Policy on Management of the Frenulum in Pediatric Dental Patients

Adopted

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Purpose

Evidence suggests that the frequency of frenotomy/frenectomy is increasing, with reports indicating as much as a 90 percent increase in recent years.[1,2] The American Academy of Pediatric Dentistry recognizes a policy on frenula would make information and recommendations more accessible to dentists, physicians, and other allied health professionals in an evidence-based format.

Methods

This policy, developed by the Council of Clinical Affairs, is a review of current dental and medical literature and sources of recognized professional expertise and stature, including both the academic and practicing health communities, related to frenula/frenotomies. In addition, literature searches of PubMed®/MEDLINE and Google Scholar databases were conducted using the terms: ankyloglossia, ankyloglossia AND breastfeeding outcomes, breastfeeding with ankyloglossia and/or upper lip tie, gastroesophageal reflux, frenotomy, frenulotomy, systematic reviews of ankyloglossia other than breastfeeding, lip-tie, super labial frenulum, maxillary lip-tie, breastfeeding cessation, frenulum, frenum, tongue-tie, speech articulation with lingual frenulum, frenuoplasty, midline diastema, lactation difficulties, nipple pain with breastfeeding, Hazelbaker Assessment Tool for Lingual Frenulum Function (ATLFF), Infant Breastfeeding Assessment Tool (IBFAT), LATCH grading scales, mandibular labial frenulum, periodontal indications for frenectomy, gingival recession associated with midline diastema; fields: all; limits: within the last 15 years, English. One hundred seventeen articles matched these criteria. Papers for review were chosen from this list and from references within selected articles. Expert and/or consensus opinion by experienced researchers and clinicians also was considered.

Definitions

Frenectomy: excision of the frenulum left to heal by secondary intention.

Frenotomy: simple cutting or incision of the frenulum.

Frenuloplasty: excisions involving sutures releasing the frenulum and correcting the anatomic situation.

Background

Frenulum attachments and their impact on oral motor function and development have become topics of emerging interest within the dental community as well as various specialties of healthcare providers. Studies have shown differences in treatment recommendations among pediatricians, otolaryngologists, lactation consultants, speech pathologists, surgeons, and dental specialists.[3-10] Clear indications and timing of surgical treatment remain controversial due to lack of consensus regarding accepted anatomical and diagnostic criteria for degree of restriction and relative impact on growth, development, feeding, or oral motor function.[3-10] Although the etiology of this condition remains unknown, there appears to be a higher predilection of anomalies of frenulum attachments, whether ankyloglossia (tongue-tie) or a hypertrophic/restrictive maxillary labial frenulum, in males.[9-13] Typically, seven frenula are present in the oral cavity, most notable the maxillary labial frenulum, the mandibular labial frenulum, the lingual frenulum, and four buccal (cheek) frenula.[14] Their primary function is to provide stability of the upper lip, lower lip, and tongue.[15]

Maxillary frenulum

A prominent maxillary frenulum in infants, children, and adolescents, although a common finding, is often a concern to parents. The maxillary labial frenulum attachment can be classified with respect to its anatomical insertion level:[14]

1. mucosal (frenal fibers are attached up to the mucogingival junction);
2. gingival (frenal fibers are inserted within the attached gingiva);
3. papillary (frenal fibers are extending into the interdental papilla); and
4. papilla penetrating (frenal fibers cross the alveolar process and extend up to the palatine papilla).

The most commonly observed types are mucosal and gingival.[9] However, a maxillary frenulum is a dynamic structure that presents changes in position of insertion, structure, and shape during growth and development.[9] Infants have the highest prevalence of papillary penetrating phenotype.[9] In severe instances, a restrictive maxillary frenulum attachment has been associated with breastfeeding and bottle-feeding difficulties among newborns in a number of studies.[16-19] It has been

suggested that a restrictive maxillary frenulum may inhibit an airtight seal on the maternal breast through "flanging" of both lips.[12,17-19] The maxillary frenulum can contribute to reflux in babies due to the intake of air from a poor seal at the breast or bottle leading to colic or irritability.[19,20] With the lack of understanding of the function of the labial frenulum, the universality of the labial frenulum, and level of attachment in most infants, therelease of the maxillary frenulum based on appearance alone cannot be endorsed at this time.[21] A hyperplastic labial frenulum that inserts into the free or marginal gingiva has been suggested to interfere with proper oral hygiene measures, potentially leading to facial-cervical caries as well as initiation and progression of gingival/periodontal disease.[22] To date, no evidence supports this conclusion although anecdotal speculation persists. Further research is required to substantiate this cause-and-effect relationship. When release of the maxillary frenulum is considered due to higher caries risk, anticipatory guidance and other preventive measures should be emphasized first.

Surgical removal of the maxillary midline frenulum also is related to presence or prevention of midline diastema formation, prevention of post orthodontic relapse, esthetics, and psychological considerations.[7-9,23] Treatment options for midline diastema and sequence of care vary with patient age and can include orthodontics, restorative dentistry, frenectomy, or a combination of these.[23] Treatment is suggested (1) when the attachment exerts a traumatic force on the gingiva causing the papilla to blanch when the upper lip is pulled, or (2) if the attachment causes a diastema wider than two millimeters, which is known to rarely close spontaneously during further development.[9,23,24] When a diastema persists into the permanent dentition, the objectives for treatment involve managing both the diastema and its etiology.[23] If orthodontic treatment is indicated, the need for surgical management of a frenulum should be assessed and coordinated with orthodontic closure of the diastema to achieve stable results.[23-25] There is general agreement between pediatric dentists and orthodontists that a frenectomy should not be performed before the permanent canines erupt and that the operation should follow orthodontic closure of the space.[26]

Mandibular labial frenulum

A high frenulum sometimes can present on the labial aspect of the mandibular ridge. This most often is seen in the permanent central incisor area and frequently occurs in individuals having a shallow vestibule.[6] The mandibular labial frenulum occasionally inserts into the free or marginal gingival tissue.[6] Movements of the lower lip can cause the frenulum to pull on the fibers inserted into the free marginal tissue, which creates pocket formation that in turn, can lead to food and plaque accumulation.[6] Early treatment can be considered to prevent subsequent inflammation, recession, pocket formation, and possible loss of alveolar bone and/or teeth.[6] However, if factors causing gingival/periodontal inflammation are controlled, the degree of recession and need for treatment decreases.[4,6] Again, when treatment of the frenulum is considered due to higher caries risk, anticipatory guidance and other preventive measures should be emphasized.

Lingual frenulum

The World Health Organization has recommended mothers worldwide exclusively breastfeed infants for the child's first six months to achieve optimum growth, development, and health.[27] Thereafter, they should be given complementary foods and continue breastfeeding up to the age of two years or beyond.[27] The American Academy of Pediatrics in 2018 reaffirmed its recommendation of exclusive breastfeeding for about six months, followed by continued breastfeeding as complementary foods are introduced, with continuation of breastfeeding for one year or longer as mutually desired by mother and child.[28] Lingual frenula, in addition to the maxillary labial frenula, have been associated by some practitioners with impedance to successful breastfeeding, thereby leading to recommendations for frenotomy. The most common symptoms babies and mothers experience from tongue- and lip-tie are poor or shallow latch on the breast or bottle, slow or poor weight gain, reflux and irritability from swallowing excessive air, prolonged feeding time, milk leaking from the mouth from a poor seal, clicking or smacking noises when nursing/feeding, and painful nursing.[19,29]

Ankyloglossia (tongue-tie)

Ankyloglossia is a congenital developmental anomaly of the tongue characterized by a short, thick lingual frenulum resulting in limitation of tongue movement (partial ankyloglossia) or by the tongue appearing to be fused to the floor of the mouth (total ankyloglossia).[6,30] Studies with different diagnostic criteria report prevalence of ankyloglossia between four and 10.7 percent of the population.[4,5] Several diagnostic classifications have been proposed based on anatomical and functional criteria, but none has been universally accepted.[4] The tongue's ability to elevate rather than protrude is the most important quality for nursing, feeding, speech, and development of the dental arch.[31,32]

Ankyloglossia has been associated with breastfeeding and bottle-feeding difficulties among neonates, limited tongue mobility and speech difficulties, malocclusion, and gingival recession.[3-10,24] A short frenulum can inhibit tongue movement and create deglutition problems.[4,33,34] During breastfeeding, a restrictive frenulum can cause ineffective latch, inadequate milk transfer and intake, and persistent maternal nipple pain, all of which can affect feeding adversely and lead to early cessation of breastfeeding.[3-11,24,30,33-36] Systematic literature review articles acknowledge the role of frenotomy/frenectomy for demonstrable frenal constriction in order to reduce maternal nipple pain and improve successful breastfeeding when the procedure is provided in conjunction with support of other allied healthcare professionals.[4-7,10,37]

Limitations in tongue mobility and speech pathology have been associated with ankyloglossia.[4,38,39] However, opinions

vary among health care professionals regarding the correlation between ankyloglossia and speech disorders. Speech articulation is largely perceptual in nature, and differences in pronunciation often are evaluated subjectively. Variability in the speech assessment outcomes among individuals and specialists from different medical backgrounds is very high.[10] The difficulties in articulation for individuals with ankyloglossia are evident for consonants and sounds like */s/*, */z/*, */t/*, */d/*, */l/*, */sh/*, */ch/*, */th/*, and */dg/*, and it is especially difficult to roll an R.[10,38] Because parents often do not report speech issues accurately, an evaluation by a speech-language pathologist trained in assessing tongue-ties is recommended to assess for speech or language errors prior to recommending a tongue-tie release.[40] Speech therapy in conjunction with frenuloplasty, frenotomy, or frenectomy can be a treatment option to improve tongue mobility and speech.[38,39] Nevertheless, further evidence is needed to determine the benefit of surgical correction of ankyloglossia and its relation to speech pathology as many children and individuals with ankyloglossia are able to compensate and do not appear to suffer from speech difficulty.[4,7,41]

Evidence to show that ankyloglossia and abnormal tongue position may affect skeletal development and be associated with Class III malocclusion is limited.[34,42] A high-arched palate and elongated soft palate have been associated with tongue-tie.[31,32] A complete orthodontic evaluation, diagnosis, and treatment plan are necessary prior to any surgical intervention.[42]

Localized gingival recession on the lingual aspect of the mandibular incisors has been associated with ankyloglossia in some cases where frenal attachment causes gingival retraction.[4,6] As with most periodontal conditions, elimination of plaque-induced gingival inflammation can minimize gingival recession without any surgical intervention.[4] When recession continues even after oral hygiene management, surgical intervention may be indicated.[4,6]

Treatment considerations

Although evidence in the literature to promote the timing, indication, and type of surgical intervention is limited, frenotomy/frenectomy for functional limitations and symptomatic relief should be considered on an individual basis.[4,10,34,36,39,43] When indicated, frenuloplasty, frenectomy, and frenotomy may be a successful approach in alleviating the problem.[4,9,10,44] Each of these procedures involves surgical incision or excision, establishing hemostasis, and wound management.[45] Dressing placement or the use of antibiotics is not necessary.[45] Post-operative recommendations include maintaining a soft diet, regular oral hygiene, and analgesics as needed. Post-operative exercises are necessary to prevent reattachment of the wound and relapse of the previous symptoms associated with the tongue or lip-tie.[29,42]

The use of electrosurgery or laser technology for frenotomies/frenectomies has demonstrated a shorter operative working time, a better ability to control bleeding, reduced intra- and post-operative pain and discomfort, fewer postoperative complications (e.g., swelling, infection), no need for suture removal, and increased patient acceptance.[46] These procedures require extensive training as well as skillful technique and patient management.[4,9,10,39,44,47-50] As with all surgical procedures, an informed consent should be obtained. Informed consent includes relevant information regarding assessment, diagnosis, nature and purpose of proposed treatment, and potential benefits and risks of the proposed treatment, along with professionally-recognized or evidence-based alternative treatment options, including no treatment, and their risks.[51]

Policy statement

Recognizing evidence is limited, the American Academy of Pediatric Dentistry supports additional research on the causative association between ankyloglossia and breastfeeding difficulties or speech articulation problems and between hyperplastic labial frenulum and increased risk of caries or periodontal disease due to interference with adequate oral hygiene. Further randomized controlled trials and other prospective studies of high methodological quality are necessary to determine the effects of frenotomy/frenectomy. With all surgical procedures, an informed consent is necessary. Informed consent includes relevant information regarding assessment, diagnosis, nature and purpose of proposed treatment, and potential benefits and risks of the proposed treatment, along with professionally-recognized or evidence-based alternative treatment options, including no treatment, and their risks.[51]

References

1. Canadian Agency for Drugs for Drugs and Technologies in Health. Frenectomy for the correction of ankyloglossia: A review of clinical effectiveness and guidelines. CADTH Rapid Response Reports; 2016 Jun 15. Available at: "https://www.ncbi.nlm.nih.gov/books/NBK373454/". Accessed July 1, 2019.
2. Walsh J, Links A, Boss E, Tunkel D. Ankyloglossia and lingual frenectomy: National trends in inpatient diagnosis and management in the United States, 1997-2012. Otolaryngal Head Neck Surg 2017;156(4):735-40.
3. Delli K, Livas C, Sculean A, Katsaros C, Bornstein M. Facts and myths regarding the maxillary midline frenum and its treatment: A systematic review of the literature. Germany Quintessence Int 2013;44(2):177-87.
4. Segal L, Stephenson R, Dawes M, Feldman P. Prevalence, diagnosis, and treatment of ankyloglossia. Can Fam Physician 2007;53(6):1027-33.
5. Boutsi EZ, Tatakis DN. Maxillary labial frenum attachment in children. Int J Paediatr Dent 2011;21(4):284-8.
6. John J, Weddell JA, Shin DE, Jones JJ. Gingivitis and periodontal disease. In: JA Dean, ed. McDonald and Avery's Dentistry for the Child and Adolescent, 10th ed. Maryland Heights, Mo.: Mosby Elsevier; 2016:243-73.
7. Finigan V, Long T. The effectiveness of frenulotomy on infant-feeding outcomes: A systemic literature review. Evidence Based Midwifery 2013;11(2):40-5.

8. O'Callahan C, Macary S, Clemente S. The effects of office-based frenotomy for anterior and posterior ankyloglossia on breastfeeding. Int J Pediatr Otorhinolaryngol 2013;77(5):827-32.
9. Webb AN, Hao W, Hong P. The effect of tongue-tie division on breastfeeding and speech articulation: A systematic review. Int J Pediatr Otorhinolaryngol 2013; 77(5):635-46.
10. Suter VG, Bornstein MM. Ankyloglossia: Facts and myths in diagnosis and treatment. J Periodontol 2009;80(8): 1204-19.
11. Huang W, Creath C. The midline diastema: A review of its etiology and treatment. Pediatr Dent 1995;17(3):171-7.
12. Knox I. Tongue tie and frenotomy in the breastfeeding newborn. Neo Reviews 2010;11(9):e513-9.
13. Walsh J, Tunkel D. Diagnosis and treatment of ankyloglossia in newborns and infants: A review. JAMA Otolaryngol Head Neck Surg 2017;143(10):1032-9.
14. Priyanka M, Sruthi R, Ramakrishnan T, Emmadj P, Ambalavanan N. An overview of frenal attachments. J Indian Soc Periodontol 2013;17(1):12-5.
15. Mintz SM, Siegel MA, Seider PJ. An overview of oral frena and their association with multiple syndromes and nonsyndromic conditions. Oral Surg Oral Med Oral Pathol Oral Radio/Endo 2005;99(3):321-4.
16. Neville BW, Damm DD, Allen CM, Chi AC. Developmental defects of the oral and maxillofacial region. In: Oral and Maxillofacial Pathology, 4th ed. St. Louis, Mo: Saunders Elsevier; 2016:9-10.
17. Coryllos E, Genna CW, Salloum A. Congenital tongue-tie and its impact on breastfeeding. In: Breastfeeding: Best for baby and mother. Am Acad Pedia (newsletter) 2004;Summer:1-7.
18. Pransky S, Lago D, Hong P. Breastfeeding difficulties and oral cavity anomalies: The influence of posterior ankyloglossia and upper-lip ties. Int J Pediatr Otorhinolaryngol 2015;79(10):1714-7.
19. Ghaheri B, Cole M, Fausel S, Chuop M, Mace J. Breastfeeding improvement following tongue-tie and lip-tie release: A prospective cohort study. Laryngoscope 2017; 127(5):1217-23.
20. Seigal S. Aerophagia induced reflux in breastfeeding infants with ankyloglossia and shortened maxillary labial frenula (tongue and lip tie). Int J Pediatr 2016;5(1):6-8.
21. Santa Maria C, Abby J, Truong MT, Thakur Y, Rea Sharon, Messner A. The superior labial frenulum in newborns: What is normal? Glob Pediatr Health 2017 Jul 12. Available at: "http://us.sagepub.com/en-us/nam/open-access-at-sage". Accessed July 1, 2019. (Archived by WebCite® at: "http://webcitation.org/74Ohw9Ggl")
22. Minsk L. The frenectomy as an adjunct to periodontal treatment. Compend Contin Educ Dent 2002;23(5): 424-6, 428.
23. Gkantidis N, Kolokitha OE, Topouzelis N. Management of maxillary midline diastema with emphasis on etiology. J Clin Pediatr Dent 2008;32(4):265-72.
24. Ochi J. Treating tongue-tie: Assessing the relationship between frenotomy and breastfeeding symptoms. Clin Lactation 2014;5(1):20-7.
25. Mallya SM, Lurie AG. Panoramic imaging. In: White S, Pharoah M, eds. Oral Radiology: Principles and Interpretation. 7th ed. St. Louis, Mo.: Mosby Elsevier; 2014: 166-84.
26. Wheeler B, Carrico CK, Shroff B, Brickhouse T, Laskin DM. Management of the maxillary diastema by various dental specialties. J Oral Maxillofac Surg 2018;76(4): 709-15.
27. World Health Organization. Breastfeeding. Geneva: World Health Organization; 2016. [cited 2016 Jun 2]. Available at: "http://www.who.int/topics/breastfeeding/en/". Accessed July 1, 2019. (Archived by WebCite® at: "http://www.webcitation.org/74oi8YxBV")
28. American Academy of Pediatrics. Breastfeeding and the use of human milk. Pediatrics 2012;129(3):e827-e841.
29. Ghaheri B, Cole M, Mace J. Revision lingual frenotomy improves patient-reported breastfeeding outcomes: A prospective cohort study. J Hum Lact 2018;34(3): 566-74.
30. Amir L, James J, Beatty J. Review of tongue-tie release at a tertiary maternity hospital. J Paediatr Child Health 2005;41(5-6):243-5.
31. Yoon A, Zaghi S, Ha S, Law C, Guilleminault C, Liu S. Ankyloglossia as a risk factor for maxillary hypoplasia and soft tissue elongation: A functional-morphological study. Orthod Craniofac Res 2017;20(4):237-44.
32. Yoon A, Zaghi S, Weitzman R, Ha S, Law C, Guilleminault C, Liu S. Toward a functional definition of ankyloglossia: Validating current grading scales for lingual frenulum length and tongue mobility in 1052 subjects. Sleep Breath 2017;21(3):767-75.
33. Dollberg S, Botzer E, Guins E, Mimouni F. Immediate nipple pain relief after frenotomy in breast-fed infants with ankyloglossia: A randomized, prospective study. J Pediatr Surg 2006;41(9):1598-600.
34. Geddes D, Langton D, Gollow I, Jacobs L, Hartmann P, Simmer K. Frenulotomy for breastfeeding infants with ankyloglossia: Effect on milk removal and sucking mechanism as imaged by ultrasound. Pediatrics 2008;122(1): e188-e194.
35. Ballard J, Auer C, Khoury J. Ankyloglossia: Assessment, incidence, and effect of frenuloplasty on the breastfeeding dyad. Pediatrics 2002;110(5):e63.
36. Srinivasan A, Dobrich C, Mitnick H, Feldman P. Ankyloglossia in breastfeeding infants: The effects of frenotomy on maternal nipple and latch. Breastfeed Med 2006;1(4): 216-24.

References continued on the next page.

37. O'Shea JE, Foster JP, O'Donnell, et al. Frenectomy for tongue-tie in newborn infants. Cochrane Library-Wiley Online Library. Available at: "http://cochranelibrary-wiley.com/doi/10.1002/14651858.CD011065.pub2/full". Accessed August 10, 2019.
38. Messner AH, Lalakea ML. The effect of ankyloglossia on speech in children. Otolaryngol Head Neck Surg 2002; 127(6):539-45.
39. Kupietzky A, Botzer E. Ankyloglossia in the infant and young child: Clinical suggestions for diagnosis and management. Pediatr Dent 2005;27(1):40-6.
41. Kummer AW. Ankyloglossia: To clip or not to clip? That's the question. ASHA Lead 2005;10(1):6-30.
40. Hazelbaker AK. Impact: speech and orofacial considerations. In: Tongue-Tie Morphogenesis, Impact, Assessment and Treatment. Columbus, Ohio: Aidan & Eva Press; 2010:107-13.
42. Lalakea M, Messner A. Ankyloglossia: Does it matter? Pediatr Clin North Am 2003;50(2):381-97.
43. Buryk M, Bloom D, Shope T. Efficacy of neonatal release of ankyloglossia: A randomized trial. Pediatrics 2011;128 (2):280-8.
44. Devishree G, Gujjari SK, Shubhashini PV. Frenectomy: A review with the reports of surgical techniques. J Clin Dent Res 2012;6(9):1587-92.
45. Kaban L, Troulis M. Intraoral soft tissue abnormalities. In: Pediatric Oral and Maxillofacial Surgery. Philadelphia, Pa.: Saunders; 2004:146-68.
46. Olivi G, Chaumanet G, Genovese MD, Beneduce C, Andreana S. Er,Cr:YSGG laser labial frenectomy: A clinical retrospective evaluation of 156 consecutive cases. Gen Dent 2010;58(3):e126-33.
47. Hogan M, Wescott C, Griffiths M. Randomized, controlled trial of division of tongue-tie in infants with feeding problems. J Paediatr Child Health 2005;41(5-6):246-50.
48. Díaz-Pizán M, Lagravère M, Villena R. Midline diastema and frenum morphology in the primary dentition. J Dent 2006;26(1):11-4.
49. Gontijo I, Navarro R, Haypek P, Ciamponi A, Haddad A. The applications of diode and Er:YAG lasers in labial frenectomy in infant patients. J Dent Child 2005;72(1): 10-5.
50. Kara C. Evaluation of patient perceptions of frenectomy: A comparison of Nd:YAG laser and conventional techniques. Photomed Laser Surg 2008;26(2):147-52.
51. American Academy of Pediatric Dentistry. Informed consent. The Reference Manual of Pediatric Dentistry. Chicago, Ill.: American Academy of Pediatric Dentistry; 2019:439-42.