

Alleviation for Ankyloglossia - Review

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Introduction

A congenital condition, caused due to fusion between the tongue and floor of mouth is known as Ankyloglossia or tongue-tie. Wallace in 1960 defined tongue-tie as a condition in which tip of the tongue cannot be protruded beyond the lower incisor teeth because of a short frenulum linguae^[1]. It can vary from a thin elastic membrane to a thickened, white nonelastic tissue. Ankyloglossia is a Greek term made by combination of two Greek words agkilos (curved) and glossa (tongue). It is characterised by a short lingual frenulum resulting in restriction of tongue movement which may have strong impact on function.

Prevalence

As reported in the literature, prevalence of ankyloglossia varies from 0.1% to 10.7%. According to studies prevalence is higher in studies concerning neonate i.e., about 1.72% to 10.7% than in studies investigating adults, adolescents or children i.e. 0.1% to 2.08%. Male to female ratio of tongue tie is 1:1.1 to 3:1. It is believed to be sporadic rather than genetic.

Anatomy of Lingual Frenum

Majorly, hyoid arch material results in formation of root of tongue. The lingual frenulum is a fibrodense conjunctive fold, occasionally made up of superior fibres of the genioglossus muscle, which are inserted in the ventral tongue, between the apex and the middle third, and in the floor of the mouth, which may be between the lingual carunculi or previously displaced to the lower alveolar ridge.

Aetiology

Ankyloglossia can be a genetically transmissible pathology. Genetic components that regulate the phenotype and penetrance in the patients are still unknown. Though it is found associated with various syndromes like:

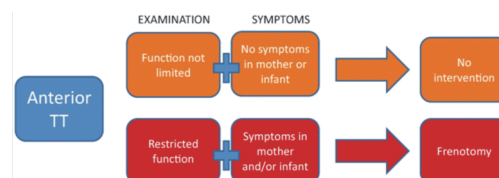
- X linked cleft palate syndrome- caused due to gene mutation on TBX22
- Kindler syndrome
- Van der Woude syndrome

- Optizsyndrome
- Ehlers-Danlos syndrome (absence of labial and lingual frenum).
- Infantile hypertrophic pyloric stenosis
- Holoprosencephaly
- Ellis-van Creveld syndrome
- Oro-facial-digital syndrome

Diagnosis

As per Carmela Baeza, there are two levels of identification

1. The Morphological Identification: A short frenulum can be identified on examining baby's mouth
2. The Clinical Identification: A short frenulum may or may not have an impact on the breastfeeding dyad.



Procedure

Tension is applied over the frenum to diagnose tongue tie. Movement of the papillary tip or the blanchis noticed which is produced due to ischemia in the region. The frenum is remarkably wide or once there's no apparent zone of the attached gingiva along the midline or the interdental papilla shifts when the frenum is extended; frenum is characterised as pathogenic.

Pathophysiology

Hazelbaker Assessment is used as assessment tool for Lingual Frenulum Function. This tool uses a scoring system using anatomy and function.

- **Anatomy:** Appearance of tongue when lifted, elasticity of frenulum, length of lingual frenulum when tongue lifted, attachment of lingual frenulum to tongue and attachment of lingual frenulum to inferior alveolar ridge
- **Function:** Lateralization, lift of tongue, extension of the tongue, spread, cupping of tongue, peristalsis, snap-back

It consists of ten points for frenulum look

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and fourteen points for tongue perform.^[2]

Abnormalities

- **Breastfeeding difficulties:** Difficulty latching and irritability while feeding.
- **Speech disorders:** The difficulties in articulation are evident for consonants and sounds like “s, z, t, d, l, j, zh, ch, th, d” and it is especially difficult to roll an “r”.
- Poor oral hygiene
- Difficulty consuming certain foods that include licking (ice cream)
- Difficulty playing certain wind instruments (examples include flutes, clarinets, tubas, trumpets)
- Bullying during childhood and adolescence.
- Gingival recession on the lingual surfaces.
- Orthodontic problems like open bite, mandibular prognathism and maxillary hypo development due to the low position and the forward and downward pressure applied^[5]

Classification

* Katlow's Classification

The ankyloglossia can be classified into 4 classes based on Kotlow's assessment as follows:

- **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.^[1]

* Placek Et Al Classification (1974)

It is based on extent of attachment of fibres

- Mucosal attachment: The frenal fibres attachment is positioned at the mucogingival junction.
- Gingival attachment: The frenal attachment is positioned or inserted within the attached gingiva.
- Papillary attachment: The frenal attachment extends up to the interdental papilla.
- Papilla Penetrating attachment: The frenal attachment cross the alveolar process and extend up to the palatine papilla.^[3]

Treatment techniques

Some milder varieties of this congenital disorder could resolve with growth. Though surgical interventions include:

Frenotomy

It is the most commonly used procedure. It includes incision and relocation of the frenal attachment. The procedure involves holding the tongue up to make the frenulum tight, then cutting through the fascia-like tissue along a line parallel with, and close to the tongue. The cut is made in a single motion as is done very quickly, less than a second. The infant is restrained by swaddling or in a Papoose board, with an assistant holding the child's head for better support. The initiation of treatment plan varies from half dozen to eighteen days.^[9]

Frenectomy

It is the complete excision of the frenum along with its

attachment to the underlying bone. It can be done in following ways.

Frenectomy with the use of one haemostat

The frenulum is held with a small curved haemostat with the convex curve facing the ventral surface of the tongue. The first incision is made with a #15c blade following the curvature of the haemostat, cutting through the upper aspect of the frenulum.^[11] The second incision is made at the lower aspect of the frenulum, fairly close to the floor of the mouth. The frenulum is then excised, leaving a diamond-shaped wound. The wound margins are undermined with the tips of blunt-ended dissecting scissors.^[12]

Frenectomy with the use of two haemostats.

After achieving good anaesthesia, two haemostats (one curved and the other straight) are placed against the tissues over the superior and inferior aspects of the frenulum, respectively, with their tips meeting in the deep aspect near the base of the tongue. Two incisions are made with a #15c blade following the haemostats, cutting through the upper and lower aspects of the frenulum, thus a triangular tissue held with the haemostats is completely removed. Fibre remnants were excised, blunt dissection is performed and 3-0 silk sutures are placed over the wound.^[13]

Frenectomy with the use of a grooved director

After antiseptics and anaesthesia, the tongue is raised toward the palate with a grooved director and an incision is made with a #15c blade from the tip to the base of the tongue following the device. The grooved director is removed and a 3-0 silk suture is used for tongue traction. The frenulum remaining is excised and the wound edges are dissected and sutured with 3-0 silk suture.^[14]

Frenectomy using electrocautery

It is advised in cases of patients with bleeding disorders, as the conventional scalpel technique carries a higher risk associated with problems in achieving a haemostasis and also in non-compliant patients.

Instruments used: Electrocautery unit with the loop electrode and a haemostat.

Procedure: Frenum is held with haemostat at the depth of the vestibule and two incisions are placed using needle electrode. Muscle fibres are then separated using loop electrode. Coagulation is achieved by using ball electrode.

Frenectomy using laser

Mechanism of action: The energy emitted by a CO₂ laser at the wavelength of 10.6 µm is efficiently absorbed into tissues with high moisture content, and this laser is commonly used for the resection and vaporization of soft tissues in the oral cavity^[4]

Advantages

- When using a scalpel, sutures are required for intraoperative haemorrhage, whereas the electric scalpel offers strong haemostatic effects by means of thick coagulation and

deformation layers. However, the surrounding areas are affected by heat, and problems, such as enlarged wound, infection, delayed healing, and postoperative pain, are likely to occur, with many cases also requiring sutures. Meanwhile, although the CO₂ laser has a shallow resection surface depth, it causes relatively no wound surface opening due to heat effects being localized, and coagulation/deformation layers being of appropriate thickness, thus implying reliable haemostasis and early healing.

- Postoperative pain and discomfort during mastication and speech were statistically and significantly less common with the CO₂ laser than with a conventional scalpel.
- Reduce treatment time
- Simplification of overall surgical procedure
- Reducing the burden on patients
- Easier to gain patient's cooperation; thus is a highly useful in paediatric patients.

Disadvantages

when using this laser to treat maxillary labial frenulum abnormalities, attention must be paid to the power during laser application. In contrast to lingual Frenectomy cases, excessive power can lead to damage of the bone surface, and constant care must be taken to protect the eyes because the laser is applied toward the upper lip.

Discussion

To alleviate the complications of Ankyloglossia it becomes necessary to treat tongue tie with time. The time of surgery depends on patient's history of speech, feeding, social/mechanical difficulties. It can be done at any age. Various treatment procedures include using scalpel, electrocautery and lasers. Each procedure has their own benefits but lasers have come out to be advantageous.

Lasers for Frenectomy are considered minimally invasive and safe for paediatric patients. Some advantages include:

- Better patient perception.
 - Quick heal of wounds as compared to other techniques.
 - Well cellularized and well organised loose connective tissues, interspersed with isolate skeletal muscle fibres and some muscle bundles.
 - Less scar tissue.
 - Use of laser results in sterilisation of wound which intern reduces the need for postoperative antibiotics and care.
- Despite of various advantages, proper care is needed to work with laser. For clinicians also; precautions like wearing of protective eye mask, high speed evacuation and a proper training are needed.

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