TONGUE-TIE AND BREASTFEEDING

Clinical assessment and management of Ankyloglossia in the newborn

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Disclosures

- I have no significant financial or other relationships to disclose.
By the end of this workshop, participants will be able to:

- Discuss the **anatomy, physiology and functional problems** created by ankyloglossia
- Be familiar with the **research** on frenotomy for breastfeeding problems
- Describe principles of infant **oral evaluation** and indications for frenotomy
- Review equipment, technique and office practice of frenotomy
- Understand post-procedure care and expected outcomes
Definitions

- **Ankyloglossia:**
  - A short lingual frenulum which alters or restricts the function/movement of the tongue
  - Frenum = frenulum
  - Frenotomy = frenulotomy
    - Incision of frenulum **without** suturing
  - Frenectomy/frenuloplasty
    - Surgical incision and/or removal **with** suturing
Epidemiology of Ankyloglossia

- **Prevalence:** 3-5% (4.8%)
  - Higher if include posterior tongue tie

- **Male:female ratio 2:1**
  - (1:1 if include posterior tongue-tie)

- Affects all ethnic groups, can run in families

- 25-40% of babies with ankyloglossia will have breastfeeding difficulty
Frenotomy
common throughout history

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 Scultetus [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].

Fig. 2. Surgical instruments for frenotomy. From left to right: tongue-lifter of Scultetus [15] in 1666; tongue fork of Mauriceau [16] in 1680; sonde cannelée of Petit [20] in 1774; blunt curved scissors proposed by Schmitt [51] in 1804; lateral view of scissors.

M. Obladen, Neonatology 2010; 97:83-89
What is old is new again

- Before 1940: done routinely at birth
- Less popular in late 20th century
  - Availability of formula
  - Not indicated routinely at birth
  - Less commonly taught → less commonly performed

- Recent years:
  - Increased prevalence of breastfeeding
  - More recognition of tongue-tie as a cause of breastfeeding difficulty
Potential problems related to ankyloglossia

- Breastfeeding difficulty
- Speech difficulties
  - rolling R’s in Spanish-speaking populations
- Dental problems (hygiene, diastema)
- Licking ice cream
- Swallowing pills
- Digestive issues due to aerophagia
- French kissing
Does ankyloglossia cause speech problems later in life?

- Ankyloglossia does not cause speech delay
- Ankyloglossia can cause speech articulation problems (letters D,N,L,S,T)
  - Most (but not all) people are able to compensate over time
    - Compensatory tongue movements
    - Stretching of frenulum over time (years!)
Tongue functions related to 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. Neoreviews 2010; 11:(9) c513-510
Impact of tongue-tie on breastfeeding

Clinically significant tongue tie

- Poor latch and nipple trauma
- Insufficient milk removal
- Poor weight gain, decreased milk supply
- Premature weaning from breastfeeding
Most common reasons women stop breastfeeding

- Low milk supply (real or perceived)
- Nipple pain
Clinical History

- Infant factors
  - Not latching/shallow latch
  - Clamping or chewing on the nipple
  - Clicking/smacking sounds
  - Prolonged feedings
  - Sleepy during feeds
  - Poor weight gain

- Maternal factors
  - Severe persistent pain
  - Pinched or blanched nipples after feeds
  - Cracked or bleeding nipples
  - Incomplete emptying of breast
  - Plugged ducts
  - Mastitis
  - Low milk supply
Research on Ankyloglossia and Breastfeeding
Examined 3036 newborns
 Identified (anterior) ankyloglossia + latch/pain problems in 127 (4%); offered frenotomy
 Frenotomy done on 123 pts
 Latch improved in all cases, maternal pain scores decreased
 Problems: no control group, no blinding
Hogan, et al *J.Pediatric Child Health* 2005; 41(5-6) 246-50

- Compared immediate frenotomy to 48 hrs intensive lactation support
- Identified 201 babies with tongue tie, 88 (40%) with breastfeeding problems, 57 enrolled in study
- 28 patients: frenotomy
  - 27 had improvement 1 did not (p.< .001)
- 29 patients: intensive lactation support x 48 hr
  - 1 had improvement, 28 did not (p. < .001)
  - These patients then offered frenotomy
    - 27 had it done and then had improvement
Geddes, et al. *Pediatrics* 2008; 122:e188-e194

- 24 mother-infant dyads with persistent breastfeeding difficulties despite professional support
- No randomization or blinding
- Submental ultrasound while breastfeeding before and after procedure
  - Infant tongue compression of base or nipple tip improved significantly after frenotomy
  - Milk intake, milk transfer rate, LATCH score and maternal pain scores improved
Infants with ankyloglossia and breastfeeding difficulty assigned to frenotomy (30) or sham procedure (28).

- Assessed before/after with nipple-pain scale and Infant Breastfeeding Assessment Tool (IBFAT)

Results:
- Both groups had decreased pain scores
- Frenotomy improved more than sham (p<.001);
- Frenotomy offered by 2 wk visit to the sham group, all but one parent in sham group requested frenotomy
Let’s Tackle the Topic of Tongue-Tie, and Talk about Tongues
Embryology

- 1\textsuperscript{st} branchial arch
  - Two lateral lingual swellings + median swelling $\rightarrow$ anterior 2/3\textsuperscript{rd} of the tongue
- Early tongue is fused to floor of mouth
- Apoptosis causes separation of the floor of the mouth from the tongue
- Lingual frenulum is the residual tissue
Anatomy Review

The 3 frenulum in mouth:

1. Upper lip: superior labial frenulum
2. Under tongue: lingual frenulum
3. Lower lip: inferior labial frenulum

This presentation is about the lingual frenulum.

Photo from Netter, F. Atlas of Human Anatomy. 4th Edition

From www.tonguetieclipit.com
Classification: Types of tongue-tie

- **Type I** extends to tip of tongue
- **Type II** extends to 2-4 mm posterior to tip near alveolar ridge
- **Type III** extends to mid-portion of tongue and mid-floor of mouth
- **Type IV** posterior tongue-tie
  - Often only palpable, not as visible
  - May be submucosal
  - More notable with effect on function

Developed by Elizabeth Corrylos, MD and Catherine Watson Genna
Classification: Types of tongue tie
(James Murphy, MD)

Using pinky placed under one side of tongue until it meets resistance, then lateral sweep:

- No resistance (no speed bump): no problem
- Small “speed bump”: small risk of problem
- Large speed bump: likely problem
- A “fence” (cannot sweep across): definite problem
Normal tongues
Types of tongue-tie: Type I

Photo credit: James Murphy, MD

Photo credit: James Murphy, MD

Photo credit: Brian Palmer, DDS
Types of tongue-tie: Type II

Photo credit: James Murphy, MD

Photo credit: James Murphy, MD

Photo credit: James Murphy, MD

Photo credit: James Murphy, MD
Types of tongue-tie: Type III

Note high-arched palate

Type III can look normal, but don’t elevate well

Photo credit: James Murphy, MD
Types of tongue-tie: Type IV

- From Catherine Watson Genna
Oral Assessment: Thickness of frenulum

Thin and Translucent  Thicker and more fibrous

Photo credit: James Murphy, MD  Photo credit: Dr. Notesine
Examination: Oral Cavity

- Appearance of tongue
- Extension of tongue
- Tongue lift
- Gloved finger sweep
- Appearance of hard palate
- Tongue lateralization
Examination: Tongue Function

- Try the following techniques
  - Downward pressure on chin
  - Stroke across upper lip from side to side
  - Put pressure on center part of lower gum
  - Sweep finger across lower gum (lateralization)
  - Note tongue lift when the baby cries
  - Motion of tongue with sucking on gloved finger
  - Look at tongue cupping of finger
Restriction of tongue movement

Tongue extension attempted (note closure of mouth to help extend tongue further)

Tongue lateralization attempted (note how tip is not able to extend)

Note tethering of central tip of tongue

Restriction of ability to lift the tongue

Photo credit: Brian Palmer, DDS
Assessment Tools for Ankyloglossia

Hazelbaker Assessment Tool
Detailed and complex,
(certain sections have been validated)

Frenotomy Decision Rule
Simplified, functional
## Hazelbaker Assessment Tool

### Appearance items
- **Appearance** of tongue when lifted
  - 2: Round or square
  - 1: Slight cleft in tip
  - 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 alveolar ridge
  - 2: Attached to floor of mouth
  - 1: Attached just below ridge
  - 0: Attached at ridge

### Function items
- **Laterlization**
  - 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: at ridge/rises only w/mouth closure
- **Extension** of tongue
  - 2: Tip over lower lip
  - 1: Tip over gum only
  - 0: Neither of the above or humps
- **Spread** of anterior tongue
  - 2: Complete
  - 1: Moderate or partial
  - 0: Little or none
- **Cupping**
  - 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

### Significant ankyloglossia:
- Function score ≤11/14
- Appearance score ≤8/10
Frenotomy decision rule for breastfeeding infants

- A lingual frenulum is present

- Breastfeeding problem
  - Latch problems, and/or inadequate weight gain (<15 g per day) and/or persistent nipple pain

- Abnormality in tongue function (any)
  - Inability to protrude beyond alveolar ridge
  - Inability to lift to the roof of the mouth (or beyond midpoint of oral cavity)
  - Inability to adequately cup the nipple-areolar complex

Adapted from: Srinivasan, et al Breastfeeding Medicine 2006; 1:216-224
Methods for treatment of tongue-tie

- Simple lysis with scissors (frenotomy, frenulotomy)
  - Done with or without anesthetic

- Revision of frenulum (frenectomy, frenuloplasty/z-plasty)
  - under anesthesia

- Laser lysis or electrocautery
Frenotomy Procedure
The Procedure: Preparation

Discuss risks and benefits, signed permit/infomed consent

- **Risks**
  - Infection (minimal)
  - Bleeding (minimal, assess family history)
  - Injury (low)

- **Benefits**
  - Potentially improved breastfeeding and consequent health benefits
  - Possible dental, speech, social benefit
The Procedure: Preparation

- Infant can be swaddled to restrict arm movement
- Infant in bassinet or parent hold
- Assistant to help stabilize head and jaw
- Good quality lighting
- Anesthetic (though usually not needed)
The Procedure: Equipment

- Grooved director
- Blunt-tipped scissors
- Sucrose solution
- Gauze 2 x 2’s
- Optional:
  - Anesthetic gel
    - (FDA warning regarding benzocaine)
  - Straight hemostat
- Silver nitrate or hemostatic gauze on hand
The Procedure: Equipment
The Procedure:

- Give oral sucrose 1-2 min before procedure
- Restrain/swaddle infant
- Assistant puts downward pressure on chin
- Isolate lingual frenulum with grooved director/tongue elevator or fingers
- Clip straight down the middle, avoiding Wharton’s ducts and tongue musculature
- Compression with gauze (with pressure to dissect tissue planes further)
- Baby feeds at breast
- Assess oral cavity post-procedure
Excerpted from video by Jeanne Ballard, MD
How much should be clipped?

- Goal is to release the restriction of tongue movement/function, finger sweep after should be smooth.

- If there is a posterior membrane, clipping this (about 2 mm) will reveal a “diamond” of the mucosal borders.

- Using gauze 2 x 2 with pressure will help dissect the tissue further and help stop bleeding.
Pre and Postoperative Appearance (thin frenulum)

Pre and Postoperative Diamond Shape Defect (thick frenulum)

Photo Credit: James Murphy, MD
Postprocedure care and instructions

- Experts recommend instructing parents to do tongue stretches/exercises after
- Advise about normal appearance of granulation tissue
- Some infants may benefit from tongue exercises
- Dyads may benefit from lactation support after procedure to “re-learn” how to attach well to the breast
Frenotomy: Who can do it?

- Best to find a provider supportive of breastfeeding
  - Pediatrician
  - Ear, Nose and Throat (ENT) surgeon
  - Pediatric Dentist
  - Nurse Practitioner
  - Physician Assistant
Frenotomy: Who can do it?

- Specialist referral for:
  - Thick or highly vascular frenulum
  - Revision or repeat procedure
  - Older infant
  - Risk of excessive bleeding or family history of bleeding disorder
Frenotomy: How do we decide?

- History suggestive of tongue-tie contributing to breastfeeding problems
- Oral evaluation consistent with tongue-tie
- Appropriate lactation support and intervention
- Ongoing maternal pain, poor latch or poor milk transfer
Frenotomy: How do we decide?

- Very low risk, simple procedure
- Can save the breastfeeding relationship, with long term benefits for baby and mom
- Should not be an alternative to good breastfeeding support
- May not “solve” breastfeeding problems that are multifactorial
- Can reattach/re-adhere
Frenotomy: When is the best time to do it?

- **Obvious tongue-tie**: the sooner the better
- **Borderline/unclear**:  
  - Can watch/wait IF mom has good BF support and follow up  
  - If breastfeeding is still problematic after day 5, it should strongly be considered
- **Obvious tongue-tie but “doing well”**:  
  - Close follow up important  
  - Early “oversupply” can mean good weight gain even with poor milk transfer
What is all this talk about posterior tongue tie?

- “Posterior” tongue tie:
  - can be felt underneath the mucosa of the floor of the mouth.
  - Can interfere with function without much of a “visible” tongue tie
  - Somewhat more difficult to diagnose but not more complicated to treat
  - Is not the cause of all breastfeeding problems
Upper Lip Tie

- All babies have an upper lip (maxillary) frenulum
- May be a problem if baby unable to flare upper lip with latch.
- Less commonly treated than lingual frenulum
- If upper lip can be retracted/flared manually, not likely to be a problem
Attachment above the anterior papilla

Attachment just in front of the anterior papilla

Attachment to the anterior papilla and to the hard palate inferiorly

Photos courtesy of Lawrence Kotlow, DDS
Post-procedure care

- Most experts recommend stretching to help prevent re-attachment.
- No evidence-based guidelines.
- Exercises several times per day until wound healed.
- For tongue-tie: firmly pushing back and up using finger/thumb on either side of wound.
- For upper lip tie: firmly push the upper lip towards the nose and/or do a finger sweep between the upper lip and gum.
Summary

- Tongue-tie is a known cause of breastfeeding problems
- A simple office procedure, in the right situation, can significantly improve breastfeeding success

HOWEVER

- Surgical procedures are no substitute for good lactation support
Questions?

Thank you!