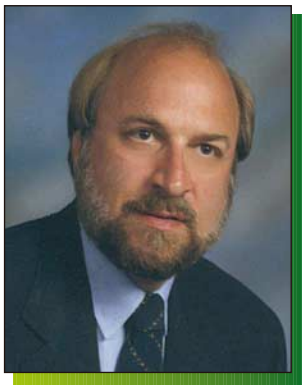
Oral Diagnosis of Abnormal Frenum Attachments in Neonates and Infants: Evaluation and Treatment of the Maxillary and Lingual Frenum using the Erbium: YAG Laser



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Introduction

The American Academy of Pediatric Dentistry states in its clinical guidelines that; " children should see a dentist by no later than age one."[1] Oral abnormalities or congenital defects that are obvious at birth or in the first three years of a child's life are often ignored, undetected or misdiagnosed. Two oral developmental problems that can be easily diagnosed and treated in the dental office are the abnormal attachments of the maxillary frenum and lingual frenum.[2]

Ankyloglossia (Tongue-Tie)

The soft tissue that attaches the underside of the tongue to the floor of the mouth is referred to as the lingual frenum. The first time a parent hears that his or her child has an abnormal lingual attachment usually brings an initial response such as "Why has no one ever mentioned this to me before?" This is usually followed by a second and third question, "Is the procedure really necessary?" and "What will happen if we do not do it?" The intent of this article is to give dentists and other allied health care providers a series of guidelines for diagnosing and treating ankyloglossia and/or maxillary frenum attachments.

Diagnosis and Rational for Treatment of Ankyloglossia (Tongue-ties) in Neonates: [6,7]

There are few long term studies, accurate recommendations or consensus on what constitutes an abnormal lingual attachment. This results in a challenge when diagnosing and treating ankyloglossia. It also contributes to parents receiving many different and conflicting opinions when seeking professional advice concerning the need to revise the lingual frenum. Traditional medical teaching has been that the tongue-tie is of little relevance, will have no adverse sequelae, and can be ignored. Comments such as, "the frenum will stretch and that we no longer need to treat this condition." are unfortunately too common. The reality is that a tongue-tie, by interfering with tongue mobility, can exert a harmful effect on many aspects of life.[3] The consequences of not treating improper tongue function may be very important as this organ can influence face development and dental therapy.[5] The simple act of eating a cracker requires appropriate tongue action just to clean the facial, lingual, and palatal areas of the teeth as well as the roof of the mouth. Ankyloglossia is not an uncommon finding in the newborn population (approximately 3%) and represents a significant proportion of problems preventing mother's from successfully breastfeeding their infant.[4]

The following criteria can be used to identify problems of an abnormal lingual attachment for nursing mothers and whether a newborn can benefit from a frenum revision.[6]

Infant Factors To Consider	Maternal Factors To Consider
A. No ability to latch on to breast	A. Creased, flattened or blanched nipples after feeding
B. Un-sustained latch	B. Cracked, bruised or blistered nipples
C. Slides off nipple	C. Bleeding nipples
D. Prolonged feeding	D. Severe pain with latch of infant draining breast
E. Unsatisfied after prolonged feeds	E. Incomplete breast drainage
F. Falls asleep easily while feeding	F. Infected nipples
G. Gumming or chewing on the nipple	G. Plugged ducts
H. Poor weight gain or failure to thrive	H. Mastitis & nipple thrush
I. Unable to hold pacifier	I. Reduction in milk flow

Revision Procedure for Newborn Infants:

When using the, *Erbium:YAG laser, revision of the lingual frenum in neonates can be completed without the need to sedate the infant or the use of a local anesthetic agent to numb the soft tissue Prior to surgery, the infant is placed on a dental auxiliary or dentist's lap (Figure 1) and the tongue is gently elevated. Visualization and access of the frenum is accomplished using two fingers placed under the tongue (Figure 4) or using the W. Lorenz tongue holder.(Figure 2,) The Lorenz holder provides better visibility and control of the tongue than using fingers for tongue stability in infants. (Figure 3) The frenum is then lased for about 10 seconds. (Setting 30 HZ, 50mj) In most cases, approximately 8 mm space between the frenum insertion and the tip of the tongue is adequate. This will allow the infant to develop a good latch onto the breast's nipple and permit normal nursing. If more mobility is required in the future, an additional release of the frenum can be completed. Care must be taken to cut the frenum as close to the base of the tongue as possible. (Figure 5) It is important to avoid the glands and vessels in the floor of the mouth. Unlike more aggressive techniques, this method avoids removal of any tissue.

Infants are able to begin nursing immediately after the revision is completed. Mothers indicate immediate relief of nipple pain and discomfort, extended nursing duration and improved infant sleeping after the frenum has been released. Quality of life for the mother as well as the infant is improved by this procedure which is simple, brief, and virtually devoid of complications.


Fig.1: Holding Infant


Fig. 2: W.Lorenze Holder


Fig. 3: W.Lorenz in Mouth


Fig. 4: Finger Holding


Fig. 5: Post-op

The Following Guidelines Can Be Used When Determining the Need to Revise the Frenum in Older Children:[3]

A. The lingual attachment should not create a diastema (gap) between the lower central incisors.
B. The lingual attachment should not cause excessive force on the lower front teeth causing them to tip backward.
C. The lingual attachment should not cause severe blanching of the gum tissue behind the lower front teeth.
D. The lingual attachment should not prevent a normal swallowing pattern.
E. The tongue should be able to lick the lips and allow the tongue to clean the tooth surfaces after eating.
F. The lingual attachment should not prevent cleaning of the palate which may result in gagging during eating.
G. The tongue should easily extend over the lower anterior teeth and outside the mouth.
H. The lingual attachment should not cause abrasion to the underside of the tongue.
I. An abnormal lingual attachment can interfere with certain eating pleasures. (such as eating ice cream!)
J. Certain Social Activities (Importance and concerns here are under reported and under expressed!)
K. Does it affect speech? Opinions vary !

Trying to educate or train a tongue to go to a correct position for speech while it remains ankylosed may only lead to frustration in a child. Prior to initiating extensive and expensive speech therapy, revising the tongue may assist in correcting speech abnormalities.

Suggested Classification of Tongue-ties: (Based on Distance of the Insertion of the Lingual Frenum to the Tip of the Tongue)


Fig.6: Normal (16mm)


Fig. 7: Class I (Mild 12-16mm)


Fig. 8: Class II (Moderate 8-12mm)


Fig. 9: Class III (Severe 4-8mm)


Fig. 10: Class IV (Complete 0-4mm)

Diagnosis and Treatment of the Tongue-tie Revision Using the ER: YAG Laser Older Children or Adults:


Fig. 11: Tongue-tie revision


Fig. 12: Suture placed at junction of revision to prevent reattachment


Fig. 13: Revised frenum without sutures


Fig. 14: No suture required


Fig. 15: Case A - Pretreatment


Fig. 16: Case A - Immediate post treatment


Fig. 17: Case A - 1 Week post treatment

Treatment Procedure in Young Children, Teenagers and Adults:

The procedure for releasing the frenum in children and adults, in most cases, requires the use of a local anesthetic agent to numb the soft tissue. The needle is inserted directly into the frenum; a complete block of the floor of the mouth is not required. The revision can be completed with the Er:YAG laser. (30HZ/50-55mj) The anesthetized tongue is stabilized by placing a hemostat as close to the base of the tongue as possible. (Figure 11) The revision is completed by cutting only the tissue at the base of the tongue, thereby avoiding the vessels and glands in the floor of the mouth. In some instances, I recommend a suture being placed at the end of the revision to prevent any reattachment of the frenum. (Figure 12) In most patients, little or no bleeding occurs when using the laser. Post-operative discomfort is usually limited to a few hours after the numbing has disappeared, however is some cases discomfort may persist for a few days. In most patients, the post-operative course is usually uneventful, requiring no more than one dose of non-prescription pain medication such as ibuprofen. The laser is a much kinder method of revision, unlike electrosurgery, which is actually a burn and the scalpel which cuts deeper into treatment area than is necessary to release the frenum. There is little damage to adjacent tissue when using the laser, therefore healing appears quicker and with minimal amount of post-operative discomfort. In reality, a lingual frenectomy is as simple as placing a dental restoration. After surgical treatment, parents are instructed to avoid giving a child acidic liquids such as apple juice for a few days and hard foods which may irritate the area. A small white patch, representing the healing area, may develop at the revision site. This is normal and is not an infection. Rinsing the mouth with warm salt water or an over the counter peroxide rinse (Peroxyl) will assist healing the area. In one week, I see the patient for a post-operative follow-up appointment.

The Maxillary Frenum

Diagnosis and Treatment of the Maxillary Frenum in Infants and in the Mixed Dentition (4)

In the newborn, a tight maxillary frenum may interfere with proper latching to the breast and create difficulty with breastfeeding. Early infant dental exams may disclose a maxillary frenum attachment inserting into the alveolar ridge and

in severe cases it may extend between the central incisors inserting into the palate. This tissue may cause a diastema to develop between the maxillary central incisors. In some instances the tight frenum may cause the lip to get caught between the central incisors. Other problems which may be related to the frenum attachment include: failure of traumatic injuries to the area to heal and interference with adequate oral hygiene.

Classifications of the Maxillary Frenum:

After reviewing over one hundred maxillary frenum attachments in children between eight months and three years of age, the author has developed a series of four classifications to use when evaluating maxillary frenum attachments. These can aid in determining when revision may be of benefit to the child.

Fig. 18: Class I - Normal Frenum

Fig. 19: Class II - Inserts above the teeth

Fig. 20: Class III - Inserts between Centrals

Fig. 21: Class IV - Inserts into palate

In infants (birth - 2 years), the procedure for revising this area is simple and quick. Optimal results appear to occur when this procedure is completed between 8-18 months of age. During this time period, the maxillary diastema has the greatest chance for spontaneous closer once the tissue has been revised.

In infants, the frenectomy can usually be competed without the use of any sedation. A small amount of a local anesthetic agent is placed into the frenum area. The area at the insertion of the frenum and the area between the central incisors is lased. No sutures are required. The post-operative course is usually uneventful, rarely requiring no more than one dose of non-prescription pain medication such as ibuprofen.

Fig. 22: Initial incision with laser 24hrs

Fig. 23: One-week hours post-operative

Fig. 24: Six months post-operative

Revision in the Mixed Dentition:

In the mixed dentition, in addition to soft tissue revision, the procedure may require the lasing of bone between the two maxillary central incisors. In the authors experience, the optimal time to revise the frenum, (if it is not done in the early primary dentition,) is when the two central incisors have erupted about 2-3 mm. At this time, the eruption of the laterals assists in closing the diastema once the frenum tissue is ablated. In over thirty years of completing this procedure, the author has not seen any adverse scar formation from this procedure. It should be completed prior to initiation of orthodontics. If the diastema is the only malocclusion problem, orthodontics may not be required.

Revision in the Mixed Dentition:

Fig. 25: Pre-op x-ray (case 1)

Fig. 26: pre-op

Fig. 27: revision

Fig. 28: 1 year post-op

Fig. 29: Pre-operative (case 2)

Fig. 30: six month post-operative

Fig. 31: Pre-operative (case 3)

Fig. 32: 1 year post-op

Conclusion

Treatment of the maxillary and /or lingual frenum requires early diagnosis and can be successfully treated in the dental office preventing many potential problems from occurring as the child develops. As with many additional oral conditions such as; eruption cysts, neonatal teeth, extrinsic stains, missing teeth, clefts and trauma which may bring parents into the dental office ,early diagnosis and treatment before problems occur, may benefit our patients. Oral care for our patients may begin as early as birth, resulting in a lifetime of good oral health.

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