

The Impact of Tongue Tie on Breastfeeding Mechanics

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Some Basics

- Breastfeeding should be an active process - passively drinking can indicate pathology
- Most commonly seen in oversupply/OALD
- Nipple pain and poor weight gain aren't only indications for intervention
- Understanding the mechanism of breastfeeding is crucial in understanding why intervention may become necessary

Previous Sucking Theory

Woolridge - *Midwifery* (1986)

- Nipple drawn into mouth
- Tip of tongue wells up and mandible elevates to pinch off milk
- roller-like action (front to back)
- d & e) milk pushed into oropharynx as soft palate elevates
- f) depression of posterior tongue creates negative pressure to restart cycle



Peristalsis Theory



Peristalsis

- The Woolridge model advocated for the presence of a peristaltic wave as an important part of nursing
- No real evidence in favor of this model
- **Paradigm shift:** focus on vacuum generation instead

Douglas/Geddes, 2018

Breastfeeding Ultrasound

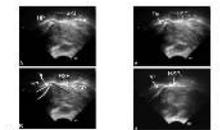
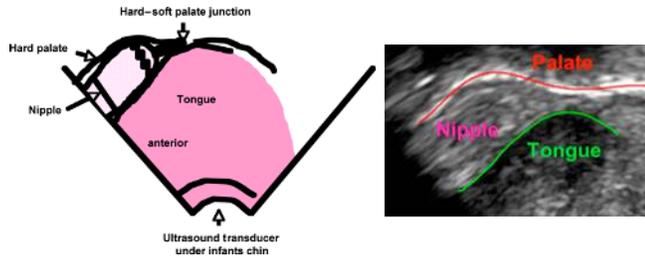


Figure 1. Breastfeeding in an infant with asymptomatic atrial septal defect (ASD). The images show the infant's mouth and the breast during breastfeeding. The top row shows the infant's mouth and the breast, and the bottom row shows the infant's mouth and the breast. The images are labeled with 'a', 'b', 'c', and 'd'.

Geddes, 2008

Mechanism of Breastfeeding



Geddes 2008 and Elad 2014

Tongue Function



Vacuum Generation

- The tongue is the motor of the latch
- The lips are largely passive in suction generation **in the absence of tongue tie or other tongue restriction**
- This concept must be the assumed starting point in the examination of breastfeeding pathology

Breastfeeding Problems

- Poor quality latch
- Falls asleep prematurely while nursing
- Slides off breast
- Colic symptoms
- Reflux symptoms
- Gumming/chewing
- Pacifier problems
- Low milk supply
- Nipple damage (creased, cracked, bleeding)
- Severe pain
- Poor/incomplete breast drainage
- Mastitis/thrush
- Vasospasm
- Infected nipples
- Poor weight gain

Approach to Symptoms

- What explains these symptoms?
- We must look for an anatomic reason for this difficulty if conventional interventions are unsuccessful
- Waiting is not an option
 - Weaning (Ricke 2005, Todd 2015)
 - Baby's health can be jeopardized
 - Mom's health can be jeopardized

Complaint	Prevalence
Poor latching	81%
Falls asleep while attempting to nurse	73%
Creased, flattened, or blanched nipples after nursing	68%
Gumming or chewing of nipple when nursing	67%
Poor or incomplete breast drainage	60%
Slides off nipple when attempting to latch	60%
Severe pain when infant attempts to latch	59%
Cracked, bruised, or blistered nipples	49%
Reflux symptoms	45%
Unable to hold a pacifier in mouth	40%
Poor weight gain	32%
Colic symptoms	24%
Bleeding nipples	24%
Plugged ducts	21%
Mastitis or nipple thrush	14%
Infected nipples or breasts	6%

Frenulum vs Tie

- The location of attachment of the frenulum does not mean it's a tie (tip of tongue is exception)
- The examination is key to determining tension
- Evaluation by IBCLC is key to determining abnormal function

Anterior TT vs Posterior TT

- Anterior TT is the classic webbing that is at or near the tip of the tongue
 - heart shaped tongue
 - speech implications
 - relatively obvious
- Revising these alone (no bleeding, minimal crying) rarely leads to improvement

Anterior TT vs Posterior TT

- Posterior TT is a bad name
 - submucosal
 - hidden
 - invisible
- Tend to look thicker
- Must use your fingers to feel this type of restriction
- Think of a sailboat

Anterior TT vs Posterior TT



Anterior TT



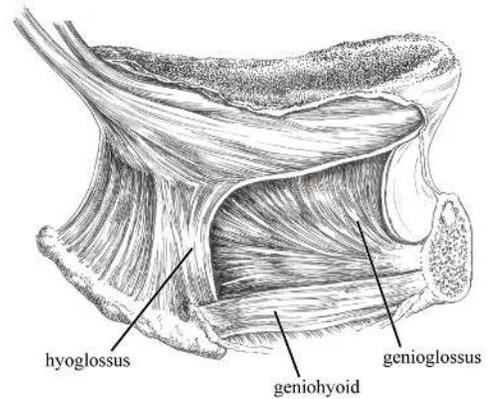
Posterior TT



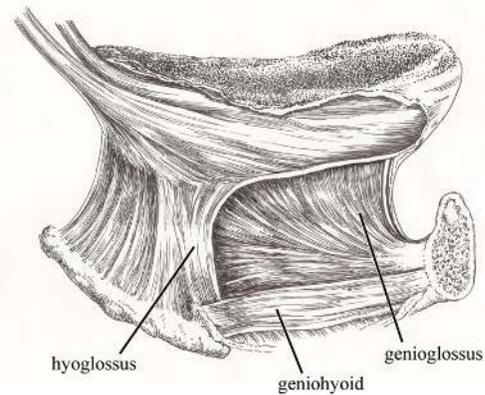
Posterior TT



Anterior TT



Posterior TT



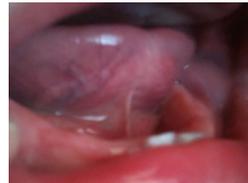
Coryllos TT Classification



Class 1: Involves Tip of Tongue



Class 2: 2-4mm behind tip



Class 3: Membrane spares most of tongue



Class 4: Submucosal

Approach to Symptoms

- Ultrasound allows us to correlate etiology to symptoms
- Understanding the underlying etiology allows you to shift your therapeutic focus
- Reproducible
- Teaching Tool

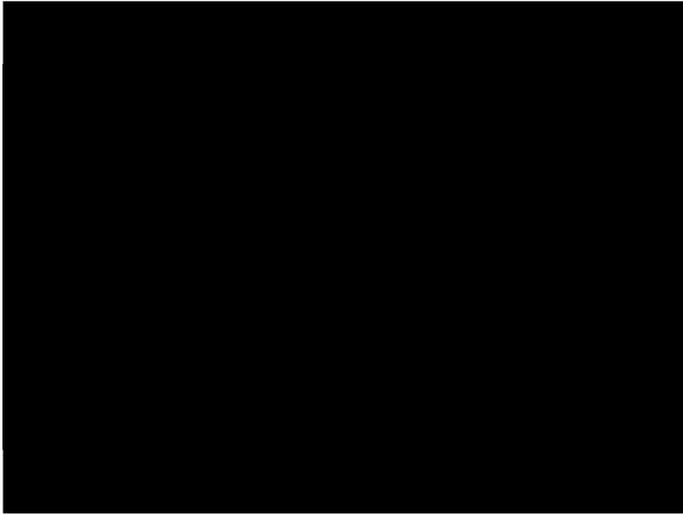
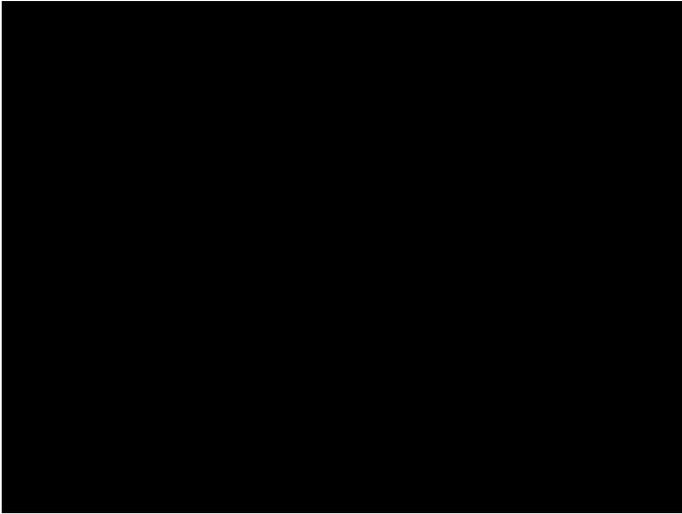
What Can You See on Ultrasound?

- Nipple
- Tongue (except for tip of tongue)
- Hard Palate
- Soft Palate
- Pharynx



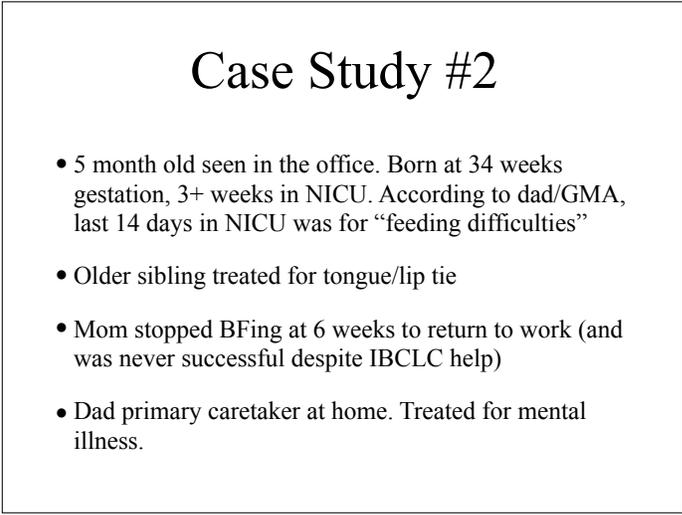
Case study #1

- 3 week old male born via C-section
- Severe nipple damage
- Inadequate breast drainage despite adequate supply
- Spills out of sides of mouth
- Very experienced IBCLC - class 4 LT, class 3 TT



Case Study #2

- 5 month old seen in the office. Born at 34 weeks gestation, 3+ weeks in NICU. According to dad/GMA, last 14 days in NICU was for “feeding difficulties”
- Older sibling treated for tongue/lip tie
- Mom stopped BFing at 6 weeks to return to work (and was never successful despite IBCLC help)
- Dad primary caretaker at home. Treated for mental illness.



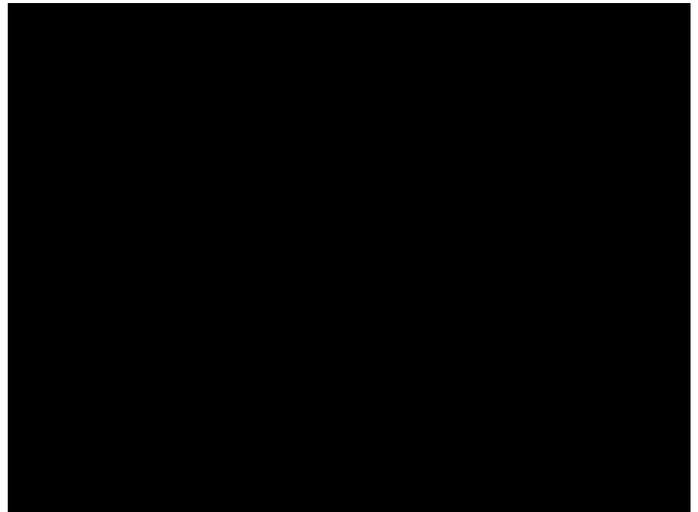
Case Study #2

- Parents take child in to PCP because of feeding difficulties. FTT diagnosis by PCP followed by call to CPS for suspected neglect
- GMA forced to move in with parents
- Finally at 4 months old, SLP in feeding clinic agrees to refer for evaluation of PTT (per parents, first one to do oral examination)
- Sxs: Constant clicking, spilling out of mouth, reflux, poor seal, infant fatigues on bottles

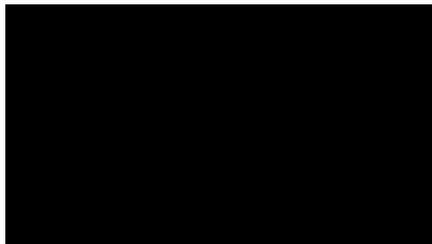
Case Study #2

- Class 3 lip tie, class 4 posterior tongue tie
- Released at 6 months of age (12 lbs)
- 1 week postop: less reflux, no longer leaking, better suction, more efficient on bottle (3.5 oz in 6 minutes vs 2 oz in 30 minutes preop)
- 7 weeks postop: holds down 95% of bottle (16 lbs)

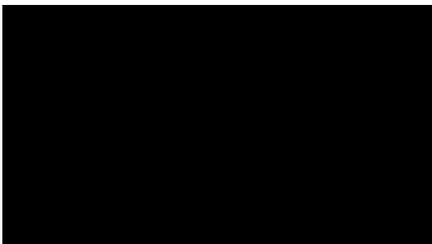
NFANT System



Pre-frenotomy



Post-frenotomy



Not Just About Ties

- Tendency to oversimplify tongue tie's role in feeding problems
- Feeding problems are almost always multifactorial
- Failure to recognize other aspects of disorganized suck/swallow will almost always limit improvement post-frenotomy



Summary of Mechanics

- Don't focus on tongue protrusion
- Don't focus on the tip of the tongue
- Challenge whether the mid-tongue elevates easily or not
- When mid-tongue elevation is compromised, symptoms can result

Our Experience

- Breastfeeding Improvement Following Tongue-Tie and Lip-Tie Release: A Prospective Cohort Study. Ghaheri BA, Cole M, Fausel SC, Chuop M, Mace JC. Laryngoscope, 2017

Our Experience

- Prospective, cohort study
- 237 dyads followed (sufficiently powered)
 - 0-12 weeks, no previous procedure. Strict exclusion criteria
 - ATLFF correlation
- Demographics
- IRB approved

Our Experience

- 4 primary outcomes
 - GERD (i-GERQ-r questionnaire)
 - Breastfeeding self-efficacy/self-confidence (BSES-SF questionnaire)
 - VAS (pain)
 - Efficiency of milk rate transfer

Our Experience

Breastfeeding Outcome Measures:	Preoperative Mean [SD]	7-days Mean [SD]	30-days Mean [SD]
BSES-SF Total Score	43.9[12.6]	52.3[11.4]	56.5[10.8]
I-GERQ-R Total Score	16.5[6.1]	13.2[5.0]	11.6[4.9]
VAS Pain Score	4.6[2.7]	2.2[1.8]	1.5[1.7]

SD, standard deviation; BSES-SF, Breastfeeding Self-Efficacy Scale Short-Form; I-GERQ-R, revised Infant Gastroesophageal Reflux Questionnaire; VAS, Visual Analog Scale;

Milk transfer rates (n=60): preoperative 3.0mL/min
1 week postoperative 4.9mL/min

p < 0.001 for all 4 measures

Newest Paper

- Revision Lingual Frenotomy Improves Patient-Reported Breastfeeding Outcomes: A Prospective Cohort Study. Ghaheri BA, Cole M, Mace JC. *Journal of Human Lactation*. 2018
- Previous study excluded previously treated babies
- This study only includes babies who have previously had a tongue tie release and did not improve
- Same outcomes (BSES, GERD, VAS)

Comparison

Breastfeeding Outcome Measures:	Preoperative Mean [SD]	7-days Mean [SD]	30-days Mean [SD]
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Previously untreated

BSES-SF Total Score	45.0 [±10.9]	51.8 [±12.0]	56.7 [±12.2]
I-GERQ-R Total Score	15.7 [±6.0]	12.0 [±5.1]	10.5 [±4.9]
VAS Pain Score	4.8 [±2.8]	2.1 [±2.1]	1.6 [±2.0]

Previously treated

Treatment

- **Finding a knowledgeable provider**
 - Will fully release TT
 - Decreases chance of revision later
 - Supportive/knowledgeable of breastfeeding – receptive to IBCLCs
 - Mandate eval with IBCLC before referring to them
 - No general anesthesia on babies

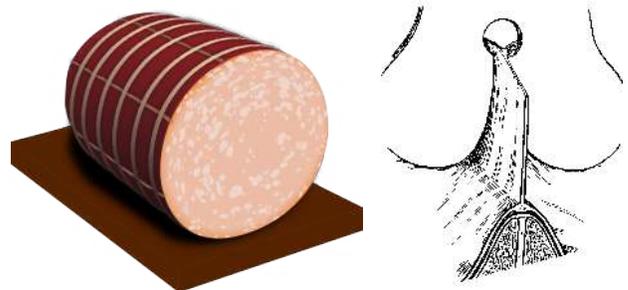
Treatment

- **Procedure risks**
 - May require further revision
 - Reattachment
 - Damage to salivary gland ducts or tongue muscles
 - Bleeding
 - Infection (very, very rare)
 - Painful

Treatment Goals - Tongue

- Full release of central tissue - this includes the submucosal fibers
- Appropriate lateral incisions to allow the tongue to release
- Avoid cutting into muscle **at all costs** - it's preferable to leave the fascia over the genioglossus muscle intact
- Palpate afterwards to determine if any residual tension exists

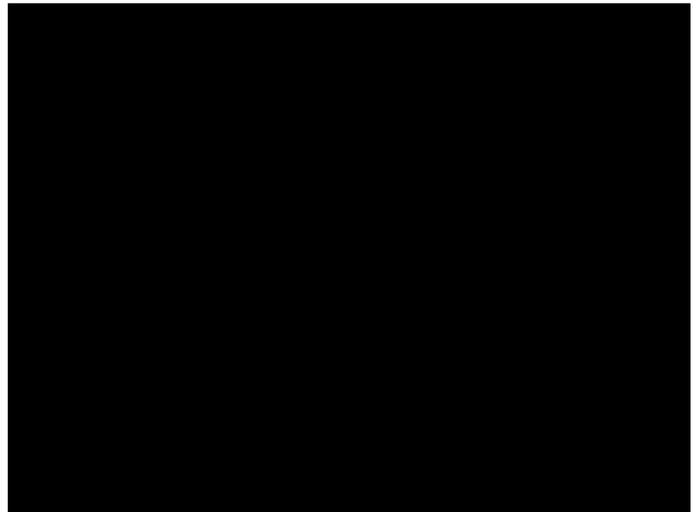
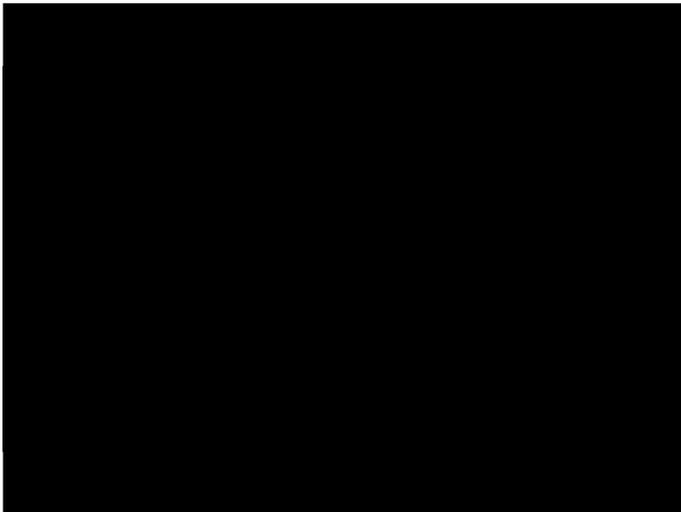
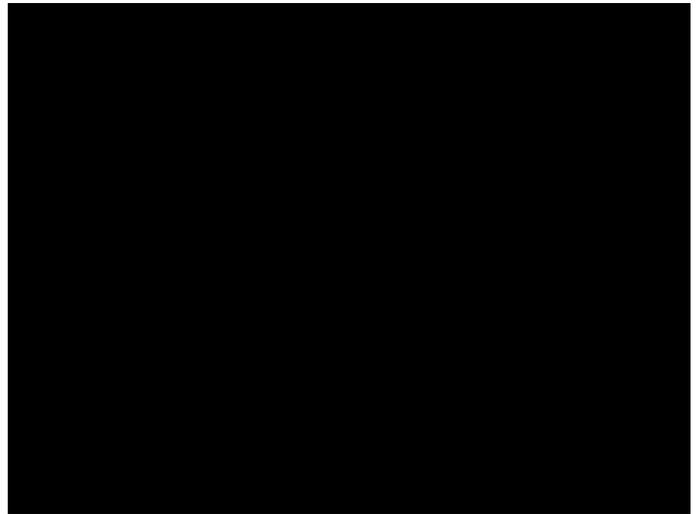
Surgical Technique

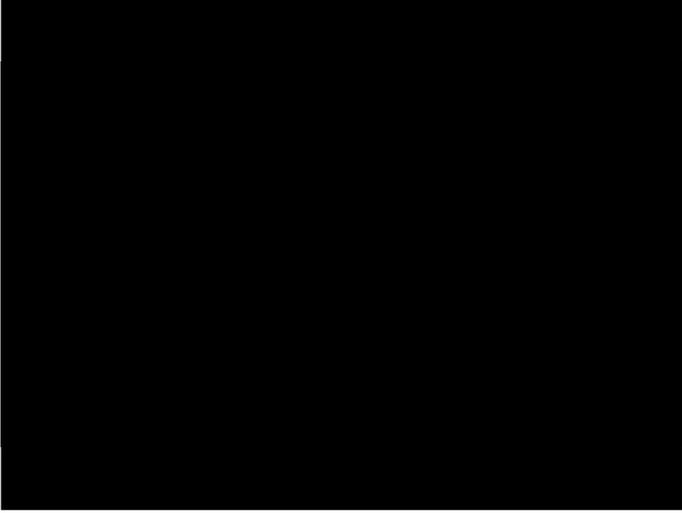


Surgical Concept: Genioglossus Fasciotomy

Scissors vs Laser

- There are no published studies demonstrating superiority of laser over scissors
- There are no published studies demonstrating superiority of one laser over another laser
- Technique trumps the tool
- It's all about wound **tension**





Conclusions

- Mid-tongue elevation is the key to breastfeeding success
- Proper examination technique and proper surgical release can facilitate breastfeeding
- If all other interventions fail to improve breastfeeding quality, consider TT as a potential cause
- TT revision can be safely done in the office without general anesthesia