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Management of ankyloglossia (tongue-tie)—Review and report of two cases

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ABSTRACT

Ankyloglossia or tongue-tie is a congenital anomaly characterized by an abnormally short lingual frenum, which restricts mobility of the tongue. Though ankyloglossia is not a serious condition, it may lead to various problems including infant feeding difficulties, speech disorders, and various mechanical and social issues related to the inability of the tongue to protrude. Hence, management of ankyloglossia should be done irrespective of age, considering the risk benifit evaluation. For many years, the subject of ankyloglossia has been controversial, with practitioners of many specialties having widely different views regarding its significance and management. This case series is about two cases of ankyloglossia subjected to surgical correction by frenectomy procedure. One case was treated with electrocautery and one case with diode laser. Postoperative follow-ups were done for 1 week and 1 month, and healing was compared with the available literature. Manipulation of tissues was better in laser and electrocautery techniques when compared with conventional techniques. This case series indicates that laser and electrocautery treatment used for frenectomy operations provides better patient perception in terms of postoperative pain and function. Considering the above advantages, when used correctly, the laser and electrocautery treatment offers a safe, effective, acceptable, and impressive alternative for lingual frenectomy.

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1. Introduction

Ankyloglossia is a Greek term that means skalios (curved) and glossa (tongue). It is a congenital condition, which occurs as a result of fusion between the tongue and the floor of the mouth. At the time of birth, the tongue is short with the frenum extending till the tip. Gradually, the tongue grows longer and thinner, and the frenum attachment often recedes to a lower position. The term ankyloglossia was first used by Wallace in 1960s to define 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.''[1] Partial ankyloglossia refers to congenital shortness of the lingual frenum or frenal attachment extending to the tip of the tongue, binding the tongue to the base of the tongue and preventing its extension.[2] In ankyloglossia, there is restriction of the tongue movement and eversion of lateral borders. Problems associated with ankyloglossia are difficulties in breast-feeding among neonates, malocclusion, gingival

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recession, improper oral hygiene, and speech difficulties in pronunciation of consonants like t, d, n, l, and r.

Various techniques have been suggested to manage patients with ankyloglossia. These techniques include conventional frenectomy, Z-plasty, electrocautery, and use of lasers. The present case series describes two different methods of lingual frenectomy, one is with diode laser and one with electrocautery.

2. Case series

2.1. *Case 1: Lingual frenectomy with diode laser*

A 33-year-old systemically healthy male patient reported with the complaint of difficulty in speech since childhood. Intraoral examination revealed class II ankyloglossia (Kotlow's classification) (Fig. 1). Lingual frenectomy was planned using soft tissue diode laser, and informed written consent was taken from the patient.

After application of topical anesthesia, the area was anesthetized by giving bilateral local infiltration in the lingual mucosa adjacent to the lingual frenum and into the tip of the tongue. A traction suture was placed at the tip of the tongue, with which the tongue was firmly retracted. Diode laser (810 nm) was used for the frenectomy procedure. After stripping the fiber-optic wire tip, the tip was initiated by firing it into a piece of cork at 2.5 W in continuous mode. An initiated tip of 200 μm was used. The diode laser was applied in a contact mode with focused beam for excision of the tissue. The tip of laser was moved from the apex of the frenum to the base in a brushing stroke cutting the frenum. The ablated tissue was continuously mopped using wet gauze piece. This takes care of the charred tissue and prevents excessive thermal damage to underlying soft tissue; the attachment of frenum to the alveolar ridge was also excised to prevent tension on the gingiva (Fig. 2). Protrusive tongue movement was checked to assess complete elimination of frenum. No suturing was done, and the patient was prescribed antibiotic, analgesics, and warm saline rinse. There was uneventful healing in progress with ''white soft scab'' formation after 1 week of follow-up. There was complete healing along with increased tongue movement after 3 and 6 weeks follow-up (Fig. 3). Speech difficulties were improved following the speech therapy.



Fig. 2 – Lingual frenectomy with diode laser. Detachment of frenum from the alveolar ridge.

2.2. *Case 2: Lingual frenectomy with electrocautery*

A 28-year-old systemically healthy female patient reported to the department with the complaint of difficulty in speech since childhood and restricted tongue movement. Intraoral examination revealed class II ankyloglossia (Kotlow's classification) (Fig. 4). Crowding in the lower anterior teeth was also observed. The patient had already been advised for orthodontic treatment. Before orthodontic therapy, lingual frenectomy was planned. After the informed consent was obtained, lingual frenectomy was planned using electrocautery.

Frenum was held with hemostat at the depth of vestibule, and two incisions were placed along both the sides of hemostat using needle electrode. Muscle fibers were then separated using loop electrode. Coagulation was achieved by using ball electrode. Immediate postoperative view showed arrested bleeding and no requisite for sutures (Fig. 5). Antibiotics, analgesics, and warm saline rinse were prescribed. One week postoperative view showed presence of slough in the operated site indicating healing process. One and half month

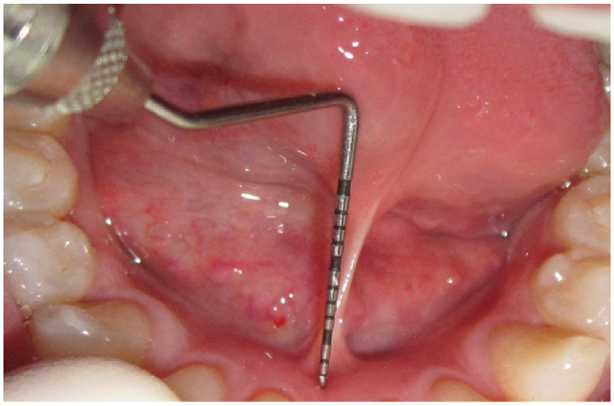


Fig. 1 – Lingual frenectomy with diode laser. Preoperative view. Kotlow's class II ankyloglossia (11 mm).

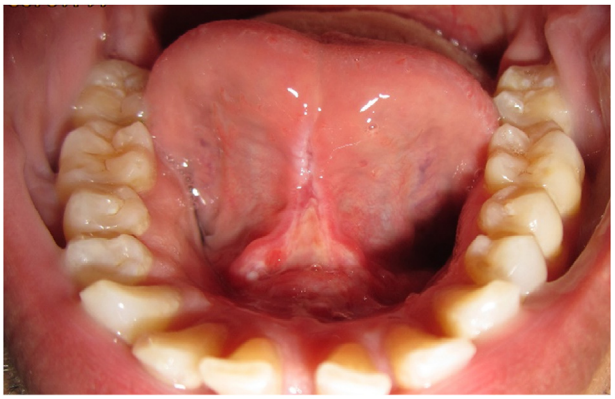


Fig. 3 – 6 weeks follow-up.



Fig. 4 – Lingual frenectomy with electrocautery. Preoperative view. Kotlow's class II ankyloglossia.



Fig. 6 – Lingual frenectomy with electrocautery. 6 weeks follow-up.

postoperative image shows complete healing without scar formation (Fig. 6).

3. Discussion

Proper management of ankyloglossia includes timely and appropriate surgical intervention, followed by speech therapy, which delivers pleasing results. Ankyloglossia represents an interdisciplinary problem including different specialties in dentistry, ranging from periodontists, pediatric dentists, and orthodontists to oral surgeons. It can be observed in neonates, children, or adults. Its prevalence varies from 0.1% to 10.7%,[3,4] with slight male predilection. The exact pathogenesis is unknown, but genetic role with the possible involvement of human G protein-coupled receptor gene (Lgr5) has been suggested.[5]

Based on the difference of the insertion of the lingual frenum to the tip of the tongue, Kotlow's classification of ankyloglossia is as follows[6]:

Class I: Mild ankyloglossia (12–16 mm)



Fig. 5 – Lingual frenectomy with electrocautery. Immediate postoperative view.

Class II: Moderate ankyloglossia (8–11 mm)
Class III: Severe ankyloglossia (3–7 mm)

Class IV: Complete ankyloglossia (<3 mm)

A normal range of motion of the tongue is indicated by the following criteria:

1. The tip of the tongue should be able to protrude outside the mouth, without clefting;
2. The tip of the tongue should be able to sweep the upper and lower lips easily, without straining;
3. When the tongue is retruded, it should not blanch the tissues lingual to the anterior teeth; and
4. The lingual frenum should not create a diastema between the mandibular central incisors.

The correction of ankyloglossia at an early age reduces the risk of latent complications. Therefore, surgery should be considered at any age depending on the patient's history of speech difficulties, feeding, or mechanical/social difficulties. Surgical techniques for the therapy of tongue-ties can be classified into three procedures. Frenotomy is a simple cutting of the frenulum. Frenectomy is defined as complete excision, i.e., removal of the whole frenulum. Frenuloplasty involves various methods to release the tongue-tie and correct the anatomic situation.

In this case report, frenectomy procedure was performed using both diode laser and electrocautery. Tissue manipulation was better with both the procedures. Bleeding was less pronounced compared to conventional frenectomy with scalpel method. Less bleeding during the procedure will be helpful in better visibility to the surgical site. Compared to conventional scalpel frenectomy procedures, healing is delayed in both frenectomy with diode laser and electrocautery. On comparing healing between diode laser and electrocautery, there was no significant difference.

Many studies have tried to compare the healing after scalpel and electrosurgical excision of soft tissues. The importance of lateral heat generated during electrosurgical procedures and its adverse effects on wound healing has been

documented in detail by Krejci et al. (1987) and Morosolli et al. (2010).[7,8] In their study, they evaluated and compared the healing process after surgical treatment of chemically induced lesions in the lateral edge of tongue of hamsters performed with scalpel, electrocautery, and carbon dioxide (CO_2) laser radiation. Following are the observations of histological sections made by Morosolli et al. (2010) in hamsters during the healing period.

3.1. *Electrocautery side*

14th day: Loose connective tissue replaced the damaged muscle tissue. This tissue was still unorganized and had been penetrated by some remainders of atrophic muscle fibers in the degeneration processes.

28th day: Histological sections revealed atrophic muscle bundles and some skeletal muscle fibers disposed in isolated groups and among the connective tissue rich in collagen.

3.2. *Laser side*

14th day: Extensive ulcerated area with reepithelialization in ulcerated area. An extensive area of loose connective tissue is seen well cellularized and well organized with degeneration of remaining muscle bundles.

28th day: Predominance of well-cellularized connective tissue, interspersed with isolated skeletal muscle fibers and some bundles. Some fibers presented with structural alterations such as central nuclei and hypertrophy.

Skeletal muscle fibers were better organized, and dynamics of healing process were more rapid in scalpel group. Thus, though the approaches to the problem of not using the traditional scalpel have merits, further improvements can still be made considering the healing aspect.

Healing was complete by first postoperative month in both the techniques. Speech therapy must include exercise for tongue such as oral kinesthesia (ability to feel the part and how they are moving) and DDK (diadochokinesis—ability to perform rapid, alternating movements), without which no significant improvement in speech will be achieved.

Complications after frenotomy, frenectomy, and frenuloplasty are rare. Various complications include bleeding, blockage of Wharton's duct while suturing on the ventral surface of tongue leading to retention cyst, and damage to the lingual nerve causing numbness of the tongue tip.

4. Conclusion

This case series indicates that laser and electrocautery treatment used for frenectomy operations provides better patient perception in terms of postoperative pain and function than that obtained by conventional methods. Considering the above advantages, when used correctly, the laser and electrocautery treatment offers a safe, effective, acceptable, and impressive alternative for frenectomy operations.

Conflicts of interest

The authors have none to declare.

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