment for ankyloglossia is lingual frenectomy. Conventionally, it was done using scalpel and electrocautery. With the advancement in technology, lasers have been widely used due to its beneficial effects in regards to good haemostasis, precise incision margin, lack of swelling and pain. In this article we will be presenting three cases of ankyloglossia which were managed successfully using Diode Laser (940nm).

Case Report

A 5 year old female patient reported to the Dept of Pedodontics & Preventive Dentistry, Daswani Dental College & Research Centre, Kota with chief complaint of difficulty in protruding the tongue since birth. Neonatal history suggested difficulty in breast feeding. Patient had difficulty in articulation of sounds “t”, “d”, “th” & “r”. Intraoral examination revealed a short lingual frenum.

She was unable to touch the tongue to the palate and had anterior cross bite. A diagnosis of Class II ankyloglossia was made. Treatment plan included lingual frenectomy using Diode Laser. Written consent was taken from parents. After local anesthesia administration, tongue was kept in retracted

position to make the lingual frenum more prominent. Diode laser of wavelength 940nm was used in pulse contact mode using 400µm fibre tip in a brushing stroke. Good hemostasis was achieved and suturing was not required. The patient was prescribed analgesics.



1month Follow Up

Discussion

The term ankyloglossia was first used by Wallace in 1960's where he defined it as a condition in which the tip of the tongue cannot be protruded beyond the lower incisors due to short lingual frenum. Tongue tie usually results due to failure in cellular degeneration leading to a much longer connection between the floor of the mouth and the tongue. There are various problems associated with ankyloglossia such as difficulty in breast feeding and speech, recession of lower incisors and malocclusion. This can be managed by lingual frenectomy. Conventionally, scalpel was used for the procedure. Since the tissue in the lingual of the tongue and floor of the mouth is highly vascular, intraoperative bleeding is a major discomfort to the patient and clinician. With the advent of lasers, the treatment of ankyloglossia has become more comfortable to clinician as well as patient.

In present cases, post operative follow up was done. There was no pain, swelling and any other complication post surgery. Since the local anesthesia administration was minimal and bleeding was negligible, the procedure was well tolerated by children without any fear and anxiety. In addition, the laser sterilization of the surgical wound reduced the need for post operative care and antibiotics.

The frenum was completely eliminated and the patients could protrude their tongue upto 10-12mm. The patients were advised to undergo speech therapy for correction & improvement of their speech.

Ramonos and Netwig (1999) reported several advantages of Diode Laser over conventional scalpel method such as; good coagulation effect, sterilization of the surgical site, minimal post operative complications like pain, trauma, swelling and inflammation, lesser anesthesia requirement, shorter working time, elimination of sutures.

Marina A *et al* (2014) conducted a case series on treatment of ankyloglossia in children using different surgical techniques. They concluded that laser is simple and safe alternative for children while reducing the amount of local anesthetics, the bleeding and the chances of infection, swelling and discomfort

Haytac & Ozcelik (2006) compared 20 frenectomy procedures done by laser and scalpel method and concluded that patients treated with diode laser reported no post operative pain & swelling.

Nubesh K *et al* (2014) [5] compared diode laser with CO2 laser in frenectomy and concluded in their study that diode laser is preferred over CO2 laser since its wavelength does not interact with the tooth structure which prevents

etching/injuring the tooth enamel unlike in Co2 lasers.

Ehsan A, Nassimeh S (2008) concluded in their study that diode laser should be considered as first choice in oral soft tissue surgeries because of easy application, better coagulation, less pain and swelling.

The present case reports described the advantages of diode laser in soft tissue surgery, making it a perfect choice for frenectomy.

Conclusion

The application of Diode Laser has been recognized as a preferred approach in soft tissue surgeries with regard to other methods especially in pediatric patients due to less anesthesia requirement, less bleeding, pain and swelling, elimination of sutures which in turn results in decreased level of anxiety and fear in children.

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