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Surgical treatment of lingual frenectomy

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Abstract
Ankyloglossia or Tongue-tie typically presents with difficulty in breast-feeding because of reduced mobility of the tongue and is implicated in difficulty with speech later in life. A lingual frenectomy also known as a tongue-tie release is the removal of a band of tissue connecting the underside of the tongue with the floor of the mouth and is performed to correct ankyloglossia. The removal of the lingual frenulum under the tongue can be accomplished with either frenectomy or frenuloplasty. Laser technology has been considered as an alternative to the conventional techniques, presenting several advantages such as shorter operative working time, tissue cauterization and sterilization, hemostasis, less local anesthesia requirement and fewer postoperative complications Additionally, the need for suture is eliminated and a uniform depth in the surgical site is maintained, reducing unnecessary damage to tongue muscle. Other techniques are available to surgeons for treatment, from simple frenotomy to multiple-flap Z-plasty. Division of the lingual frenulum is typically a simple procedure that can be performed either in the office or in the operating room, depending on patient (or parent) comfort and surgeon preference.

Keywords: tongue tie, speech difficulities, frenectomy, frenotomy, frenuloplasty, lasers

Introduction
Ankyloglossia, also known as tongue-tie, is a congenital anomaly characterized by an abnormal frenal attachment usually consists of mucosa and dense fibrous connective tissue. This high frenal attachment binds the tip of the tongue to the medial surface of the mandibular alveolar ridge [1, 2]. The first use of the term ankyloglossia in the medical literature dates back to the 1960s, when Wallace [3] defined 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."Its prevalence is around 4.4% to 4.8% in newborns, with a male to female ratio of 3:1.0 [4, 5, 2]. In children, ankyloglossia can lead to breastfeeding difficulties, speech disorders, poor oral hygiene and bullying during childhood and adolescence[6]. Nowadays, several surgical techniques have been described to correct an abnormal frenulum [5, 7, 8, 9]. The following techniques are of particular interest in Pediatric Dentistry: frenotomy and frenectomy with the use of one hemostat, two hemostats, a groove director or laser [10, 11]. Therefore, the purpose of the present article was to describe a clinical case of ankyloglossia, which were approached by scalpel method technique.

Case Report
A 14 year old male patient reported in my clinic with difficulty in normal speech. On intraoral examination, it was found that the individual had ankyloglossia (tongue-tie) and was unable to protrude the tongue up to the lower lip. The patient was explained about the procedure and informed consent was obtained. The bilateral lingual nerve blocks and local infiltration in the anterior area were performed with 2% lignocaine hydrochloride and 1:80,000 adrenaline. First a curved hemostat was inserted to the bottom of the lingual frenum at the depth of the vestibule and clamped into position followed by giving two incisions at the superior and the inferior aspect of the hemostat. This way the intervening frenum was removed. Then with the help of the same hemostat the muscle fibers was released so as to achieve a good tension free closure of the wound edges after which the wound edges were approximated with (4-0) silk sutures for the tissues to heal by primary intention thereby minimizing the scar tissue formation. Postoperative instructions were given, antibiotics and analgesics were prescribed (Cap. Amoxicillin (500 mg) thrice a day for 3 days and non-steroidal anti-inflammatory drug Tab. Ketorolac DT (10 mg) thrice a day for 3 days was prescribed to prevent post-operative infection and pain). The post-operative period was uneventful with no delayed hemorrhage and Sutures were removed after 1 week. After a follow-up of 6 months, the tongue showed good healing, protrusion several mm beyond the lower lip and normal speech.

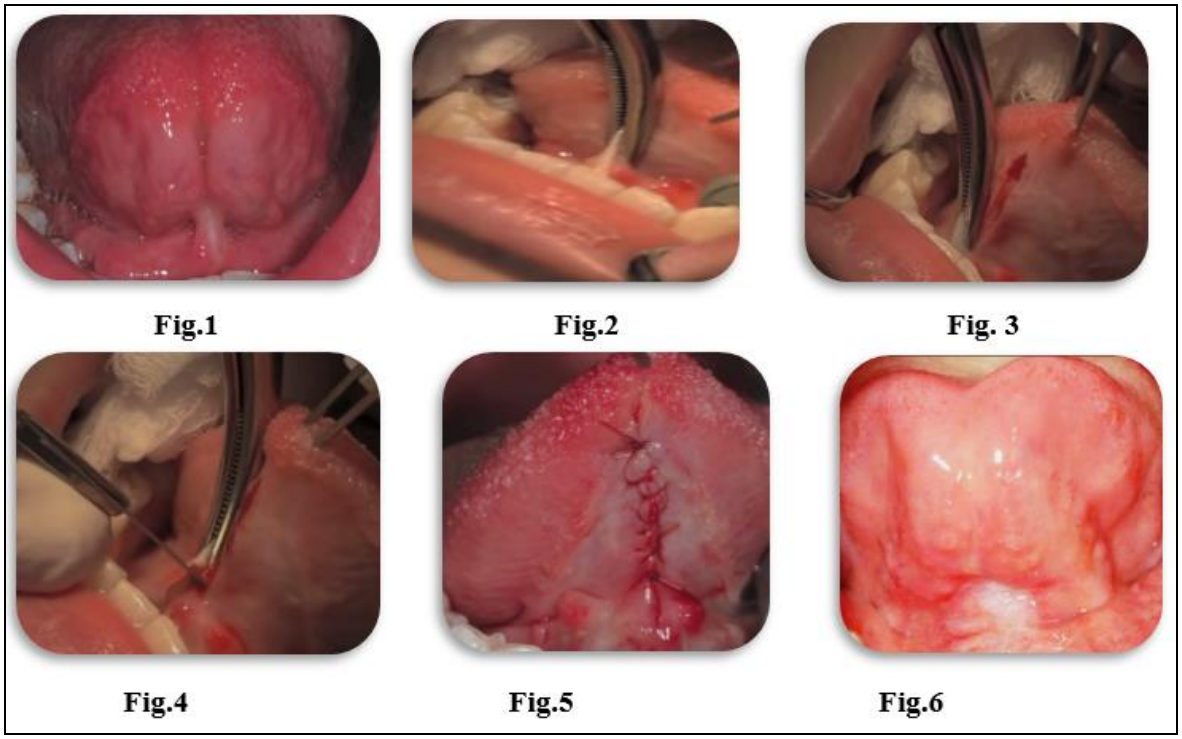

Fig 1: Pre-operative fig.1 Frenulum being held with a small curved hemostat, Fig. 2 Frenulum being held with a small curved hemostat, Fig. 3 First incision following the curvature of the hemostat cutting through the upper aspect of the frenulum. Fig 4 Second incision at the lower aspect of the frenulum. Fig. 5 sutures placed over the wound. Post-operative fig.6 surgical after 4 months.

Discussion

Ankyloglossia is an uncommon congenital oral anomaly that can cause difficulty with breast-feeding and speech articulation. The exact cause of ankyloglossia is unknown, although it is likely to be due to abnormal development of the mucosa covering the anterior two-thirds of mobile tongue. In most of the cases, ankyloglossia is seen as an isolated finding in children. However, several syndromes are associated with this physical finding, including Ehlers-Danlos syndrome, Beckwith-Wiedemann syndrome, Simosa syndrome, X-linked cleft palate and orofaciodigital syndrome [12, 13, 14, 15]. Additionally, maternal cocaine use is reported to increase the risk of ankyloglossia to more than threefold [12, 14]. In nursing mothers, it may cause breastfeeding difficulties, poor milk transfer and nipple damage, resulting in early weaning and low weight gain in babies [15, 16]. Speech articulation problems are the most common indications for lingual frenulum surgery in preschool children [17]. The prevalence of ankyloglossia reported in the literature varies from 0.1% to 10.7%. The prevalence is also higher in studies[18] investigating neonates (1.72% to 10.7%) than in studies[19] investigating children, adolescents, or adults (0.1% to 2.08%). Speech problems can occur when there is limited mobility of the tongue due to ankyloglossia. The difficulties in articulation are evident for consonants and sounds like “s, z, t, d, l, j, zh, ch, th, dg”[20] and it is especially difficult to roll an “r”.

Frenotomy

It is the clipping of the lingual frenulum and is the most indicated technique for babies with ankyloglossia since it is a conservative, simple and quick procedure that may be performed in the dental office settings during initial consultation. The limitation of this technique is the possibility of recurrence and the need to perform complementary procedures to release the tongue satisfactorily [21, 10, 22].

Frenectomy

It corresponds to the complete excision of the frenulum and is more invasive and difficult to be performed in young children, although the results are more predictable, decreasing the recurrence rate [10, 22]. However, surgery should be performed before the child develops abnormal swallowing and speech patterns. Laser technology has been considered as an alternative to the conventional techniques, presenting several advantages such as: shorter operative working time, tissue cauterization and sterilization, hemostasis, less local anesthesia requirement, and fewer postoperative complications[23]. Additionally, the need for suture is eliminated and a uniform depth in the surgical site is maintained, reducing unnecessary damage to tongue muscle [24, 25]. For all these features, laser is well tolerated by children.

The ankyloglossia can be classified into 4 classes based on Kotlow's assessment[26];

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 3 mm.

Class III and IV tongue-tie category should be given special consideration because they severely restrict the tongue's movement. A normal range of motion of the tongue is indicated by the following criteria:
The tip of the tongue should be able to protrude outside the mouth without clefting
The tip of the tongue should be able to sweep the upper and lower lips easily without straining when the tongue is retruded. It should not blanch the tissues lingual to the anterior teeth and the lingual frenum should not create a diastema between the mandibular central incisors.
Ankyloglossia limits the tongue's range of motion because of limited mobility of the tongue in patients with ankyloglossia, the tongue is in a low position and causes forward and downward pressure favoring the development of mandibular prognathism with maxillary hypo development and there is limited evidence that tongue-tie represents a co-factor in the development of malocclusions, especially Class III malocclusion. More studies, especially controlled clinical trials are needed to establish a clear correlation between malocclusion and ankyloglossia. After completion of growth and also during infancy, if the individuals have a history of speech, feeding, or mechanical/social difficulties surgical intervention should be carried out. Therefore, surgery should be considered at any age depending on the patient's history of speech, feeding, or mechanical/social difficulties.

Conclusion

Early diagnosis and prompt surgical intervention generally helps the patient to avoid long-term effects of these problems. All the techniques are successful for the treatment of ankyloglossia. Laser may be considered a simple and safe alternative for children while reducing the amount of local anesthetics, bleeding and the chances of infection, swelling and discomfort. Multiple techniques are available to surgeons for treatment, from simple frenotomy to multiple-flap Z-plasty. Division of the lingual frenulum is typically a simple procedure that can be performed either in the office or in the operating room, depending on patient (or parent) comfort and surgeon preference.

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