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)

a) Nipple drawn into mouth
b) Tip of tongue wells up and mandible elevates to pinch off milk
c) 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

Breastfeeding Ultrasound

Geddes, 2008
Mechanism of Breastfeeding

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

<table>
<thead>
<tr>
<th>Complaint</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor latching</td>
<td>81%</td>
</tr>
<tr>
<td>Falls asleep while attempting to nurse</td>
<td>73%</td>
</tr>
<tr>
<td>Creased, flattened, or blanched nipples after nursing</td>
<td>66%</td>
</tr>
<tr>
<td>Gumming or chewing of nipple when nursing</td>
<td>67%</td>
</tr>
<tr>
<td>Poor or incomplete breast drainage</td>
<td>60%</td>
</tr>
<tr>
<td>Slides off nipple when attempting to latch</td>
<td>80%</td>
</tr>
<tr>
<td>Severe pain when infant attempts to latch</td>
<td>59%</td>
</tr>
<tr>
<td>Colic symptoms</td>
<td>49%</td>
</tr>
<tr>
<td>Reflux symptoms</td>
<td>45%</td>
</tr>
<tr>
<td>Unable to hold a pacifier in mouth</td>
<td>40%</td>
</tr>
<tr>
<td>Poor weight gain</td>
<td>32%</td>
</tr>
<tr>
<td>Colic symptoms</td>
<td>24%</td>
</tr>
<tr>
<td>Bleeding nipples</td>
<td>24%</td>
</tr>
<tr>
<td>Plugged ducts</td>
<td>21%</td>
</tr>
<tr>
<td>Mastitis or nipple thrush</td>
<td>14%</td>
</tr>
<tr>
<td>Infected nipples or breasts</td>
<td>6%</td>
</tr>
</tbody>
</table>
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

- 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

Posterior TT

Anterior TT vs 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


- 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

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<tr>
<th>Breastfeeding Outcome Measures</th>
<th>Preoperative Mean [SD]</th>
<th>7-days Mean [SD]</th>
<th>30-days Mean [SD]</th>
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<tr>
<td>BSES-SF Total Score</td>
<td>43.9[12.6]</td>
<td>52.3[11.4]</td>
<td>56.5[10.8]</td>
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<td>i-GERQ-r Total Score</td>
<td>16.5[6.1]</td>
<td>13.2[5.0]</td>
<td>11.6[4.9]</td>
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<td>VAS Pain Score</td>
<td>4.6[2.7]</td>
<td>2.2[1.8]</td>
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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

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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 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

[Diagram of 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