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Case Series

Untying the Lingual Constraint: Treatment of Ankyloglossia with Diode Laser - A Case Series

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Abstract

The tongue's movement and functionality are greatly influenced by the lingual frenulum. The frenulum's restricted flexibility and range of motion can provide a number of difficulties in people with ankyloglossia. In recent years, research on the diagnosis, treatment, and effects of ankyloglossia on numerous parts of life has grown in importance. The lingual frenulum is often thoroughly examined, and the diagnosis is made after evaluating any functional restrictions. Ankyloglossia can be treated with frenotomy (also known as frenectomy), a quick surgical operation that loosens or trims the frenulum to increase tongue mobility. This case report demonstrates two cases of lingual frenectomy with diode laser.

Keywords: Lingual; Ankyloglossia; Diode Laser

Introduction

Ankyloglossia, commonly known as tongue-tie, is a congenital oral condition characterized by an abnormally short or tight frenulum, the band of tissue that connects the underside of the tongue to the floor of the mouth [1]. This condition can restrict the tongue's range of motion and lead to various difficulties in breastfeeding, atypical swallowing habits, periodontal problems, mechanical problems such as inability to clean the oral cavity, and psychosocial stress [2]. The restricted movement of the tongue can affect the ability to produce certain sounds and articulate words correctly. Speech impediments, such as difficulty pronounciation of certain consonants like t, d, n, and l, and difficult to roll a "r" or a lisp, may be present in individuals with ankyloglossia.

Case 1

A 25 year old female was referred to department of periodontology for ankyloglossia. During case history it was noticed that the patient had difficulty in speaking and had a lisp. Upon intraoral examination, the cause of speech impediment and lisp was determined to be short lingual frenum. According to Kotlows classification it was a type IV ankyloglossia. Slight recession was seen on lingual aspect of 31 and 41 which may be due to pull associated with short lingual frenum. The restricted movement of tongue further increased the tension on the frenum.

Surgical procedure

The need and process of the treatment was explained to the patient and written consent was obtained. Appropriate laboratory investigations were advised to the patient. After satisfactory results of investigations, treatment was initiated. Area of treatment i.e., tip of tongue and lingual mucosa adjacent to the lingual frenum was anesthetized using 2% lignocaine 1:80,000. For purpose of retraction, a traction suture was placed at the tip of the tongue. A diode laser (Novolase gold; 810nm 2W) was used for frenectomy. The laser was applied in a contact mode from apex of frenum to the base in a brushing stroke for excision of frenum. The ablated tissue tissues were continuously mopped using wet gauze. This helps clear the field of operation and prevents excessive thermal damage to the underlying tissues. 4-0 mersilk sutures were placed for approximation of the wound. Special care was taken for suture at the base of the frenum to avoid minor salivary glands in the floor of mouth. The mobility and range of motion immediately increased.

Post surgical care

The wound healed with primary intention. The patient was prescribed with antibiotics, analgesics and warm saline rinses to facilitate faster healing. Patient was reviewed after 1 week for suture removal and the healing was seen to be uneventful. Following the treatment the patient reported increased tongue movement and upon clinical examination the tension on the lingual gingiva was reduced. An improvement in the speech was also observed.

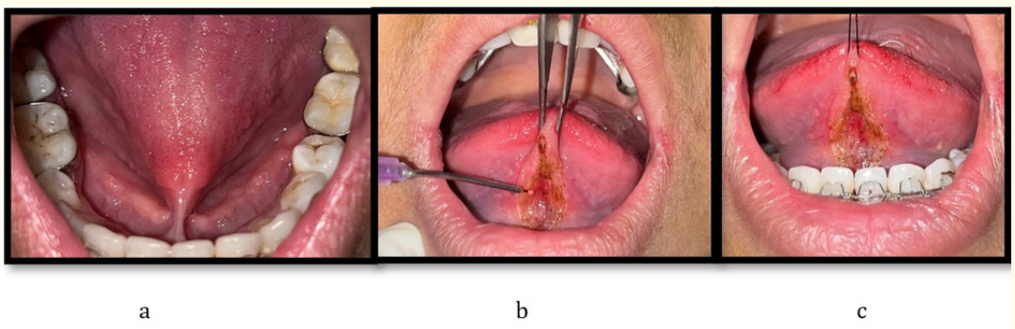

Figure 1: a: Ankyloglossia, Type IV, b: Excision of lingual frenum with laser, c: Immediate post-op.

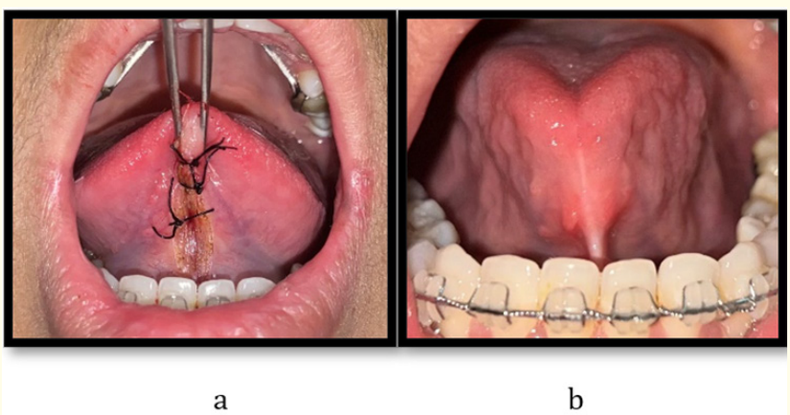

Figure 2: a: Sutures placed, b: post-op after 2 months showing complete healing.

Case 2

A 19 year old male was referred to department of periodontology for ankyloglossia. The patient came with a chief complaint of restricted tongue movement. The patient also mentioned difficulty in maintaining oral hygiene due to tongue tie. It was noticed that patient had different pronounciation for certain words. Upon intraoral examination it was observed that he had type IV ankyloglossia according to kotlows classification. The surgical and post-surgical protocol was same as carried out for Case 1.

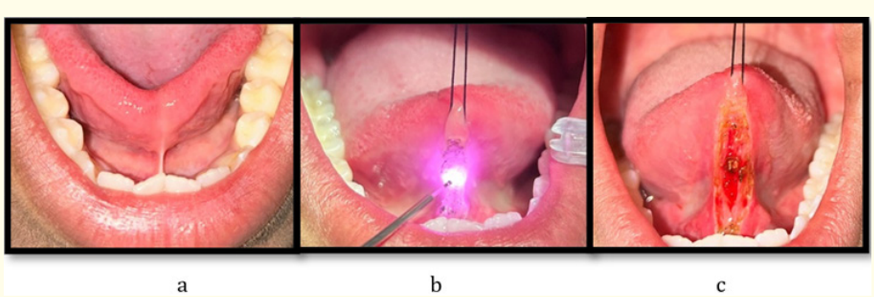

Figure 3

Discussion

Tongue is a special muscle and important oral structure that has as significant impact on speech, swallowing (indirectly affecting nutrition), alignment of teeth, periodontal tissue, oral hygiene status. Ankyloglossia restricts the movement of tongue affecting its range of motion to fulfil its functions. Treatment of ankyloglossia is an interdisciplinary problem demanding involvement of specialists in periodontics, pediatric dentistry and oral surgery.

Although the precise causes of ankyloglossia are yet unknown, it is believed to be the result of a combination of genetic role of hu-

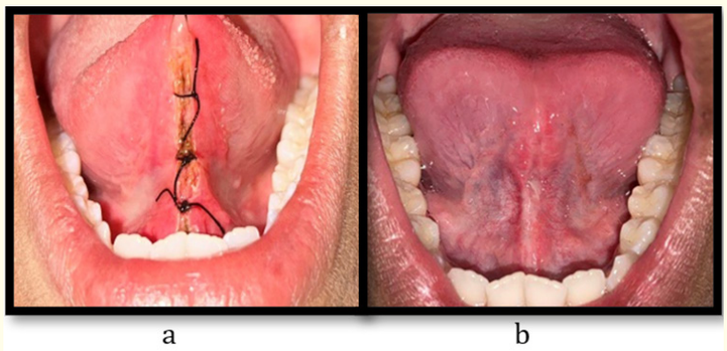

Figure 4: a: Sutures placed, b: Post-op after 2 months showing complete healing.

man G-protein coupled receptor gene (Lgr5) [3] and environmental factors. The condition is present at birth and can vary in severity, with some individuals experiencing mild limitations and others facing more significant challenges. Ankyloglossia prevalence rates vary from 2.08% to 10.7% [4] with a slight male prediction.

There are many methods to assess and classify tongue-tie based on appearance and function. The Kotlow classification system [5], proposed by Dr. Lawrence Kotlow, categorizes tongue tie based on the movement of the tongue (in mm) (Table 1).

Class	Type	Movement of tongue (mm)
Clinical acceptable		>16 mm
Class I	Mild	12-16 mm
Class II	Moderate	8-11 mm
Class III	Severe	3-7 mm
Class IV	Complete	<3 mm

Table 1: The Kotlow classification system.

Another classification was proposed by Coryllos in 2004 [6] based on appearance (Table 2).

Type 1	Insertion of the frenulum to the tip of the tongue.
Type 2	Insertion of the frenulum slightly (2 to 4 mm) behind the tip of the tongue
Type 3	Thickened frenulum attached to the mid-tongue and the middle of the floor of the mouth, usually tighter and less elastic.
Type 4	Thick, shiny, and very inelastic submucosal frenulum that restricts movement at the base of the tongue

Table 2: Coryllos Classification.

There are many surgical techniques available to manage lingual frenectomy, scalpel frenectomy, electrocautery, and laser frenectomy. In lasers, most commonly used are Er: YAG, CO_2 laser, and diode laser. Conventional surgical lingual frenectomy have certain disadvantages i.e., profuse bleeding especially because ventral side of tongue is highly vascularized, blockage of wharton's duct while suturing leading to retention cyst and injury to the lingual nerve resulting in numbness of tongue tip [7].

Laser has many advantages over conventional surgical techniques. The laser-assisted lingual frenectomy is an easy procedure which can be performed with precision, causes less discomfort, heals faster with less postoperative bleeding and oedema, and causes minimum to no bleeding due to the capillaries being sealed by protein denaturation and the activation of clotting factor VII synthesis [8]. Complications after laser frenectomy are very rare. In addition to antibacterial action of laser which help reduce the risk of infection, it prevents swelling and inflammation that follows surgery.

Conclusion

Ankyloglossia should be diagnosed and treated as early as possible to avoid the problems associated with it. Use of lasers for lingual frenectomy proves to be simple, safe, minimally invasive with reduced bleeding and scarring and minimum post operative complications and morbidity.

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