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FRENECTOMY: MANAGEMENT BY ELECTROSURGERY - A REPORT OF TWO CASES

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ABSTRACT

The frenum is defined as a mucous membrane fold that attaches the lip and the cheek to the alveolar mucosa, the gingiva, and the underlying periosteum. The frenum may hamper the gingival health if it is attached too closely to the gingival margin. The management of such an aberrant frenum is by performing a frenectomy/ frenotomy. While performing a frenectomy, conventional scalpel techniques have their traditional drawbacks. To overcome them newer techniques like electrosurgery and lasers are increasingly used in a routine periodontal practice. The present article is a report of two cases of frenectomy; the first case is the management of an aberrant maxillary labial frenum causing midline diastema and the second case is the management of an aberrant lingual frenum leading to complete ankyloglossia; both using electrosurgery. Electrosurgery has been defined as the intentional passage of high-frequency waveforms or currents through the tissues of the body to achieve a controllable surgical effect. Electrosurgery is a continuously evolving field with active research into various new applications.

CASE REPORT

INTRODUCTION:

A frenum is a mucous membrane fold containing muscle and connective tissue fibers, which attach the cheek and the lip to the alveolar mucosa, the gingiva, and the underlying periosteum.[1] The presence of an aberrant frenum is one of the aetiological factors responsible for diastema between the maxillary central incisors in adults, which is considered an aesthetic problem.[2] The frena may cause a gingival recession, jeopardizing the gingival health when they are attached too close to the gingival margin, either because of interference with the proper placement of a toothbrush or through the opening of the gingival crevice because of a muscle pull.[3]

Several frena are usually present in a normal oral cavity, most notably the maxillary labial frenum, the mandibular labial frenum, and the lingual frenum.[4] Labial frenal attachments are thin folds of mucous membrane with enclosed muscle fibers originating from orbicularis oris muscle of the upper lip that attach the lips to the alveolar

mucosa and underlying periosteum.[5] The primary function of frena is to provide stability to the upper and lower lips and the tongue.[6]

The lingual frenum is a mucosal fold that connects the bottom of the body of the tongue to the floor of the mouth and the mandibular bone. When the frenum is thick and very tight and/or its place of insertion limits the mobility of the tongue, it can result in ankyloglossia.[7] Etymologically, "ankyloglossia" originates from the Greek words "agkilos" (curved) and "glossa" (tongue).[8] Ankyloglossia is an embryological anatomical malformation that usually affects males more than females in a ratio of 3:1. It occurs in newborns with an incidence of about 5%, more frequently as an isolated event, and sometimes associated with malformation syndromes (Beckwith Wiedemann Syndrome, Orofacial-digital Syndrome, Simpson Golabi Behmel Syndrome, Opitz Syndrome).[9]

Based on the extension of attachment fibers, frena are classified as: [10]

- Mucosal –when the frenal fibers are attached up to the mucogingival junction
- Gingival –when fibers are inserted within attached gingiva
- Papillary –when fibers are extending into the interdental papilla
- Papilla penetrating –when the frenal fibers cross the alveolar process and extend up to palatine papilla.

Classification of ankyloglossia based on "Free Tongue" length:[11]

- Clinically acceptable, normal range of free tongue: greater than16 mm
- Class I-Mild ankyloglossia: 12 to 16 mm
- Class II -Moderate ankyloglossia: 8 to 11 mm
- Class III -Severe ankyloglossia: 3 to 7 mm
- Class IV -Complete ankyloglossia: less than 3mm

Indications of frenectomy:[12]

The frenum is characterized as pathogenic and is indicated for removal when

- An aberrant frenal attachment is present, which causes a midline diastema.
- A flattened papilla with the frenum closely attached to the gingival margin is present, which causes a gingival recession and a hindrance in maintaining oral hygiene.
- An aberrant frenum with inadequate attached gingiva and a shallow vestibule.
- An aberrant lingual frenum restricting adequate movements of the tongue (ankyloglossia).

Frenectomy can be accomplished either by the routine scalpel technique, electrosurgery, or by using lasers. Electrosurgery has been defined as the intentional passage of high-frequency waveforms, or currents through the tissues of the body to achieve a controllable surgical effect. By varying the mode of application of this type of current, the clinician can use electrosurgery for cutting or coagulating soft tissues.[13]

SURGICAL PROCEDURE:

Case 1

A 32-year-old female patient undergoing fixed orthodontic treatment was referred to the Department of Periodontics. Her initial chief complaint was spacing between the upper front teeth, which was not aesthetically pleasing to her. Her medical history was non-contributory. The patient did not report any deleterious habits. On intraoral examination before orthodontic treatment, the frenal attachment was found to be papillary between the 11 & 21 regions, giving positive tension test. It also hampered the oral hygiene maintenance in that area. Hence, towards the completion of fixed orthodontic treatment, frenectomy procedure was planned. The patient was informed about the treatment and after obtaining her consent, phase I periodontal therapy was performed followed by maxillary labial frenectomy using an electrosurgical unit. After administering adequate local anesthesia with a solution of 2% lignocaine with 1:80,000

adrenaline; a hemostat was inserted into the depth of the vestibule to grasp the frenum. The Carlo de Giorgi S.r.l. (Milan, Italy; 2014) electrosurgery unit was used. The setting on the cutting electrode was set to a power supply of 230V, frequency of 50/60Hz, 1.25A, and power output of 50±20%VA. The output power was kept at 50W. Two incisions using the loop electrode were made as in the classical frenectomy technique, above & below the hemostat. Continuous saline irrigation was done during the procedure. The triangular tissue of the labial frenum was then removed and blunt dissection was done on the bone and laterally from the incision lines on both the sides to relieve the fibrous attachments, following which, the edges of the diamond-shaped wound were sutured using 3-0 black silk interrupted sutures.

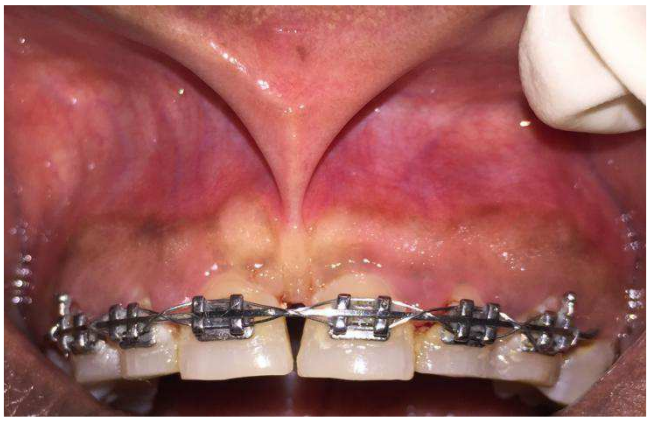

Figure I: Papillary type of maxillary labial frenum

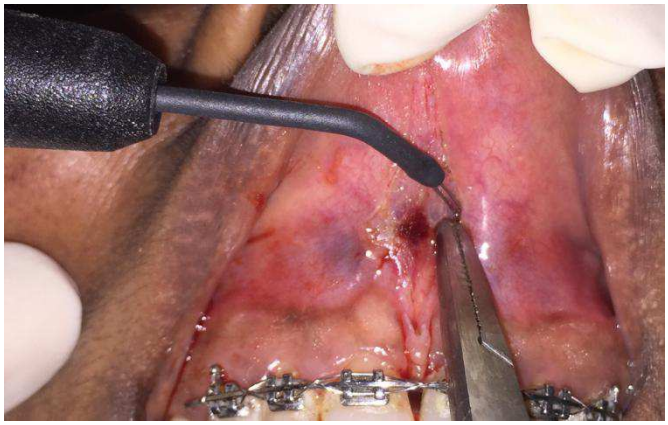

Figure II: Frenum excised with loop electrode

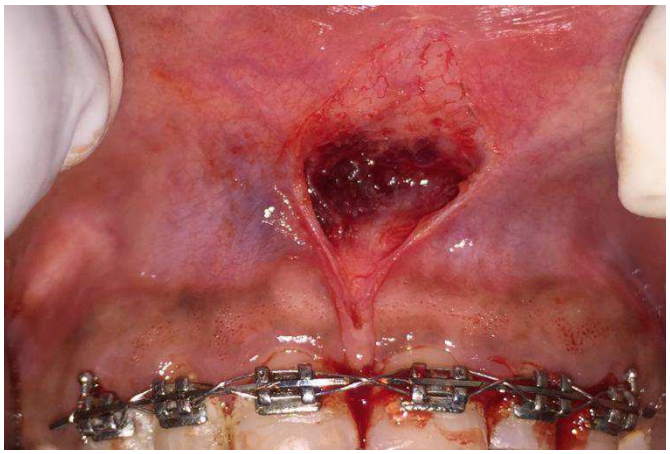

Figure III: Blunt dissection done to release firbrous attachments on both the sides of the incision

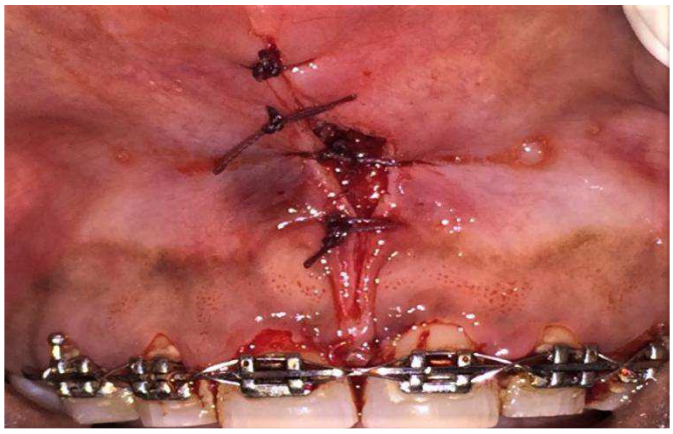

Figure IV: Incision margins approximated using 3-0 black silk interrupted sutures

Figure V: Two weeks post-operative view

CASE 2:

A 16-year-old female patient reported with a chief complaint of difficulty in pronouncing certain words. On intraoral examination, Kotlow's class IV ankyloglossia was noticed. The patient was asked to do lateral, protrusive, and upward movements of the tongue and it was noticed that patient was unable to touch the palate and cheeks with the tip of the tongue and also unable to protrude

the tongue. The patient did not report any documented medical history and had no history of deleterious habits. The patient was informed about the treatment and after obtaining her consent, phase I periodontal therapy was performed followed by lingual frenectomy using an electrosurgical unit.

After the administration of local anesthesia with a 2% solution of lignocaine (adrenaline - 1:80,000); the tongue was retracted with two mouth mirrors. Using the loop electrode of the electrosurgery unit and at similar settings like the first case, the frenum was incised from the tip of the lingual frenum to the base of the tongue. Other areas were checked in the context of any tension over the surrounding gingival tissue/muscles and were relieved using castroviejo scissors. Immediately after the procedure patient was asked to do some tongue movements like protrusion of tongue and uplifting towards palate to assess whether the complete frenal attachment was excised or not. Interrupted suture using 4-0 black silk was placed to approximate the wound edges.

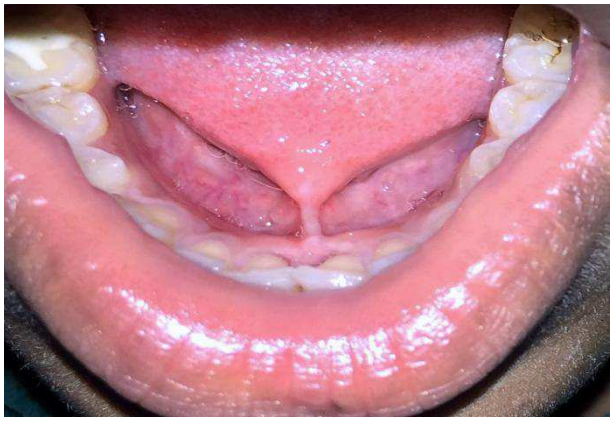

Figure VI: Kotlow's class IV ankyloglossia

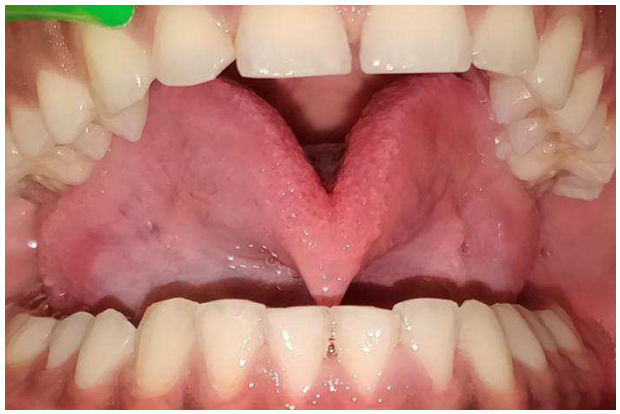

Figure VII: Restricted upward movement of the tongue

Figure VIII: Restricted protrusive movement of the tongue

Figure IX: Lingual frenum incised with loop electrode

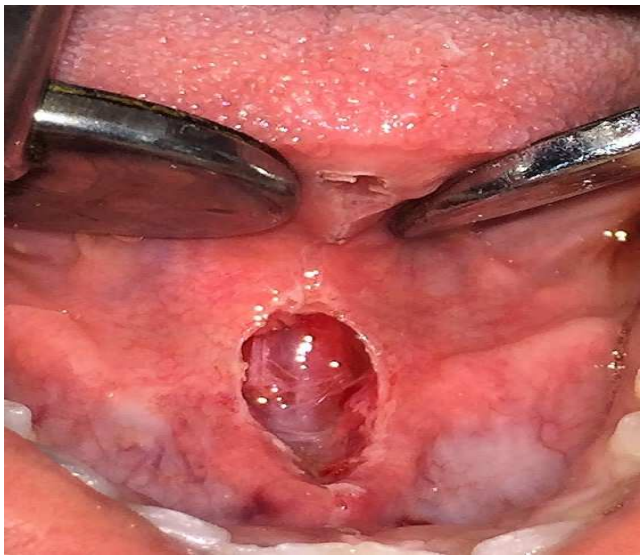

Figure X: Fibrous attachments released on both sides of the incision

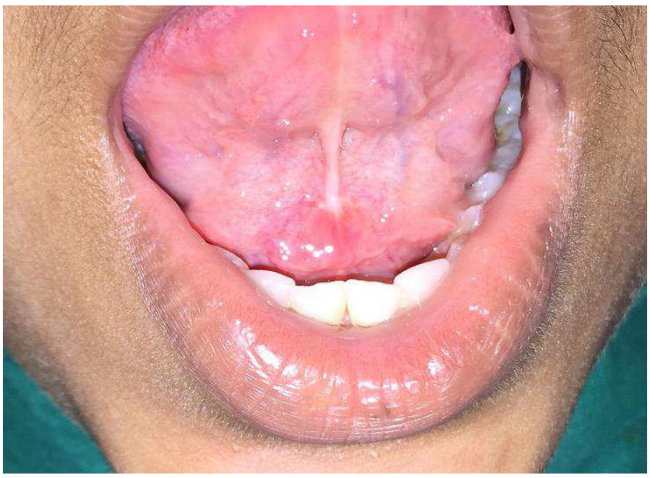

Figure XI: Two weeks post-operative view

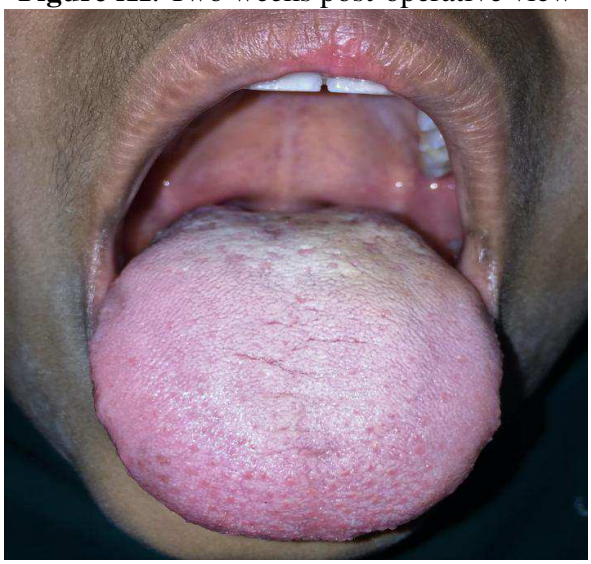

Figure XII: Improved protrusive movement of the tongue one month after frenectomy

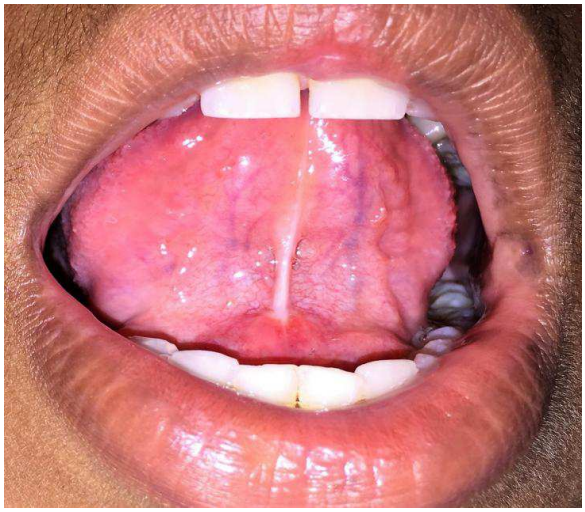

Figure XIII: Improved upwards movement of the tongue one month after frenectomy

Both the patients were prescribed analgesics (Tab. Ibuprofen 400mg) and chlorhexidine mouthwash (0.2%). They were also recommended to follow all post-operative instructions. Patients were recalled after one week, sutures were removed and the surgical area was flushed with an antimicrobial solution. The healing was uneventful in both the patients and both patients reported mild pain on the first two days post-operatively. The patients were then recalled after one month. The first patient was referred back to the department of orthodontics for completion of orthodontic treatment and the second patient was referred to a speech therapist.

DISCUSSION:

The aberrant frena can be treated by frenectomy or frenotomy procedures. Frenectomy is the complete removal of the frenum including its attachment to the underlying bone, while frenotomy is the incision and the relocation of the frenal attachment.[14] Frenectomy can be accomplished either by the routine scalpel technique, electrosurgery, or by using lasers.[15] The conventional technique involves the excision of the frenum by using a scalpel. However, it carries the routine risks of surgery like bleeding and patient compliance.[16]

An abnormally short lingual frenum leads to a lot of problems like infant feeding, difficulties in speech, oral hygiene maintenance, development of gingival recession on the tension side (mostly on the lingual side of the lower front teeth), also interferes with the stability of mandibular prosthesis and various mechanical and social issues related to the inability of the tongue to protrude and improper pronunciation of certain words. Many published cases of tongue-tie and impaired speech are based on the observation that established speech difficulties can be associated with tongue-tie as it restricts the mobility of the tongue tip rather than definite evidence which causes speech impairment.[17] Certainly, tongue-tie does not seem to be the cause of speech prevention or delay; however, many clinicians believe that it can cause articulation difficulties of the sounds of alphabets like “t”, “d”, “l”, “n”, and “s”.[18]

The optimal management of ankyloglossia at an early age by appropriate surgical intervention delivers pleasing and acceptable results. This correction may reduce the risk of latent complications; therefore, surgery should be planned at any age as per the patient’s history of speech or mechanical/social difficulties.[16]

Though lasers have marked the beginning of their use in soft tissue management, electrosurgery units are far less expensive than the least expensive diode lasers, and hence it can be questioned whether the advantages of the diode laser are significant enough to compensate for the additional cost.[19] Also when mucosal incisions made by scalpel, CO_2 Laser, and electrosurgery were compared, on subjective evaluation of ease of use, constant-voltage electrosurgery scored highest followed by the CO_2 laser.[20]

Advantages of electrosurgery:[13]

- A clear view of the surgical site is provided.
- Tissue separation is clean with little or no bleeding.
- The technique is pressureless and precise.
- Planning of soft tissue is possible.
- Healing discomfort and scar formation are minimal.
- Access to difficult-to-reach areas is increased.
- Chair time and operator fatigue are reduced.

Disadvantages of electrosurgery:[13]

- Cannot be used on patients with poorly shielded pacemakers.
- Electrosurgery units cannot be used near inflammable gases.
- The odor of burning tissue is present if high volume suction is not used.

- The initial cost of the equipment is far more than conventional surgical equipment.

Electrosurgery can be used to perform other periodontal surgical procedures like gingivectomy, gingivoplasty, incision, and drainage of the periodontal abscess, biopsies, operculectomy, soft tissue-ridge recontouring, etc. However, extra caution must be carried out to avoid contact with the bone since irreparable damage will occur. The major advantage of electrosurgery today is the coagulation to reduce bleeding and resulting in a clean field with better visibility during the surgery.[13]

CONCLUSION:

While an aberrant frenum can be removed by any of the techniques that have been established in the literature, a functional and an aesthetic outcome can be achieved by a proper technique selection, based on the type of the frenal attachment. Though the approaches using electrosurgery and lasers have merits over the traditional scalpel technique, further improvements can still be attempted.

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