

Case Report

Diode 980 nm Laser Ablation of Ankyloglossia: A Case Report

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Abstract: Background: Ankyloglossia “tie tongue” is a congenital anomaly, characterized by abnormal short thick lingual frenum that causes limitation of tongue movement, which results in problems in speech, mastication and patient discomfort. Laser is an alternative for conventional surgery to treat ankyloglossia. **Case Report:** A 50 years old female patient presented with ankyloglossia to laser clinic in faculty of Dentistry in Misr University for Science and Technology. Lingual frenectomy was done with Diode Laser with 980 nm wavelength, fiber tip diameter 300 µm, power 1.5 Watt, continuous wave mode and contact mode. The time of procedure was only 15 minutes, with bloodless field during work. Patient dismissed without sutures or wound dressing. **Results:** There was no post-operative pain, discomfort or swelling. Complete healing occurred after 2 weeks. The patient was very satisfied with the quick painless procedure. **Conclusion:** Diode Laser 980nm treatment of Ankyloglossia is a simple, quick, painless and safe, and effective procedure. We recommend this treatment modality because of its advantages for both the patient and the operator.

Keywords: Ablation, Ankyloglossia, Diode 980 nm, Laser.

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I. INTRODUCTION

The tongue is an important oral structure for breast-feeding, speech, swallowing, breathing, position of teeth, growth of oro-facial structures, and oral hygiene through, cleansing of teeth and periodontal tissue [1, 2].

Ankyloglossia, or tongue-tie, is a congenital anomaly due to abnormal development of the mucosa covering the anterior two-thirds of the tongue, with reported prevalence in the literatures ranging from 5% to 10.7%. Clinically, ankyloglossia is characterized by an abnormally short thick fibrous lingual frenulum that limits tongue's mobility [3, 4].

Limited tongue movement causes problems during infancy and childhood that persist through lifetime. Functional problems and social

embarrassment will eventually make the patient seek treatment. Ankyloglossia causes alterations in growth of oro-facial structures (bones and muscles) [5].

Regarding phonetics, the sounds which more often alter is the /s/, producing a distorted sound, as well as the /t/ sound. Other sounds less frequently altered are the /t/, /d/ and /l/. The lowered tongue position and restricted tongue movement prevent total closure against the palate to create the necessary vibration to emit the sound correctly [6].

Regarding the jaws & teeth, ankyloglossia reduces maxillary and mandibular inter-canine widths and reduces maxillary inter-molar width. Also, restricted tongue movement reduces cleansing of teeth and periodontium; thereby, affecting oral hygiene [7].

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Clinically Acceptable	Normal Range of Free Tongue: Greater Than 16 mm
Class I	Mild AG 12 mm – 16 mm
Class II	Moderate AG 8mm – 11 mm
Class III	Complete AG 3 mm – 7 mm
Class IV	Complete AG < 3 mm
Free-tongue is defined as the length from insertion of lingual frenum into the base of the tongue to the tip of the tongue	

Fig-1: Kotlow's classification of Ankyloglossia (AG)

Different techniques have been used to treat ankyloglossia, such as simple clipping with hemostat blades in newborns (frenotomy), electro-cauterization (bipolar diathermy), cryosurgery, and lasers [9, 10]. Laser surgery is recently used as a very good alternative for conventional surgery for treatment of ankyloglossia. Laser had shown a better effect on frenectomy as compared with surgery. Laser has less recurrence rate than conventional surgery due to the photo-thermal interactions between laser and soft tissues (denaturation and coagulation), which minimize the possibility of tongue tie recurrence [11].

II. CASE PRESENTATION

A 50 years old female patient presented with Ankyloglossia (lingual frenum) and missing mandibular posterior teeth to laser clinic in faculty of Dentistry in Misr University for Science and Technology. The patient was referred from prosthodontics department because the lingual frenum caused difficulty in construction of removable partial denture to restore missing mandibular posterior teeth. The patient was diabetic, uncontrolled; therefore, dental implants were contra-indicated in her case. The patient was diagnosed with Class III ankyloglossia, according to Kotlow's classification. She complained difficulty in tongue movement, causing social problems due to altered speech, and discomfort during mastication of food. The patient delayed treatment for many years due to her fear of conventional surgery as a treatment option for ankyloglossia.

All patient data was recorded in the patient file including: age, sex, patient chief complaint, laser parameters, clinical response, and follow up visits. Standardized digital colored photographs were taken for the patient: pre-operative, immediate post-operative, after 1 week, and 2 weeks, after 12 months with a standard 16-megapixel digital camera. Prior to the treatment, the laser procedure was explained to the patient, an informed written consent was signed by the patient. The procedure was carried out under local infiltration anesthesia (Mepivecaine Hcl 2% with Levonordefrine vasoconstrictor, 1:20,000 conc.) (Fig. 2).

The procedure was done by Diode 980 nm wave-length laser, using fiber-optic tip 300 µm

diameter, Laser parameters: power of 1.5 Watt, with continuous wave mode, and in contact mode lingual frenum. (Figure 3) After the laser optic fiber tip was initiated (Fig. 4), a plastic fork was used to elevate the tongue from the floor of the mouth (Fig. 5), instead of any metallic instrument to prevent reflection of laser beam. The laser tip is used to cut the lingual frenum, until the tongue is completely released and the patient is able to move her tongue in different directions. Then, the area was wiped with gauze soaked in saline. The time taken for procedure was only 15 minutes (Fig. 6).

Level of pain was evaluated using the visual analog scale (VAS) score: score 0: 0 mm: no pain, score 1: 1 to 30 mm: slight pain, score 2: 31 to 60 mm: moderate pain, and score 3: 61 to 100 mm: severe pain [12]. There was no pain during the procedure with local infiltration anaesthesia; there was no post-operative pain, or swelling. and the patient was dismissed without suture and without wound dressing. Complete healing occurred after 2 weeks.

Patient satisfaction was measured on a five-point scale based on patient's opinion: 0: very dissatisfied, 1: dissatisfied, 2: neither satisfied nor dissatisfied, 3: satisfied, and 4: very satisfied [13]. The patient was very satisfied with the simple, quick, painless and safe procedure. There was great improvement in tongue movement, speech and oral hygiene. In addition, the patient had constructed the removable partial denture.



Fig-2: Pre-operative view



Fig-3: Infiltration Anesthesia



Fig-6-A: Plastic fork used to elevate the tongue during laser ablation



Fig-4: Diode Laser 980 nm Parameters



Fig-6-B: Immediate Post-operative view

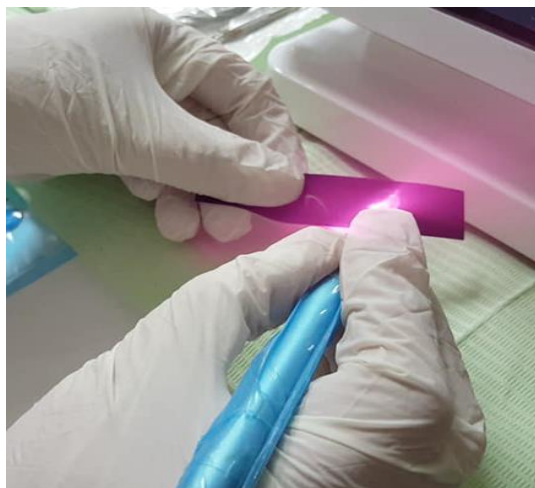


Fig-5: Laser Tip Initiation



Fig-6-C: Healing after 1 week



Fig-6-D: After 2 weeks: tongue can move freely and can reach the hard palate

III. DISCUSSION

This article reports the surgical management of a 28-year-old female patient having class III (sever) ankyloglossia. The patient complained restricted movement of tongue, difficulty in speech, discomfort, and social embarrassment. According to literature, class III and IV ankyloglossia result in significant restriction of tongue movement, which usually necessitate surgical release of the tongue treatment. Conventional surgical release of lingual frenum has the risk of injury to deep lingual blood vessels, associated with severe hemorrhage, in addition to risk of injury to submandibular duct opening during surgical release and undermining to allow suture closure [13, 14]. The patient delayed treatment of ankyloglossia for years, due to her fear of conventional surgery and her ignorance of availability of laser treatment option for tie tongue. Therefore, we recommend increasing public awareness in Egypt of laser as a treatment option for many oral diseases.

In this case report, we used Diode 980 nm Laser, with power 1.5 watt, continuous wave mode, and contact mode. The time taken for procedure was only 15 minutes. Initiation of laser fiber tip was done to reduce divergence and scattering of laser beam; thereby reducing heat generation, collateral tissue damage, and to allow immediate cutting of soft tissue; thereby reducing procedure time. Hemostasis by diode laser 980 nm resulted in working in a bloodless field during the procedure; this was a faster procedure compared to the conventional surgery. No sutures and no wound dressing were used.

Also, this resulted in no post-operative pain, discomfort or swelling and accelerated soft tissue healing. Good initial healing was noticed after 7 days; the patient reported improvement in tongue movement and speech. Complete healing occurred after 2 weeks.

Diode Laser 980 nm is a one-step simple procedure, which has many advantages compared to conventional surgery, such as, sufficient hemostasis,

which provides good vision and reduces the procedure time, elimination of sutures, reduction of post-operative pain and discomfort, less recurrence rate [15, 16].

CONCLUSION

We recommend Diode 980 nm Laser ablation of Ankyloglossia as a more efficient and comfortable treatment option for both the patient and the operator, because of its simplicity, time saving, safety, and effectiveness.

Ethical Considerations

Verbal consent was obtained from the patients for the publication of this case report.

Conflict of Interest

The authors declare that they have no conflict of interest.

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