Tethered Oral Tissues and Infant Oral Assessment

Marsha Walker, RN, IBCLC
Marshalact@gmail.com

1

2

Controversy!!
Researchers and clinicians do not always agree on many issues related to tongue-tie, such as:

- The definition of a lingual frenulum
- What a tongue-tie is
- What a labial tie is
- What a buccal tie is
- How to identify tethered oral tissues (TOT)
- What effect they have on breastfeeding, dentition, and speech
- What to do about them, if anything
- How to fix them
- What interventions to recommend following TOT revisions

3

Tongue-tie is nothing new

- Recognized since the days of Aristotle in third century BC
- Tongue-tie or ankyloglossia from the Greek “agkilos” (curved) and “glossa” (tongue).
- 7th century AD has medical reports of dividing a tongue-tie
- In Middle Ages, competition between midwives who used a sharpened fingernail and surgeons who could use instruments
- Tongue-ties were routinely released through the early 1900s
- When bottle-feeding became the norm in the 1950s, tongue-ties and their division fell out of favor
- Resurgence of breastfeeding caused this to become controversial
- ↑ in diagnosis of tongue-tie in US by 834% from 1997-2012 (Walsh et al, 2017)
- Incidence 0.02-12%

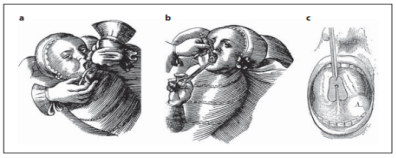


Fig. 1. Woodcuts showing the operative techniques of Fabricius [14] in 1620 (**a**) ['the tongue is held with a handkerchief and the band loosened with a falciform knifelet'] and Sculletus [15] in 1666 (**b**) ['how the surgeon lifts the tongue with a silver instrument and dissects the attached band with a small sharp scissors']. **c** Ranula (grenouillette) with Petit's spatula on frenulum [30].

4

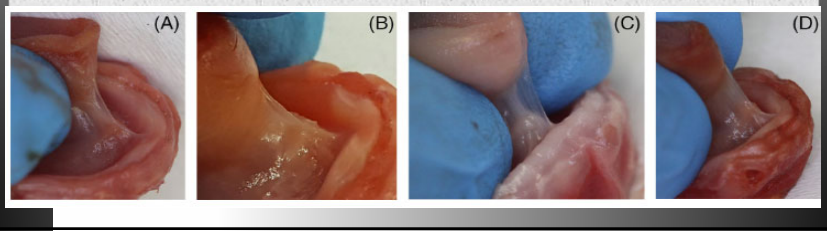
Uncertainty and cautions

- An online survey found that professional opinions about tongue-tie varied greatly based on profession and geography
  - Jin et al. (2018). Acta Paediatr, 107,1733-1738
- A study looked at Website quality and trends for ankyloglossia, and found that the quality of Websites is good but many of the published Websites available to patients are opinion pieces without clear sources and with inherent bias toward performing frenotomy for tongue-tie
  - Aaronson et al. (2018). Ann Otol Rhinol Laryngol, 127:439-444
- Some infants will indeed benefit from frenotomy and others who have multifactorial causes of feeding difficulty may have minimal or no benefit from the procedure.

5

Definition of lingual frenulum

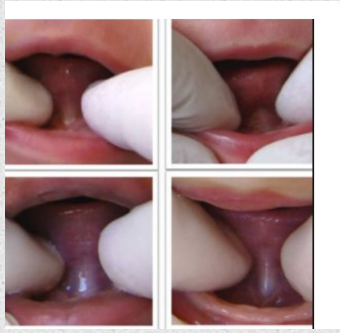
- Variously defined as "midline submucosal string," "band," "mast," "cord"
- Upon dissection, it was seen as a dynamically layered structure formed by oral mucosa and the underlying fascia covering the floor of the mouth
- Tongue mobilization creates tension in the fascial layer, raising the fascia and overlying mucosa into a midline fold that is recognizable as the lingual frenulum or anterior lingual frenulum (Mills et al, 2019)



6

Posterior lingual frenulum

- Low attachment of floor of mouth fascia
- Can normally occur in up to 35% of infants without necessarily interfering with breastfeeding
- Martinelli et al, 2016

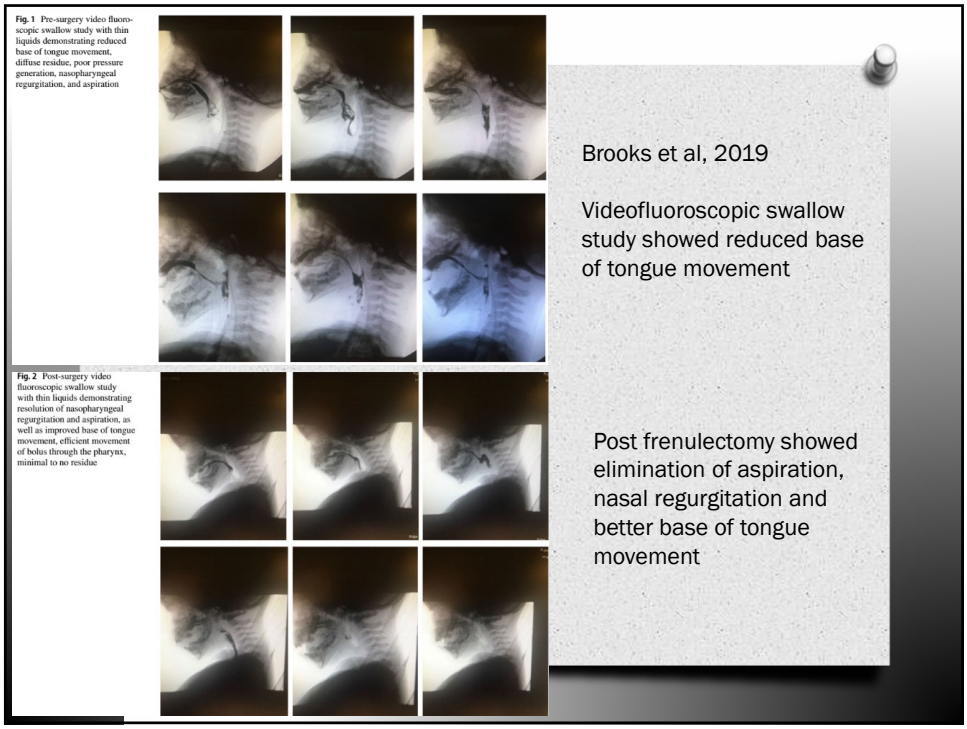


7

The posterior tongue

- Base of tongue retracts against posterior pharyngeal wall generating pressure that helps move bolus through back of mouth
- Reduced base of tongue movement could interfere with swallowing
- During breastfeeding, could see nasal regurgitation, gagging, choking, coughing, aspiration
- May be altered in infants with congenital Zika syndrome (Fonteles et al, 2018)

8



9

Upper lip (superior) labial frenulum

- Small, non-muscular triangular fold of connective tissue that extends from the midline maxillary gingiva into the vestibule and central upper lip
- Involved in creating a seal around breast tissue
- Has many morphological components with varying distributions
- Attachment site for maxillary labial frenulum alone is not a sufficient population discriminator for lip tethering

10

Ray et al. JAMA Otolaryngol Head Neck Surg 2019; doi:10.1001/jamaoto.2019.2302

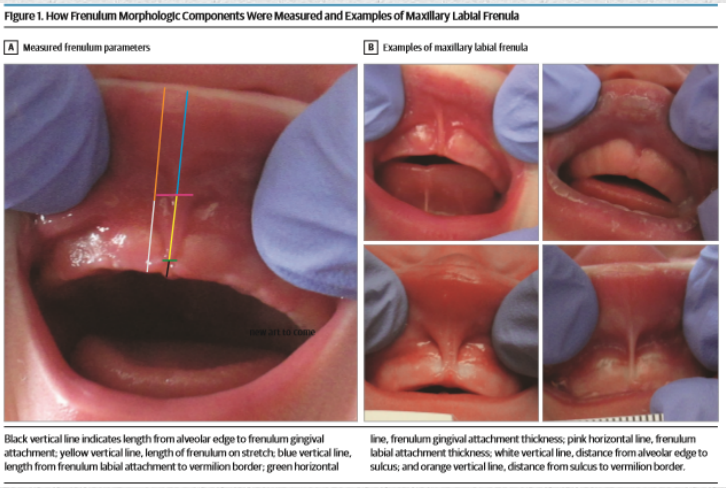


Figure 1. How Frenulum Morphologic Components Were Measured and Examples of Maxillary Labial Frenula

A Measured frenulum parameters

B Examples of maxillary labial frenula

Black vertical line indicates length from alveolar edge to frenulum gingival attachment; yellow vertical line, length of frenulum on stretch; blue vertical line, length from frenulum labial attachment to vermilion border; green horizontal line, frenulum gingival attachment thickness; pink horizontal line, frenulum labial attachment thickness; white vertical line, distance from alveolar edge to sulcus; and orange vertical line, distance from sulcus to vermilion border.

11

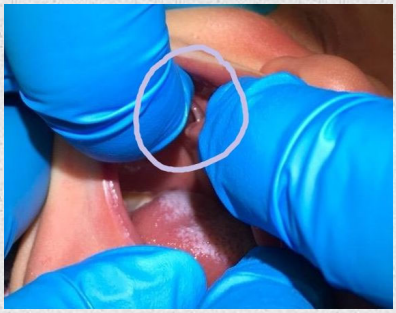
Buccal frena

- Buccal ties are uncommon
- Buccal ties are abnormal mucosal tethers extending from the checks to the gingiva
- Most are small and without medical significance
- Buccal ties can interfere with the gape response, labial seal causing aerophagia (swallowing of air), stabilizing the nipple, creating vacuum
- Possible decrease in suction

12

Buccal tie

Green arrow points to right buccal tie and the blue arrow points to an upper lip tie. There is an irritation granuloma developing on the buccal tie.



http://www.firstfoodforbaby.com/tongue-lip--buccal-ties.html

13

Lingual frenulum assessment

- Assessment Tool for Lingual Frenulum Function (ATLFF)
  - Hazelbaker AK. The assessment tool for lingual frenulum function (ATLFF): Use in a lactation consultant private practice. Pasadena, California, Pacific Oaks College; 1993
- Bristol Tongue-tie Assessment Tool (BTAT)
  - Ingram J et al. The development of a tongue assessment tool to assist with tongue-tie identification. Arch Dis Child Fetal neonatal Ed 2015;100:F344-F348
- Coryllos classification system
  - Watson Genna C. Supporting sucking skills. Jones & Bartlett Learning, Burlington, MA: 2013
- Lingual Frenulum Protocol with Scores for Infants
  - Martinelli et al. Lingual frenulum protocol with scores for infants. Intl J Orofacial Myology 2012;38:104-112
- Tongue-tie and Breastfed Babies (TABBY)
  - Ingram J et al. The development and evaluation of a picture tongue assessment tool for tongue-tie in breastfed babies (TABBY). Intl Breastfeed J 2019;14:31
- Kotlow
  - Kotlow LA. Oral Diagnosis of Abnormal Frenum Attachments in Neonates and Infants: Evaluation and Treatment of the Maxillary and Lingual Frenum using the Erbium: YAG Laser. J Pediatr Dental Care 2004;10:

14

ATLFF (Hazelbaker)

Appearance Items

Appearance of tongue when lifted
2: Round or square
1: Slight cleft in tip apparent
0: Heart- or V-shaped

Elasticity of frenulum
2: Very elastic
1: Moderately elastic
0: Little or no elasticity

Length of lingual frenulum when tongue lifted
2: > 1 cm
1: 1 cm
0: <1 cm

Attachment of lingual frenulum to tongue
2: Posterior to tip
1: At tip
0: Notched tip

Attachment of lingual frenulum to inferior
2: Entire edge, firm cup
1: Side edges only, moderate cup
0: Poor or no cup

Peristalsis
2: Complete, anterior to posterior
1: Partial, originating posterior to tip
0: None or reverse motion

Snapback
2: None
1: Periodic
0: Frequent or with each suck

Function Items

Lateralization
2: Complete
1: Body of tongue but not tongue tip
0: None

Lift of tongue
2: Tip to mid-mouth
1: Only edges to mid-mouth
0: Tip stays at lower alveolar ridge or rises to mid-mouth only with jaw closure

Extension of tongue
2: Tip over lower lip
1: Tip over lower gum only
0: Neither of the above, or anterior or mid-tongue humps

Spread of anterior tongue
2: Complete
1: Moderate or partial
0: Little or none

Cupping alveolar ridge
2: Attached to floor of mouth or well below ridge
1: Attached just below ridge
0: Attached at ridge

*The infant's tongue is assessed using the 5 appearance items and the 7 function items. Significant ankyloglossia is diagnosed when the appearance score total is 8 or less and/or the function score total is 11 or less. (2;3)

15

Bristol Tongue Assessment Tool (BTAT)

	0	1	2	Score
Tongue tip appearance	Heart shaped	Slight cleft/notched	Rounded	
Attachment of frenulum to lower gum ridge	Attached at top of gum ridge	Attached to inner aspect of gum	Attached to floor of mouth	
Lift of tongue with mouth wide (crying)	Minimal tongue lift	Edges only to mid-mouth	Full tongue lift to mid-mouth	
Protrusion of tongue	Tip stays behind gum	Tip over gum	Tip can extend over lower lip	

Score of 0-3 indicate severe restriction of tongue function
Showed good correlation with ALTFF

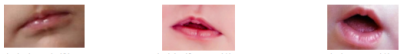
16

CLINICAL EXAMINATION

(Video to future analysis suggested)

PART I – ANATOMO-FUNCTIONAL EVALUATION

1. Lip posture at rest



( ) closed (0) ( ) half-open (1) ( ) open (1)

2. Tongue posture during crying

( ) midline (0) ( ) elevated (0) ( ) midline with the lateral elevated (2) ( ) down (2)

3. Tongue shape when elevated during crying

( ) round (0) ( ) V-shaped (2) ( ) heart-shaped (3)

Lingual frenulum protocol with scores for infants

4. Lingual Frenulum

( ) visible ( ) not visible ( ) visible with maneuver (*)

IF THE LINGUAL FRENULUM IS NOT VISIBLE, GO TO PART II (evaluation of orofacial functions)

4.1. Frenulum thickness

( ) thin (0) ( ) thick (2)

4.2. Frenulum attachment to the tongue

( ) midline (0) ( ) between midline and apex (1) ( ) apex (3)

4.3. Frenulum attachment to the floor of the mouth

( ) visible from the caruncles (0) ( ) visible from the crest (1)

17

PART II – EVALUATION OF NON-NUTRITIVE SUCKING AND NUTRITIVE SUCKING

1. Non-nutritive sucking (little finger suction wearing gloss)

1.1. Tongue movement

( ) adequate: tongue protrusion, coordinated movements and efficient suction (0)

( ) inadequate: restricted tongue protrusion, uncoordinated movement and late suction start (1)

2. Nutritive sucking during breastfeeding (when breastfeeding starts, observe infant sucking during 5 minutes)

2.1. Suction Rhythm (observe groups of suction and pauses)

( ) several suctions in a row followed by short pauses (0)

( ) a few suctions followed by long pauses (1)

2.2. Coordination among suction/ swallowing/ breathing

( ) adequate (0) (balance between feeding and suction-swallowing-breathing without stress)

( ) inadequate (1) (cough, choking, dyspnea, regurgitation, hiccup, noises during deglutition)

2.3. Nipple chewing

( ) no (0)

( ) yes (2)

2.4. Clicking during sucking

( ) no (0)

( ) non-systematic (1)

( ) frequent (2)

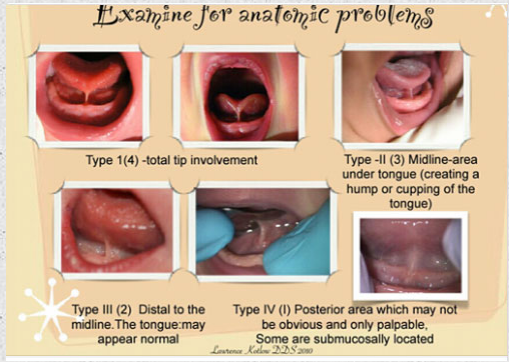
Non-nutritive sucking and nutritive sucking evaluation scores: Best result = 0 Worst result = 7

HYSTORY + CLINICAL EXAMINATION TOTAL SCORES: BEST RESULT=0 WORST RESULT= 27

WHEN THE SUM OF HISTORY AND CLINICAL EXAMINATION IS EQUAL OR MORE THAN 9, LINGUAL FRENULUM MAY BE CONSIDERED ALTERED.

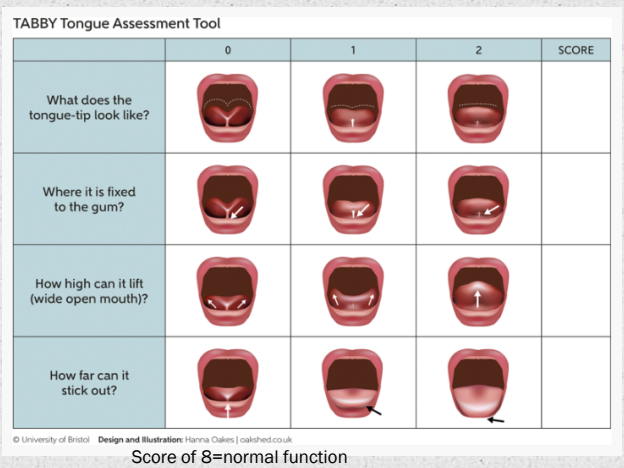
18

Kotlow classification



19

TABBY assessment tool



Score of 8=normal function
Score of 6 or 7=borderline
Score of 5 or below=tongue function impairment

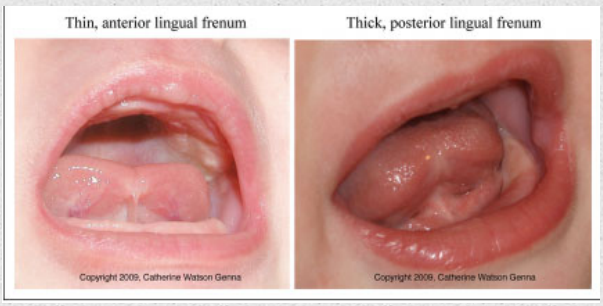
20

Coryllos' 4-type description

- Type 1 = classical (anterior) lingual frenulum; attachment of frenulum to the tongue tip, usually in front of the alveolar ridge in the lower lip sulcus
- Type 2: 2-4 mm behind the tongue tip and attaches on or just behind the alveolar ridge
- Type 3: **Posterior lingual frenulum;** tongue-tie is attachment to the mid-tongue
- Type IV: essentially against the base of the tongue; thick, shiny and very inelastic

Coryllos et al. (2004)

21



Left: Classic, thin anterior tie reducing tongue elevation. Notch in midline of tongue. Notice sucking blisters

Right: Thick posterior frenulum visible as white line on posterior floor of mouth. Palpation reveals taut, firm, "speed bump"

22

Maxillary frenulum assessment

- Kotlow maxillary lip tie classification
  - Kotlow LA. Diagnosing and understanding the maxillary lip-tie (superior labial, the maxillary labial frenum) as it relates to breastfeeding. J Hum Lact 2013;29:458-464
- Stanford superior labial frenulum classification
  - Santa Maria C et al. The superior labial frenulum in newborns: What is normal? Global Pediatric Health 2017;4:1-6

23

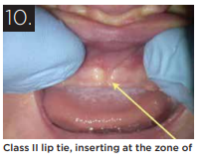
Kotlow maxillary lip tie classification

Location of the lip-tie is based on the zone of attachment of the inner lip's mucosa.

9.

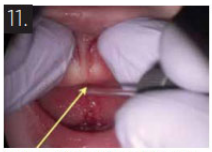
Class I lip-tie

10.



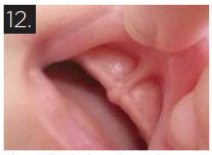
Class II lip tie, inserting at the zone of the free and attached gingival tissue

11.



Class III lip-tie inserting at the zone between the areas of the future central incisors

12.



Class IV lip-tie, inserting at the zone extending into the anterior palatal area

24

Stanford superior labial frenulum classification

Figure 1. Stanford superior labial frenulum classification. Type 1: Insertion of the frenulum is near the mucogingival junction. Type 2: Insertion is along the mid attached gingiva. Type 3: Insertion is along inferior margin at the alveolar papilla, and can continue to the posterior surface.

Most infants (83%) were Type 2
Poor interrater reliability

25

26

Problems with maxillary lip tie classification systems

- Classification may have evaluated older infants, not neonates
- May only be anatomical and not correlated with clinical breastfeeding difficulties
- Classification may not have been validated on a functional basis
- May not be reproducible by clinicians
- Authors and "experts" may have competing interests
- Some practitioners advertise themselves on the web claiming non-existent complication rates and major benefits without supporting evidence

27

Assessing buccal ties

- Buccal ties can be asymmetrical with some ties on both sides and some on only one side
- May change as child gets older
- Most are small and of no significance
- No measurements or classification systems
- Just because they are visible does not mean they need to be released
- These are very rare and only in severe cases would revision be necessary

Buccal ties

http://bfmedaz.com/tongue-tie/

28

Finger sweep for assessing posterior tongue tie-Dr. James Murphy

- Insert your 5th finger, pad down, into the left side of the infant's mouth under the tongue
- Advance the finger until meeting firm resistance
- Holding the finger at this depth, move the finger directly to the right side of the infant's mouth.
- No resistance = no Tongue Tie
- Tongue vibrates only = Small Speed Bump = Small Risk of latch problems
- Tongue moves far to the right then swings back = Large Speed Bump = usually a problem
- Won't move to the right = a fence = always a problem at some point in life, now or later

29

James Murphy finger sweep

30

Finding a posterior tie

- Elevate and push tongue back simultaneously
- Some studies show the occurrence of posterior frenulum at 35%
- May be normal in many infants and not causing problems

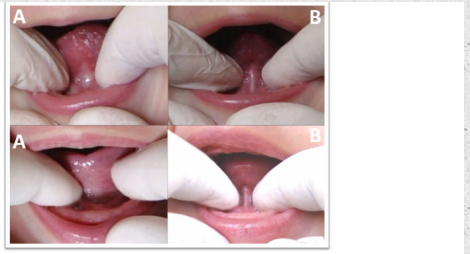


Figure 3. (A) posterior frenulum not visualized by elevating the lateral margins of the tongue (simple maneuver); (B) same lingual frenulum visualized by means of the special maneuver consisting in elevating and pushing the tongue back, simultaneously

31

Problems with rating and classification systems

- May be too complicated to use in clinical practice
- Nuances or measurements may be slight or difficult to discern without actually measuring the frenulum
- Generally look only at structure or appearance and not function
- Often have very poor interrater reliability
- Should not be only criteria in determining interventions

32

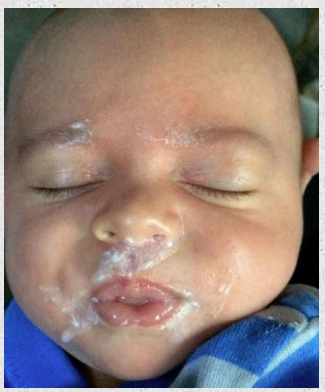
Signs of frenulum restrictions

- Infant has a high or narrow palate
- Tongue normally rests pressed against hard palate in utero
- Lingual tie prevents tongue from assuming this posture
- Hard palate is maleable and without gentle rounding guidance from tongue, may take the form of high or narrow complicating breastfeeding because tongue cannot press nipple against palate

33

Signs of frenulum restrictions

- Milk leakage out of mouth
- Nasal regurgitation
- May indicate shallow latch, poor tone, lack of recruitment of compensatory muscles



34

Signs of frenulum restriction

- Sucking blisters on infant's lips
- Overcompensation of facial muscles to maintain latch
- Infant may still obtain milk in presence of ties due to abundant milk supply, forceful milk ejection reflex

https://www.infantlaserdentistry.com/infant-nursing-challenges-and-concerns.html

35

Signs of frenulum restriction

- Milk tongue
- Typically only in center of tongue compared to thrush
- Tongue cannot elevate high enough to clear milk by cleansing against the hard palate

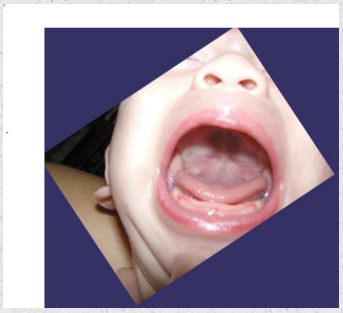
https://www.infantlaserdentistry.com/infant-nursing-challenges-and-concerns.html

Thrush

36

Signs of frenulum restriction

- Low tongue posture
- Sides of the tongue are raised
- Front of tongue pulls downward
- Tongue appears flattened against floor of mouth



http://www.cwgenna.com/ttidentify.html

37

Signs of frenulum restriction

- Aerophagia
- Poor seal around the breast may contribute to excessive swallowing of air
- May see excessive gas in infant, reflux, bloating, excessive spitting up, crying

Kotlow L. Clinical Lactation 2011; 2(4):25-29

38

Nipple deformity

39

Signs of interference with breastfeeding

Infant Signs/Symptoms	Mechanism
Poor latch	Inadequate seal, inability to manipulate nipple/areola into position
Clicking sound while nursing	Intermittent loss of seal
Gradual sliding off breast	Inability to maintain hold on nipple/areola
"Chewing"	Failure to inhibit bite reflex; compensatory use of jaw muscles to maintain nipple position
Ineffective milk transfer	Failure of breast emptying
Poor weight gain or weight loss	Failure of milk transfer
Hypernatremic dehydration (18)	Unrecognized severe failure of milk transfer
Fussiness and arching away from breast	Infant response to frustration
Falling asleep at breast	Infant exhaustion
Maternal Signs/Symptoms	**Mechanism**
Nipple trauma: pain, blister, crack, bleeding, scab	Localized ischemia from sustained point compression; tissue destruction from repetitive crush or roll, excessive vacuum (19)
Painful breasts	Engorgement from failure to empty during primary lactogenesis; infection
Low milk supply	Failure of secondary lactogenesis from failure to empty
Plugged ducts	Stasis from failure to empty
Mastitis	Failure to empty with bacterial ingress from nipple tissue barrier break
Frustration, disappointment, discouragement about breastfeeding	Pain, infant frustration, sense of failure because of inability to nourish infant
Untimely weaning	Lack of availability of tongue tie diagnosis and remediation

https://neoreviews.aappublications.org/content/neoreviews/11/9/e513.full.pdf

40

Potential interference with speech

- Lingual tie
  - Reduced ability to retract tongue for k,g,h
  - Reduced ability to elevate/depress tongue tip for s,z
  - Reduced ability to elevate tongue tip for t,d,l,n
- Labial tie
  - Reduced lip rounding for w
  - Compensatory jaw jutting for f and v
- Buccal tie
  - Decreased ability to contract cheeks during production of o,u,w

41

Tongue placement and breastfeeding

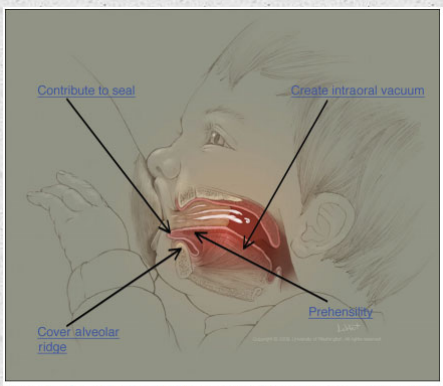


Figure 2. During nursing, the infant's tongue must: 1) protrude over the alveolar ridge to inhibit the bite reflex, 2) assist the flanged lips in maintaining an airtight seal on the areola, 3) with its prehensile function, manipulate the nipple into the proper position (note the depth of the nipple tip and its proximity to the hard-soft palate junction), and 4) via distal-to-proximal muscular contractions that end with the lowering of the base of the tongue, produce an intraoral vacuum, resulting in milk flow.

https://neoreviews.aappublications.org/content/neoreviews/11/9/e513.full.pdf

42

Tongue placement and breastfeeding

Douglas P et al. Midwifery 2018; 58:145-155

43

Does TOT revision make a difference?

Geddes DT et al. Pediatrics 2008; 122:e188-e194

- 24 infants with lingual tongue-tie underwent revision with scissors
- Total milk production pre-frenotomy 455 ± 323 g (16.05 oz ±11.39 oz)
- Total milk production post-frenotomy 615 ± 289 g (21.69 oz ± 10.19 oz)

TABLE 2 Characteristics of the Breastfeed Infants Monitored Before and ≥7 Days After Frenulotomy

Variable	Prefrenulotomy	Postfrenulotomy
Milk intake	50.5 ± 29.1 g	69.1 ± 31.9 g[a]
Milk transfer, mL/min	5.6 ± 3.0 g	10.5 ± 5.5 g[a]
LATCH score	7.9 ± 1.4	9.4 ± 0.8[b]
Pain score	3.6 ± 3.0	0.5 ± 1.2[b]
Nipple shield, *n/N*	4/24	1/24

[a] $P < .01$.
[b] $P < .05$.

44

Does TOT revision make a difference?

- Observational analysis of the ultrasound scans revealed 2 distinct patterns of sucking by the infants before frenulotomy.
- One group of infants (11 of 24 [46%]) placed the nipple close to the HSPJ and pinched the base of the nipple
- Second group (9 of 24 [37%]) placed the nipple further away from the HSPJ, and the posterior tongue seemed to hump compressing the tip of the nipple to a point

45

Ultrasound pre- and post-frenotomy

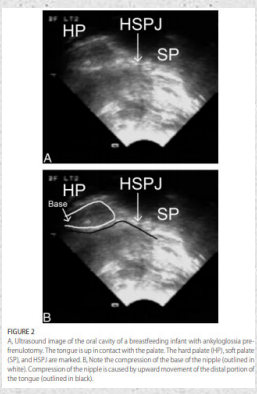


FIGURE 2
A, Ultrasound image of the oral cavity of a breastfeeding infant with ankyloglossia pre-frenulotomy. The tongue is up in contact with the palate. The hard palate (HP), soft palate (SP), and HSPJ are marked. B, Note the compression of the base of the nipple (outlined in white). Compression of the nipple is caused by upward movement of the distal portion of the tongue (outlined in black).

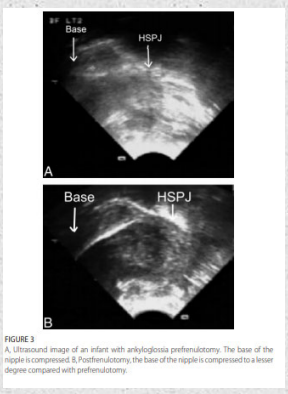


FIGURE 3
A, Ultrasound image of an infant with ankyloglossia prefrenulotomy. The base of the nipple is compressed. B, Posfrenulotomy, the base of the nipple is compressed to a lesser degree compared with prefrenulotomy.

46

Ultrasound pre- and post-frenotomy

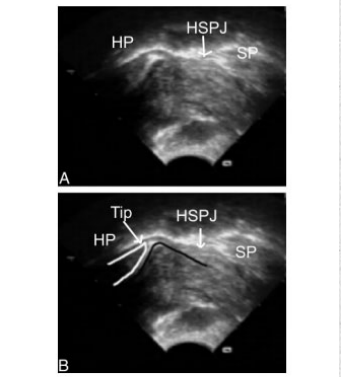


FIGURE 4
A, Ultrasound image of the oral cavity of a breastfeeding infant with ankyloglossia prefrenulotomy. The tongue is up in contact with the palate. The hard palate (HP), soft palate (SP), and HSPJ are marked. B, Note the compression of the tip of the nipple (outlined in white). The tongue appears "humped" distal to the nipple (outlined in black).

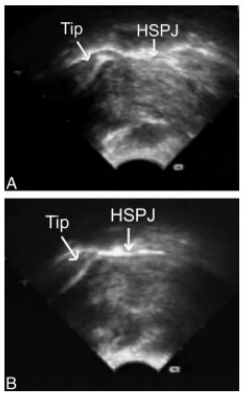
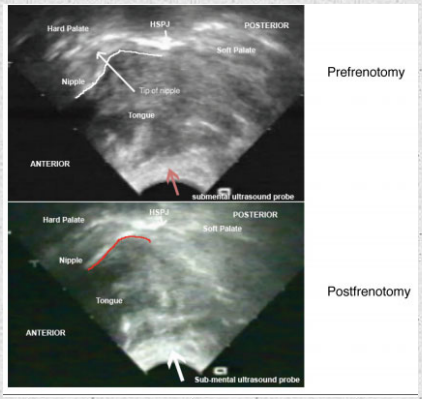


FIGURE 5
A, Ultrasound image of an infant with ankyloglossia prefrenulotomy. The tip of the nipple is compressed. B, Postfrenulotomy the tip of the nipple is compressed to a lesser degree compared with prefrenulotomy.

47

Pre- and post-frenotomy

- Post-frenotomy shows smoother contour of the back of the tongue which no longer deforms the nipple
- Probably where much of the nipple pain and damage originates



48

Frenotomy Decision Rule for Breastfeeding Infants

Mother with nipple pain or trauma while breastfeeding

AND/OR

inability to maintain latch

AND/OR

poor weight gain in the infant (≤15 g/d)

AND

a visible membrane anterior to the base of the tongue, which restricts tongue movement, leading to:

inability to touch the roof of the mouth

OR

inability to cup an examining finger

OR

inability to protrude the tongue past the gum line

(Reproduced with permission from Srinivasan A, Dobrich C, Mitnick H, Feldman P. *Breastfeed Med.* 2006;1[4]:218.)

49

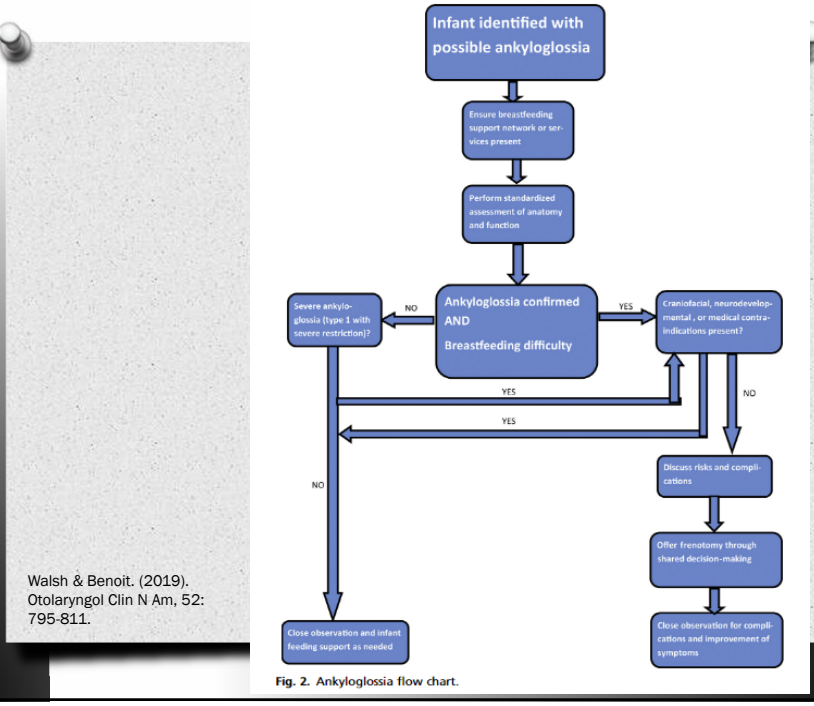


Fig. 2. Ankyloglossia flow chart.

Walsh & Benoit. (2019). Otolaryngol Clin N Am, 52: 795-811.

50

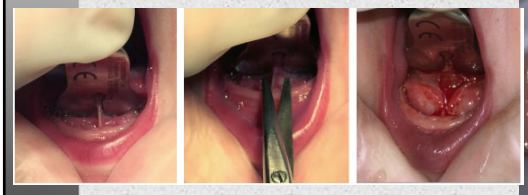
Making the decision

- Is restriction present
- Check both appearance and function
- Does tongue/lip/cheek alteration interfere with breastfeeding
- Might the restriction also interfere with speech
- What are maternal and infant signs and symptoms
  - Nipple pain/damage
  - Infant weight gain issues
  - Excessively long feeding sessions
  - Milk production problems
- Do parents wish to initiate corrective procedure
- Do parents understand the risks of the procedure and that it may not always fix the problem, at least not immediately
- Is mother ready to abandon breastfeeding
- Better breastfeeding outcome noted when tie revision done by 72 hours postpartum
  - Todd & Hogan. Breastfeeding Review 2015; 23:11-16

51

Procedure (Pros and Cons)

Scissors



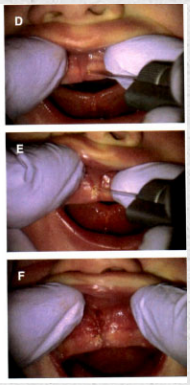
Hospital or office procedure
Pediatrician or ENT

Light scalpel CO_2 laser (diode, Erbium)

Less pain
Promotes hemostasis
Creates clear surgical site
Reduces post-surgical edema
Avoid excising nerves, muscles, lingual glands
Needs specialized equipment and providers

52

Maxillary lip tie release



https://www.kiddsteeth.com/assets/pdfs/articles/drkotlowarticlemay2011.pdf

53

Pre-frenotomy activities

- Many protocols and suggestions with little research, consistency, or validation
- Some say to delay procedure for up to several weeks to engage in pre-frenotomy activities
- Accustoms the infant to how things about the mouth are supposed to move
- Prepare and re-pattern tongue function
- Strengthen intrinsic and extrinsic tongue muscles
- Offer tummy time opportunities

54

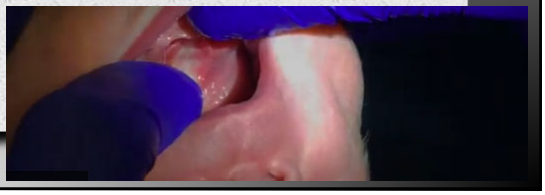
Pre-frenotomy activities www.Drghaheri.com

- SUCKING EXERCISES
- It's important to remember that you need to show your child that not everything that you are going to do to the mouth is associated with pain. Additionally, babies can have disorganized or weak sucking patterns that can benefit from exercises. Starting these exercises from the moment you make your appointment can speed up your recovery after the procedure. The following exercises are simple and can be done to improve suck quality. Aim for 4x/day leading up to the day of your procedure.
- Slowly rub the lower gumline from side to side and your baby's tongue will follow your finger. This will help strengthen the lateral movements of the tongue.
- Let your child suck on your finger and do a tug-of-war, slowly trying to pull your finger out while they try to suck it back in. This strengthens the tongue itself. This can also be done with a pacifier.
- Let your child suck your finger and apply gentle pressure to the palate. Once the baby starts to suck on your finger, just press down with the back of your nail into the tongue. This usually interrupts the sucking motion while the baby pushes back against you. Listen for a seal break and then put your finger back up into the palate to re-stimulate sucking. Repeat as tolerated.
- With one index finger inside the baby's cheek, use your thumb outside the cheek to massage the cheeks on either side to help lessen the tension.

55

Post procedure exercises

- Controversial
- Some say no exercises needed
- Some say stretching exercises for 6 weeks
- Dr. Ghaheri-4 weeks
  - Stretches 6x/day for 3 weeks, then 4th week taper down to end at 4 weeks, not going more than 6 hours between stretches
- Dr. Baxter
  - Stretches 6x/day for 3 weeks



56

Are there contraindications or cautions?

- Should check with pediatrician prior to any procedures
- Any airway compromise which could worsen with increased tongue mobility
  - Macroglossia
  - Small mandible
  - Pierre Robin Sequence
  - Laryngomalacia
  - Tracheomalacia
- Genetic anomalies of a more complex nature
- Familial bleeding history
- Infection/fever
- Illness
- Questionable ability for follow-up

57

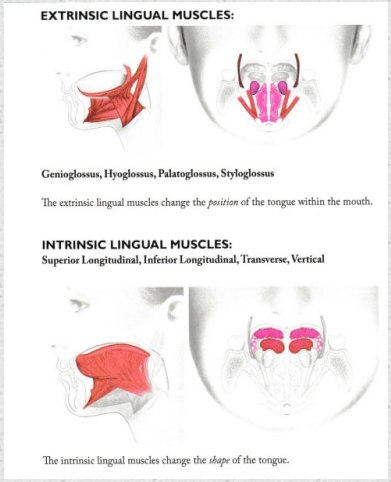
What if it doesn't work?

- Should the revision be revised
- Infant may have other issues (mandible position,
- Most but not all revisions result in improved breastfeeding, reduced nipple pain and damage
- Some studies show up to 22% of revisions do not result in better breastfeeding
- Some studies and clinicians postulate that the longer the revision is delayed the less likely the procedure will be successful
- Infant may have recruited other muscles and altered sucking patterns to compensate for tethered oral tissues

58

Other muscle involvement

- Tongue composed of 8 muscles
- Intrinsic originate and attach within the body of the tongue
- Extrinsic originate outside the body of the tongue and attach within it
- Muscles work in pairs, unequal contraction, weakness or strength, may cause the tongue to still not work as desired
- Other breastfeeding issues may also be in play



Gatto K. Understanding the orofacial complex. Outskirts Press, Denver CO: 2016

59

Bodywork

- Bodyworkers locate areas of the body impacted by restriction, tightness, decreased mobility, asymmetry and mobilize these areas
- May be helpful whether or not revision is successful
- Orofacial myology
- Chiropractic
- Craniosacral
- Osteopathic
- Speech and Language Pathologist (SLP)
- Occupational therapy
- Physical therapy

60

When parents decide against revision

- Is breastfeeding uncomfortable/painful but still effective?
- Is breastfeeding comfortable but ineffective?
- Is breastfeeding comfortable and effective
- Is breastfeeding uncomfortable and ineffective?
- All of this can change over time and may require long term follow-up
- Some mothers may have particular breast/nipple or milk ejection characteristics that allow successful breastfeeding in presence of TOT

61

Considerations when revision will not be done

- 1. Monitor infant weight
  - Some infants rely on an ample milk supply and strong milk ejection to gain weight in the early days and weeks
  - This may change as baby gets older and must rely on generating vacuum to maintain milk production
- 2. Maintain milk production
  - Create an overabundance of milk
  - May need to pump milk several times per day

62

Considerations when revision will not be done

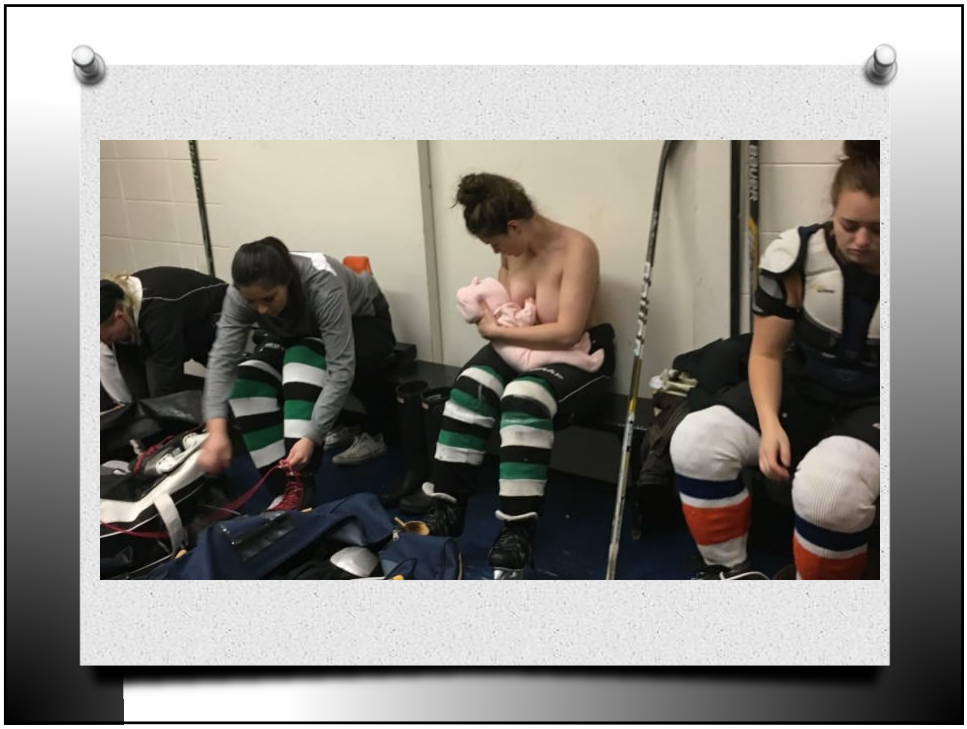
- 3. Manage nipple discomfort/pain/damage
  - Can try nipple shield
- 4. Try different nursing positions
  - Ventral or prone positioning may use gravity to bring tongue forward
- 5. General sucking exercises to strengthen tongue muscles bilaterally
  - Finger tug
  - Lateral tongue stimulation
- 6. Consider bodywork and referrals such as:
  - Myofacial/myofunctional therapy
    - Exercises to strengthen and maintain range of motion for jaw, lips, cheeks, and tongue
  - SLP referral for impact on speech and feeding
  - Chiropractic, cranio-sacral

63

Resources

- International Affiliation of Tongue-tie Professionals (IATP)
  - https://tonguetieprofessionals.org/
- International Association of Orofacial Myology
  - https://www.iaom.com/
- Ankyloglossia Bodyworkers
  - http://www.ankyloglossiabodyworkers.com/

64



65