

Ankyloglossia (tongue-tie): A diagnostic and treatment quandary

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The tongue is an important oral structure that affects speech, the position of teeth, periodontal tissue, nutrition, swallowing, nursing, and certain social activities. Ankyloglossia (tongue-tie) limits the range of motion of the tongue, impairing its ability to fulfill its functions. In this article, diagnostic criteria needed to evaluate and treat ankyloglossia are suggested, and a method for classifying ankyloglossia is proposed. (Quintessence Intl 999;30:259-262)

Key words: ankyloglossia, classification, lingual frenum, tongue-tie

CLINICAL RELEVANCE: A lingual frenum attachment limits the tongue's range of motion. This article provides the dentist and other health professionals with a list of criteria that can be used to determine when the lingual frenum should be revised.

Ankyloglossia (tongue-tie) in children poses a diagnostic challenge for dentists. A review of the literature reveals little information about what constitutes an abnormal lingual attachment (ankyloglossia) and what criteria should be used to justify surgical intervention. Definitions of Ankyloglossia range from a vague description of a tongue that functions with a less-than-normal range of activity to a description of the frenum as short, thick, muscular, or fibrotic. Many descriptions of ankyloglossia are prefaced with statements such as, "Little research has identified the positive relationship between tongue-tie and speech disorders;"¹

Physicians often delay recommending treatment of a short lingual attachment unless there are obvious speech or nursing difficulties, and most general dentists are reluctant to see children under the age of 3 years for routine dental examinations. Because pediatric dentists examine children from 1 year of age, it would be useful to have a protocol to enable the pediatric dentist and pediatrician to conclude which lingual frenum require early revision, which ones should be revised later in childhood, and which ones do not require treatment.

CLASSIFICATION OF ANKYLOGLOSSIA

The term *free-tongue* is defined as the length of tongue from the insertion of the lingual frenum into the base of the tongue to the tip of the tongue. Because the tongue is a muscle, which in young children is flexible and often difficult to stabilize, placing a dental instrument at the insertion point and approximating the tip of the tongue determine this measurement. A Boley gauge is then used to measure this distance.

A group of 322 children, ranging in age from 18 months to 14 years, were examined for the length of free tongue and then evaluated for clinical evidence of speech and oral problems. Assessment of these measurements resulted in the development of the following descriptions and categories of ankyloglossia (Figs 1a to 1e):

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

Structural guidelines were developed to assist in determining if the lingual frenum required revision. 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 (Fig 2a).
2. The tip of the tongue should be able to sweep the upper and lower lips easily, without straining (Fig 2b).



Fig 1a Normal range of motion.



Fig 1b Class I: Mild tongue-tie.



Fig 1c Class II: Moderate tongue-tie.



Fig 1d Class III: Severe tongue-tie.



Fig 1e Class IV: Complete tongue-tie.

5. When the tongue is retracted, it should not blanch the tissue lingual to the anterior teeth (Fig 2c).

4. The tongue should not place excessive forces on the mandibular anterior teeth (Fig 2d).

5~ The lingual frenum should allow a normal swallow-ing pattern (Fig 2e).

6. The lingual frenum should not create a diastema between the mandibular central incisors (Fig 2f)

7. In infants, the underside of the tongue should not exhibit abrasion (Fig 2g).

8. The frenum should not prevent an infant from attaching to the mother's nipple during nursing.

9. Children should not exhibit speech difficulties associated with limitations of the movement of the tongue.

Lingual frena in the complete (Class IV) tongue-tie category should be revised because they severely restrict the tongue's movement. Many lingual frena in the se-vere (Class III) category also benefit from revision. Children often adapt to the short attachment (Class III) with fatiguing efforts. Release of this frenum is often recommended. Children with moderate (Class II) and mild (Class I) ankyloglossia are the most difficult to evaluate. Most of these children appear to have nor-mal speech patterns and are able to effortlessly fulfill most of the criteria listed above.

In addition to the guidelines cited, there are addi-tional reasons for lingual frenum revisions. These in-



Fig 2a Clefting of the anterior border of the tongue.



Fig 2b Inability to raise the anterior border of the tongue and lick the lips.



Fig 2c Blanching of tissue lingual to the mandibular anterior teeth.

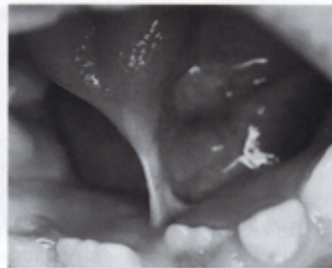


Fig 2d Lingual tipping of the mandibular anterior teeth.



Fig 2e Inability to swallow correctly. The tongue cannot touch the roof of the mouth.



Fig 2f Diastema created by protrusion of the frenum between the mandibular anterior teeth.

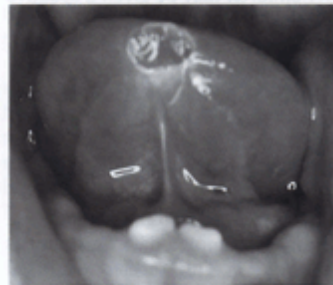


Fig 2g Abrasion of the underside of the tongue in an infant.

dude abnormalities in tongue function during swallow-ing, difficulty in eating or drinking, difficulty in playing wind instruments, difficulty in licking ice cream cones and, during the adult years, instability of dentures as well as impairment of certain social activities.

Flexibility of the floor of the mouth is also an im-portant factor in determining the effect of ankyloglos-sia. Some of the children examined displayed normal mobility of the tongue in conjunction with a flexible

floor of the mouth; others displayed restricted tongue movement, when the tension of the floor of the mouth exhibited little or no flexibility. The tension was associated with a pulling of the tissue behind the mandibular incisors or the development of a diastema between the mandibular central incisors. It also ap-peared that, in Class I and Class II ankyloglossia, a natural lengthening of the free tongue might occur as a child grows.

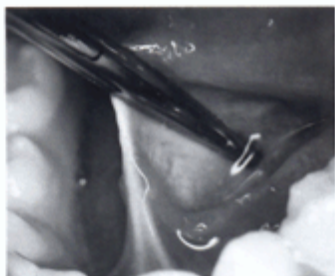


Fig 3a Initial placement of the hemostat on the anesthetized lingual frenum.

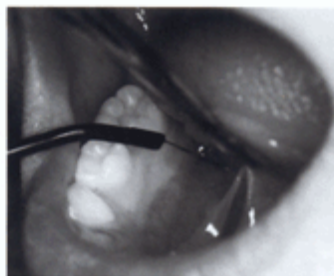


Fig 3b Release of the frenum with an electro-surgical probe.



Fig 3c Closure with gut suture.

TREATMENT

CONCLUSION

Treatment is accomplished in the dental office after administration of a local anesthetic. General anesthesia or deep sedation is not usually necessary unless an extensive revision or a muscle reattachment procedure is required. Infants are treated with only a local anesthetic solution. Older children may be given a sedative such as chloral hydrate and hydroxyzine, in combination with nitrous oxide or other suitable regimens with appropriate monitoring.

There are a wide range of opinions about the diagnosis and treatment of ankyloglossia. This article establishes a protocol that can be used by pediatricians and pediatric dentists to classify the severity of a tongue restriction resulting from ankyloglossia and offers guidelines for diagnosis and treatment.

The frenum is revised with the following surgical procedure:

1. A topical anesthetic is applied to the underside of the tongue.
2. A local anesthetic is infiltrated into the frenum area.
3. After the anesthesia is completed, a hemostat is used to clamp the frenum, and an electro-surgical instrument is used to release the frenum (Figs Sa and Sb).
4. The area is sutured with 4-0 gut suture (Fig Sc).
5. The patient is discharged with postoperative instructions to avoid juices and to treat discomfort with non-narcotic analgesics.

Parents are urged to encourage fluids. Postoperative complications are few. The most common postoperative problems are pain in front of the ear and dehydration in young children and infants.

REFERENCES

1. Ayer F, Hilton L. Treatment of ankyloglossia: Report of a case. *J Dent Child* 1977;44:69-71.
2. Ewart NP. A lingual mucogingival problem associated with ankyloglossia: A case report. *NZ Dent J* 1990;56:16-17.
3. Lee SI, Iim YS, Lim CY. A pathological consideration of ankyloglossia and lingual myoplasty. *Taechan Chikkwa Uisa Hyophoe Chi* 1989;27:287-308.
4. Marmet C, Shell E, Marmet R. Neonatal frenotomy may be necessary to correct breastfeeding problems. *J Human Lact* 1990;6:117-120.
5. Nostestine GE. The importance of the identification of ankyloglossia (Short lingual frenum) as a cause of breast-feeding problems. *J Human Lact* 1990;6:113-115.
6. Waldron CM, Williams WN. Assessment of lingual function when ankylosis (tongue-tie) is suspected. *J Am Dent Assoc* 1985;110:353-356 (reference 1).
7. Warden PJ. Ankyloglossia: A report of the literature. *Gen Dent* 1991 ;July/August:25 1-253.
8. Wright JE. Tongue-tie. *J Paediatr Child Health* 1995;31:276-278.