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## USING THE ERBIUM:YAG LASER TO CORRECT AN ABNORMAL LINGUAL FRENUM ATTACHMENT IN NEWBORNS

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**Disclosure:** Dr. Kotlow is a consultant and lecturer for Continuum Biomedical for which he receives lecture fees and supplies.

Erbium:YAG lasers are becoming extensively utilized due to their ability to treat a wide variety of soft and hard tissue dental conditions.<sup>1</sup> The clinical benefits of these lasers include reduced need for local anesthesia; elimination for patients of the sound and vibrations produced by conventional handpieces, and the smell associated with the cutting of a tooth.<sup>2,3</sup> Additional positive benefits observed by the author in using erbium lasers include the ability to complete multiple quadrants of restorative treatment in one sitting, reduced collateral damage of surrounding tissues resulting in faster surgical healing, and the bactericidal effect.<sup>4</sup> Patients benefit by reducing dental visit stress and anxiety and this results in dentists' reduction of their personal stress as well as increasing patient referrals and office productivity.

In addition to providing an excellent service to the patient and personal satisfaction for the dentist, there is one oral soft tissue procedure that provides relief of pain and anxiety to a third individual, the nursing mother! That procedure is revision of an abnormally attached lingual frenum. Approximately 3-4 percent of infants are born with a condition known as ankyloglossia.<sup>5</sup> This is a condition that interferes with the normal mobility and function of an infant's tongue. In the author's opinion, it is one of the most overlooked, misdiagnosed, and untreated oral conditions in newborns and young children. The reality is that a tongue-tie, by interfering with tongue mobility, can exert a harmful effect on many aspects of life.<sup>5</sup> The consequences of not treating improper tongue function may be very important since the tongue can influence future oral, nutritional, speech, and dental development. Revising a tongue that has little or no mobility can give tremendous satisfaction to the dentist, the patient, and the infant's parents. Mothers are encouraged to nurse their children rather than use the bottle,

and mother's milk has been shown to provide a variety of benefits that cannot be seen with alternative milk sources.<sup>6,7</sup>

It is unfortunate that many mothers are forced to give up after many unsuccessful attempts at nursing their newborn. One cause, among a variety of factors, can be directly related to a tight frenum attachment.<sup>8</sup> Discussions with parents of these infants relate similar and consistent comments, including:

- infants are often unable to nurse effectively due to the lack of an ability to properly latch onto the mother's nipple
- if latching is successful, it is unsustainable
- prolonged feeding periods without adequate draining of the mother's breast milk
- fatigue of the infant from the effort of ineffective nursing
- poor weight gain
- failure to thrive
- gumming or chewing of the nipple.

Mothers often present with complaints of flattened or blanched nipples during nursing periods, as well as cracked, bruised, bleeding, or blistered nipples after nursing attempts. They often indicate suffering from reduced milk flow, mastitis, infected nipples, and, most importantly, guilt over failing to be able to nurse their child. The result of the combination of infant failure to adequately nurse and the mother's overall discomfort often results in the mother giving up nursing and placing her child on a baby bottle. This can be psychologically upsetting for both parents.

When the tongue's lingual frenum is attached so close to the tip of the tongue the infant is unable to sustain an adequate latch onto the mother's nipple, this in turn results in many of the aforementioned problems.<sup>9-12</sup>

Treatment using the Er:YAG laser to revise the frenum and allow for normal tongue function and mobility is quick and

simple.<sup>13</sup> If the frenum is allowed to remain attached, other problems may occur as the infant grows. Parents report gagging due to the inability of the infant to clear foods from the roof of the mouth, as well as difficulty in chewing foods. Unexpectedly, some parents indicate that after the procedure is performed the infant sleeps better.

The procedure for revising the frenum in the dental office will now be described.

### Diagnosis

Examination of the tongue is accomplished most easily using the W. Lorenz tongue elevator to pull up the tongue and allow the dentist to view and evaluate the attachment position of the frenum. The author has developed a classification of frenum attachments to be of assistance when evaluating ankyloglossia (Figures 1-5). Diagnosis is based upon classifying the frenum attachment as Class I-IV, and is based on the distance between the insertion of the lingual frenum to the tip of the tongue.<sup>13</sup> In the author's opinion, if this measurement is less than 8 mm, the frenum should be revised.



Figure 1: Normal (16 mm)

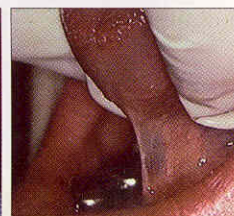


Figure 2: Class I (Mild) (12-16 mm)

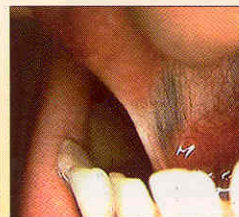


Figure 3: Class II (Moderate) (8-12 mm)

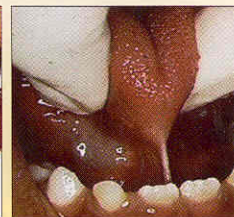


Figure 4: Class III (Severe) (4-8 mm)



Figure 5: Class IV (Complete) (0-4 mm)

## Surgical Procedure

The infant is placed in a position on the auxiliary's or the dentist's lap (Figure 6). This enables direct viewing of the frenum attachment. Usually no local anesthesia is required. Either by holding the tongue with the dentist's fingers or by using the W. Lorenz tongue elevator, the frenum is viewed and stabilized (Figures 7-8). An Erbium:YAG laser, 2940 nm wavelength (DELIGHT, HOYA ConBio, Fremont, California) is set at 30 Hz and 40-55 mJ, without water spray (Figure 9). The soft tissue tip is used. The laser is placed at the anterior portion of the frenum and the area is revised. One cut at this point is all that is required. Care should be taken to make the revision only on the underside of the tongue. It is important to stay above the glands and vessels in the floor of the mouth. It is not necessary to also release the tongue at the floor of the mouth. The procedure takes about 30 seconds. Little or no bleeding occurs using this technique. Approximately 8 mm of freedom is given to the tongue (Figure 10). If additional revision is required, it can be repeated when the infant is older. Experience in cutting this amount appears to be more than adequate to allow for sustained latch, maternal comfort, and proper nursing.

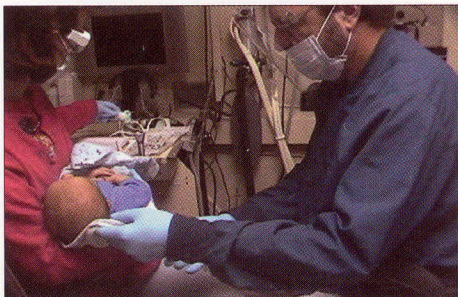


Figure 6: Infant in dental auxiliary's lap

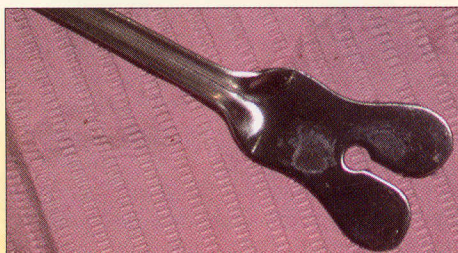


Figure 7: W. Lorenz instrument

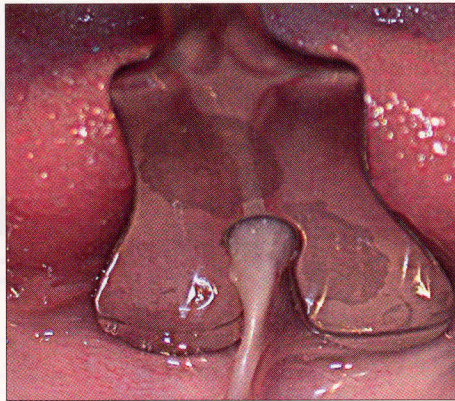


Figure 8: W. Lorenz instrument in place

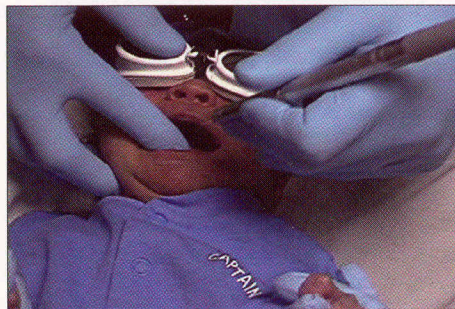


Figure 9: Er:YAG laser ready

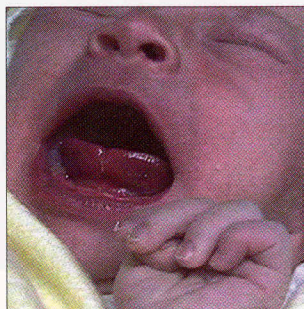


Figure 10: Procedure complete

When the infant is returned to the parents, the mother is urged to attempt breastfeeding. Mothers indicate that they have immediate pain relief and the infant's latch on the breast is improved. Postoperative follow-up discussions with mothers at one week indicate that their children immediately began nursing for longer periods, increasing from every 2 hours to every 4-5 hours. Usually there are reports that the infants slept longer between nursing episodes, emptied the breasts more completely of milk (allowing for increased breast milk flow), and began gaining weight. Any breast problems were usually cleared up by the end of the first week. Psychologically, mothers stated that they began to look forward to their child nursing, rather than feeling that the nursing would be painful.

## Conclusion

The time has now come to go beyond marveling at the benefits of using lasers. The ability to quickly complete procedures

with very little discomfort in our offices makes laser dentistry an important concept for the youngest patient. Additional benefits of early revision of the lingual frenum include improved cleaning of the facial and buccal surfaces of upper and lower teeth, reduced potential for speech difficulties, and reduced potential for lingual tipping of erupting permanent mandibular incisors. ✚

## References

1. Kotlow L. The use of the erbium hard and soft tissue laser in the pediatric dental practice. *J Southeast Soc Pediatr Dent* 2001;7(4):12-14.
2. Keller U, Hibst R, Geurtsen W, Schilke R, Heidemann D, Klaiber B, Raab WH. Erbium:YAG laser application in caries therapy. Evaluation of patient perception and acceptance. *J Dent* 1998;26(8):649-656.
3. Matsumoto K, Hossain M, Hossain MM, Kawano H, Kimura Y. Clinical assessment of Er,Cr:YSGG laser application for cavity preparation. *J Clin Laser Med Surg* 2002;20(1):17-21.
4. Ando Y, Aoki A, Watanabe H, Ishikawa I. Bactericidal effect of erbium YAG laser on periodontopathic bacteria. *Lasers Surg Med* 1996;19(2):190-200.
5. Fernando C. *Tongue tie: From confusion to clarity. A guide to the diagnosis and treatment of ankyloglossia (tongue tie)*. Sydney, Australia: Tandem Publications, 1998. Foreword and Introduction.
6. United States Department of Health & Human Services, Ad Council, News Release. Public Service Campaign to Promote Breastfeeding Awareness Launched. Available at: [www.hhs.gov/news/press/2004pres/20040604.html](http://www.hhs.gov/news/press/2004pres/20040604.html). Accessed July 5, 2004.
7. The National Women's Health Information Center. Breastfeeding. Best for Baby. Best for Mom. Available at: [www.4women.gov/Breastfeeding/index.htm](http://www.4women.gov/Breastfeeding/index.htm). Accessed July 5, 2004.
8. Protocol Committee, The Academy of Breastfeeding Medicine, J.L. Ballard, C. Chantry, and C.R. Howard. ABM Clinical Protocol Number 9: Guidelines for the evaluation and management of neonatal ankyloglossia and its complications in the breastfeeding dyad. *ABM News and Views* 2004 (in press).
9. Marmet C, Shell E, Marmet R. Neonatal frenotomy may be necessary to correct breastfeeding problems. *J Hum Lact* 1990;6(3):117-121.
10. Ballard JL, Auer CE, Khoury JC. Ankyloglossia: Assessment, incidence, and effect of frenuloplasty on the breastfeeding dyad. *Pediatrics* 2002;110(5):e63.
11. Defabianis P. Ankyloglossia and its influence on maxillary and mandibular development. (A seven year follow-up case report). *Funct Orthod* 2000;17(4):25-33.
12. Notestine GE. The importance of the identification of ankyloglossia (short lingual frenulum) as a cause of breastfeeding problems. *J Hum Lact* 1990;6(3):113-115.
13. Kotlow L. Ankyloglossia (tongue-tie): A diagnostic and treatment quandary. *Quintessence Int* 1999;30(4):259-262.