

The Impact of Ankyloglossia on Breastfeeding Success

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Overview

- Normal infant biology (breastfeeding)
- Impact of Tongue Tie and Lip Tie on breastfeeding
- Surgical treatment

Overview

- This is a paradigm shift
- This is new information
- You don't have to believe me - start your own journey in learning more about it

Teamwork Needed

- Lack of expertise by practitioners = potential misinformation to parents
- Importance of sympathy to parents - especially important if your patient population is limited to children
- Importance of trusting your IBCLC - they are the breastfeeding experts

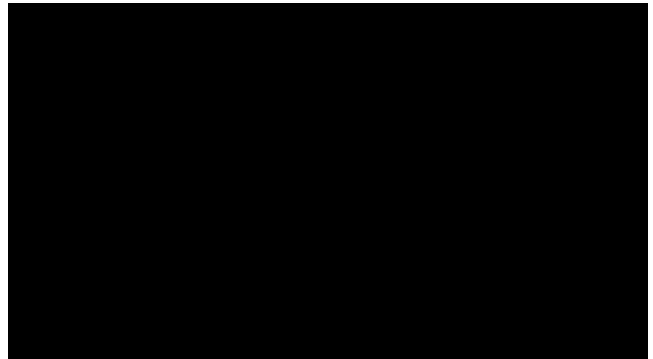
Evolutionary Angle

- Breastfeeding is one of the most basic instincts
- Difficulty with breastfeeding is common. That does NOT mean it is normal
- Breastfeeding is an essential component of normal infant life and its absence means something is fundamentally wrong with the infant's world

Mechanism of Breastfeeding

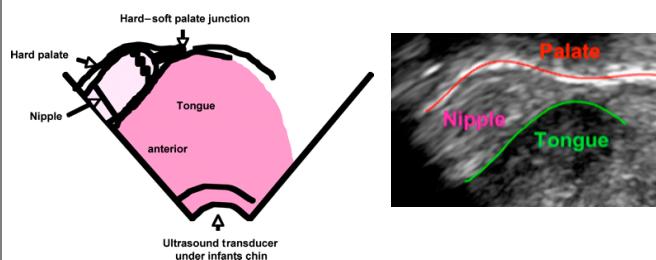
- Should be an active process, even in instances when mom has OALD or high flow
 - some babies will just drink, rather than nurse
- Contrary to popular belief, the baby does not “milk” the breast in a stripping motion
- Understanding the mechanism of breastfeeding is crucial in understanding why intervention may become necessary

Peristalsis Theory



Mechanism of Breastfeeding

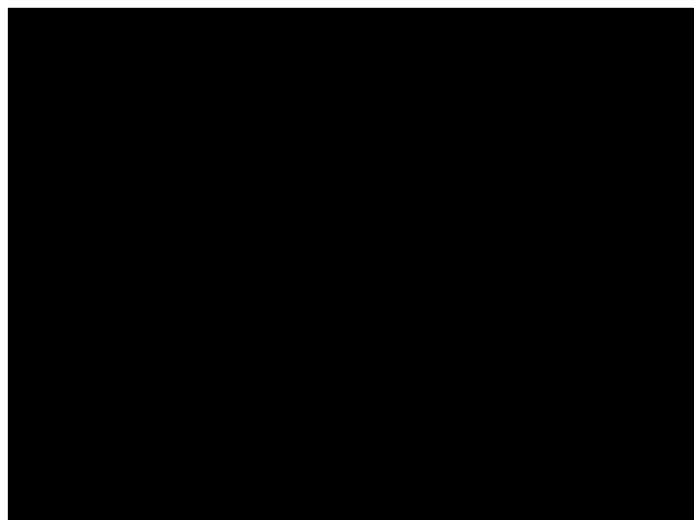
- Geddes (2008) and Elad (2014)



Elad et al (2014)

- “Biomechanics of Milk Extraction During Breast-feeding” - PNAS 2014
 - Anterior tongue moves in unison with the mandible
 - “The results...provide objective support that movement of the anterior part of the tongue, which lies under the nipple, is controlled by the periodic movement of the mandible and definitely does not represent a peristaltic wave of contraction.”
 - Changes in mouth volume (tongue undulation up and down) dictate vacuum generation —> milk extraction

Tongue Function in Breastfeeding



Understanding Compensations

- The ability of a baby to compensate for tethered tissue doesn't justify inaction
- Tongue Tie
 - Impeded movement up = no seal
 - No seal = no latch
 - No latch = compensation



Must treat the dyad

- In most of medicine, treating the patient is for the sake of the patient
- With TT/LT that affects breastfeeding, treating the patient may be for the benefit of someone other than the patient
- Importance of sympathy/empathy towards the mother is critical

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%

Approach to These 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
 - Baby's health can be jeopardized
 - Mom's health can be jeopardized

Financial Burden

American Academy
of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN

FROM THE AMERICAN ACADEMY OF PEDIATRICS
Organizational Principles to Guide and Define the Child Health Care System and/or Improve the Health of all Children

POLICY STATEMENT

Breastfeeding and the Use of Human Milk

- March, 2012
- If 90% of infants breastfed exclusively for the first 6 months, the US would save \$13 billion annually

Examination Technique

- This is absolutely key to diagnosing a potential anatomical problem that affects BFing
- It's ok to make a baby cry during examination
- Use a headlamp
- Proper positioning is the most important part of the examination

Examination Technique



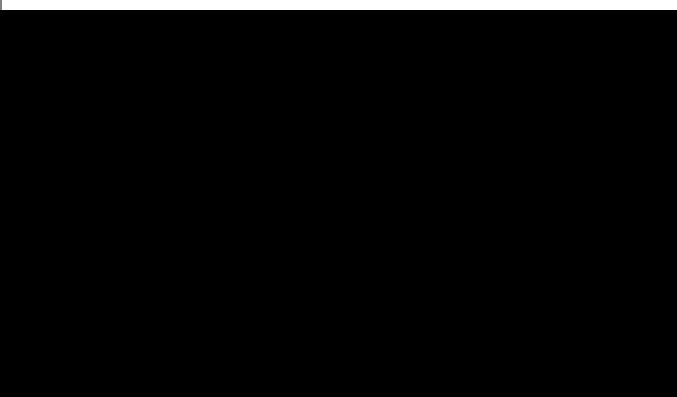
Examination Technique



Normal Labial Frenulum



Normal Lingual Frenulum



Frenulum vs Tie

- The location of attachment of the frenulum does not mean it's a tie
- Many people will see a labial frenulum that comes down low on the gumline and assume it's pathologic
- 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
- “Mild”
- Think of a sailboat

Anterior TT vs Posterior TT



Anterior TT



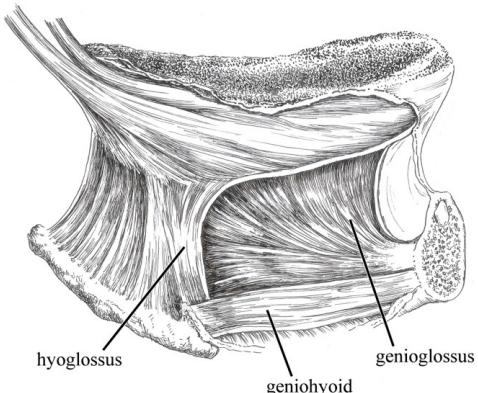
Posterior TT



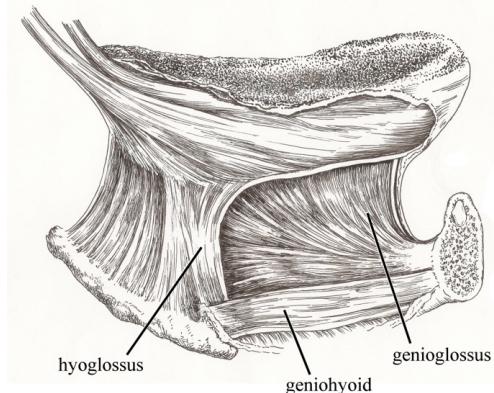
Posterior TT



Anterior TT



Posterior TT



*Kotlow Diagnostic criteria (one) for clinically apparent tongue-ties in infants



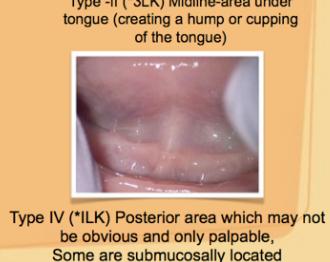
**Type I (*4LK) -total tip involvement



Type -II (*3LK) Midline-area under tongue (creating a hump or cupping of the tongue)



Type III (*2LK) Distal to the midline. The tongue:may appear normal



Type IV (*1LK) Posterior area which may not be obvious and only palpable, Some are submucosally located

**Lactation consultants diagnostic criteria

Lawrence Kotlow DDS 2011

Kotlow infant and newborn maxillary lip-tie diagnostic classifications



Class I
Minimal visible Attachment



Class II
Attachment primarily into the gingival tissue



Class III:
Inserts just in front of anterior papilla



Class IV
Attachment just into the hard palate or papilla area

Lawrence Kotlow DDS 2011

Incidence

- Research** - 1-12% of babies with tongue tie (only anterior TT)
 - Incidence is increasing (genetic, epigenetic)
 - Approximately 4 million born in 2014 (if you assume 4% incidence, that's 160,000 babies)
 - **Emergence of posterior tongue tie as a diagnosis explains the increased incidence clinically**
 - Han 2012 and Klockars 2009 shows genetic transmission

Lip tie	Umbilical hernia	Gastroschisis
Cleft lip/palate	Hypopspadius	
Sacral dimple	Tight frenulums on penis	
Spina bifida	Labial adhesions	
Heart defects	Abdominal hernia	

Early Intervention Matters

- Ricke (2005)
 - Untreated tongue-tied children are 300% more likely to be exclusively bottle fed at 1 week of age
- Todd (2015)
 - in 2008, age of intervention for TT release was 6.5 days. Bottle use = 3.4%, Nipple pain 85%.
 - in 2011, age of intervention for TT release was 9.7 days. Bottle use = 17.4%, Nipple pain 97%.

Moms are often told...

- “It’s normal to have pain/bleeding/cracking.”
- “You need time for your nipples to toughen up”
- “Baby is just getting tired/baby is a lazy eater”
- “You’re not making enough milk”
- “She just has a small tongue”
- “Tongue tie doesn’t cause problems with breastfeeding”
- “Your nipples are too big” or “baby’s mouth is too small”
- **“Your baby can’t be tongue tied b/c they can stick out their tongue”**
- “Your baby is gaining weight, so there’s nothing more to worry about”
- “Enough with the breastfeeding!”
- “The frenulum will stretch over time”
- “One day, your child will fall and rip the upper lip tie and it’ll take care of itself”

Is There Evidence?

- The desire to practice EBM vs the desire (and need) to treat a dyad where time is of the essence
- Safety
- Avoidance of panacea
- Every study published shows an improvement in breastfeeding following frenotomy

Efficacy

- What are the outcomes we’re most interested in?
 - maternal pain
 - weight gain
 - breastfeeding quality
 - speech (older children)
 - dental development/health

Summer 2010
American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN
Section on Breastfeeding

Breastfeeding: Best for Baby and Mother



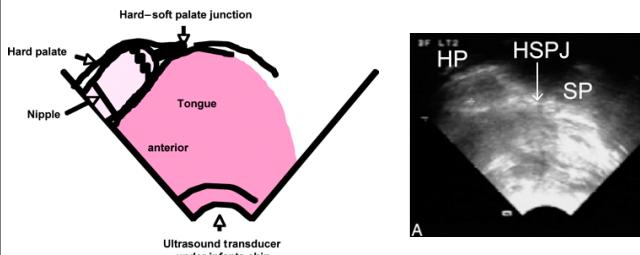
Available Studies

- Dollberg 2006 (RCT)
- Berry 2012 (RCT)
- Buryk 2011 (RCT)
- Hogan 2005 (RCT)
- Emond 2013 (RCT)
- Steehler 2012
- Ricke 2005
- Edmunds 2011
- Ito 2014
- Geddes 2008
- O’Callahan 2013
- Pranksy 2015
- Ghaheri 2017
- Ghaheri 2018

Geddes et al (2008)

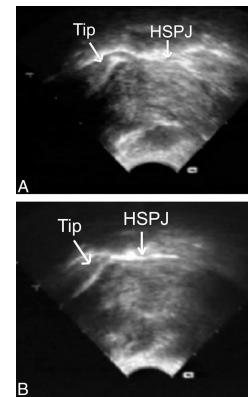
- 24 mother-baby dyads
- Milk transfer, pain, and LATCH scores pre- and post-procedure
- Ultrasound pre- and post-procedure
- All but 1 improved in all arenas
- Ultrasound shows nipple compression before and improvement after

Geddes et al (2008)



Geddes et al (2008)

A: Pre-frenotomy,
showing nipple
compression



O'Callahan et al (2013)

- 311 babies - 299 underwent lingual frenotomy
- Only 16% had a classic anterior TT
- 37% had a labial tie
- 92% of dyads ultimately breastfed
 - mean duration 14 months
- Improvement in latch quality and nipple pain
 - limitation is subjective grading by moms - bias

Ito (2014)

- “Does Frenotomy Improve Breastfeeding Difficulties in Infants with Ankyloglossia?”
- Pediatrics International: 2014 June 30
- Meta-analysis looking at available literature
- “The literature review supported an overall moderate quality of evidence for the effectiveness of a frenotomy for the treatment of breastfeeding difficulties in infants with ankyloglossia. No major complications from a frenotomy were reported.”

RCTs

- Dollberg (2006)
 - 25 dyads, sham vs procedure, evaluated nipple pain
 - frenotomy patients resulted in less nipple pain
 - Improved latch nearly significant (underpowered)
- Berry (2012)
 - 57 dyads, procedure vs no intervention (non-intervention babies offered frenotomy same day after)
 - 78% of babies with frenotomy had improvement vs 47% in non-intervention group (immediate post-procedure)

RCTs

- Buryk 2011
 - 58 dyads, procedure vs sham, 2 week follow-up
 - Nipple pain improved in both, but frenotomy more so
 - Latch improvement in frenotomy group (not in sham)
- Hogan (2005)
 - procedure vs control (followed for 48h)
 - 27/28 procedure patients improved, only 1/29 controls did
 - 28/29 controls ultimately had frenotomy at 48h, 27 improved

RCTs

- Emond (2013)
 - 107 dyads, procedure vs control, evaluated at 5 days
 - LATCH scores non-significant
 - 15.5% of control babies bottle-fed vs 7.5% in procedure group
 - At day 4, 44/52 controls requested frenotomy (9 moms couldn't wait 5 days)
 - BSES 0.002 in moms of frenotomy group

Treatment

- **Finding a knowledgeable provider**

- Will fully release LT/TT/PTT
- Decreases chance of revision later
- Supportive/knowledgeable of breastfeeding – receptive to IBCLCs
 - Some prefer 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

- **Can breastfeed immediately after – may or may not notice improvement**

- Provides compression to help stop bleeding
- Breastmilk is antibacterial

- **3-5 hours after – very sore**

- Tylenol (for >6 months can use Motrin)
- Coconut oil – Soothing lubricant for stretches

- **24-48 hours – latch may worsen, baby may refuse**

- Keep feedings the same as before – avoid too many changes
- Skin to skin
- Moving while feeding
- Feeding in a bath

Personal Experience

- Between April 2012 and April 2013, 203 babies underwent TT and ULT revision using scissors
- 203 babies experienced bleeding
- Directly to breast afterwards - all bleeding stopped. None needed cautery
- No general anesthesia - just local (ULT) or topical EMLA (TT)

Scissor Revision

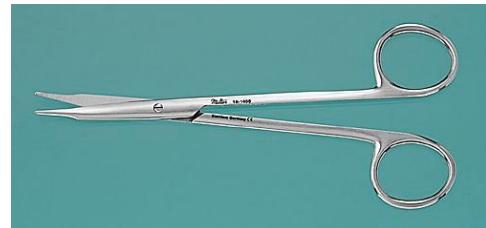
- **What do you need?**

- Swaddle
- Assistant
- Grooved Director
- Tenotomy Scissors
- Topical numbing agent (EMLA or TAC)
 - Benzocaine contraindicated under age 2
- Lidocaine with Epinephrine
- Gauze

Scissor Revision



Scissor Revision

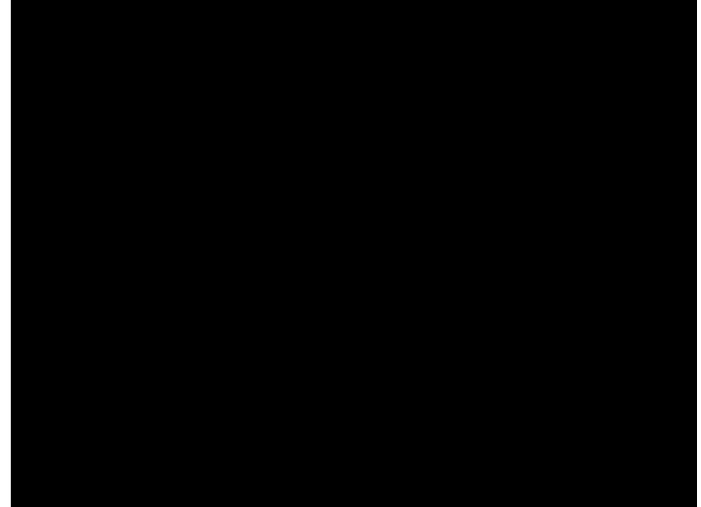


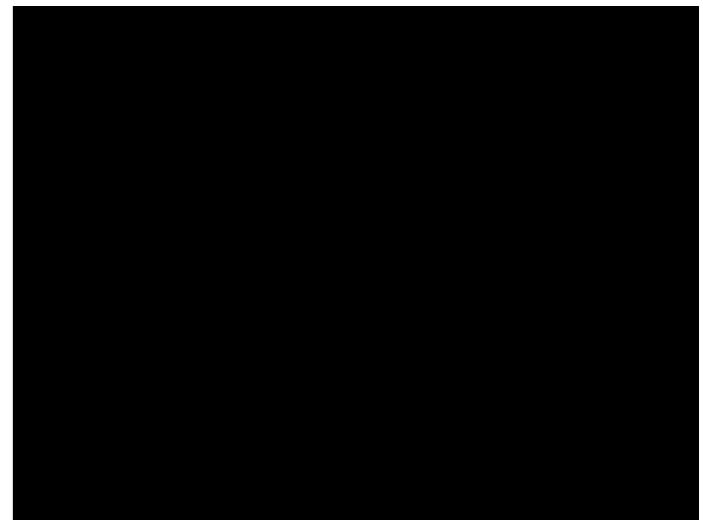
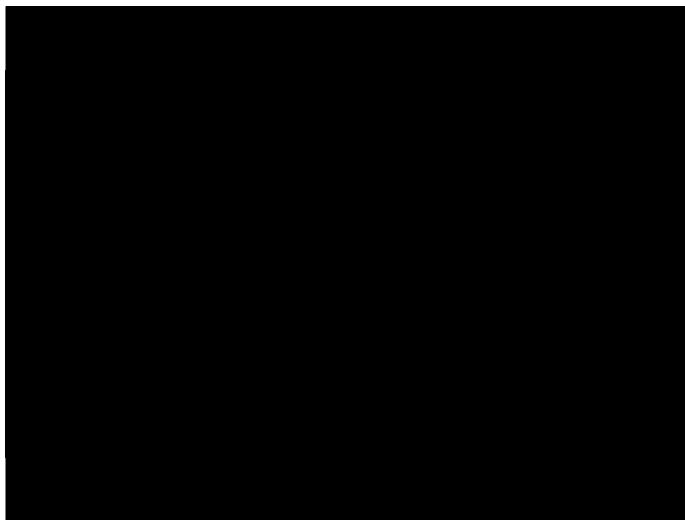
Scissor Revision



Scissor Revision

- Technique
 - Baby swaddled
 - Swab topical numbing on upper lip tie
 - Can inject the lip tie with a small amount of 1% lido with 1:100000 epi. Try to inject suprperiosteal
 - Same numbing technique for tongue if desired
- Some fear using gel in the mouth because of inadvertent swallowing - use thick paste and paint directly on desired areas





How to Manage Bleeding

- Once procedure is complete, immediately to the breast (or bottle if not breastfeeding). The compression helps with hemostasis
- Have a glass of ice cold water (with salt) with gauze soaking - use if necessary
- Afrin-soaked gauze can help
- I have never needed to use cautery or stitches

Scissor Revision

- Disadvantages
 - Bleeding can limit your visualization and force you to undercorrect
 - “More frenulum can come forward”
 - Because scissors have an inherent thickness to them, some tissue is always left down on the gums when revising an ULT

Laser Revision

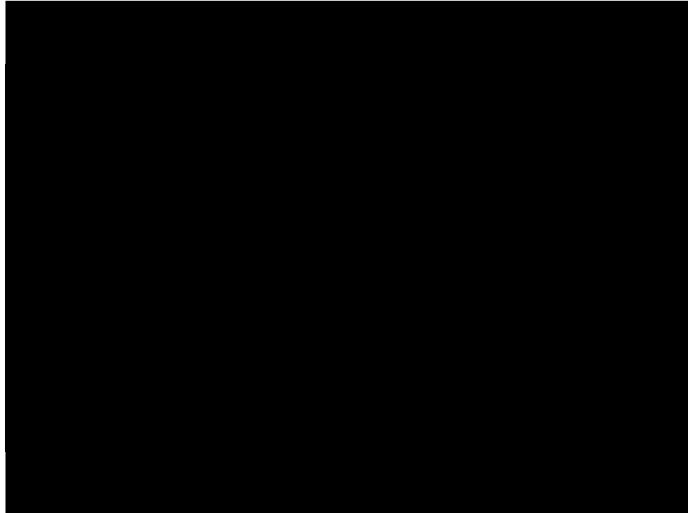
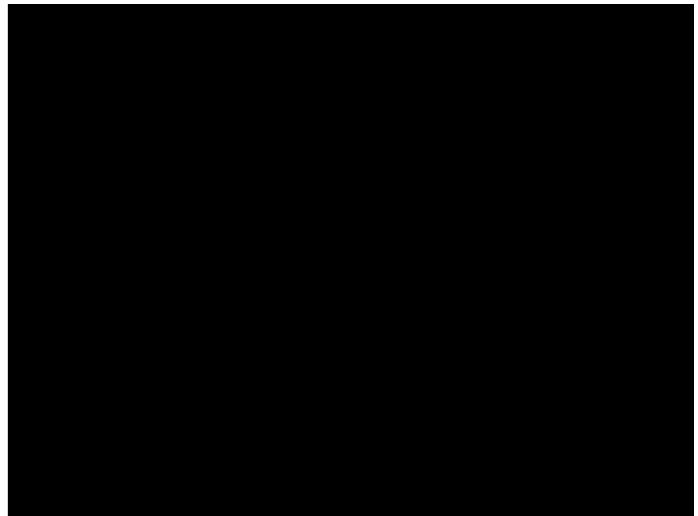
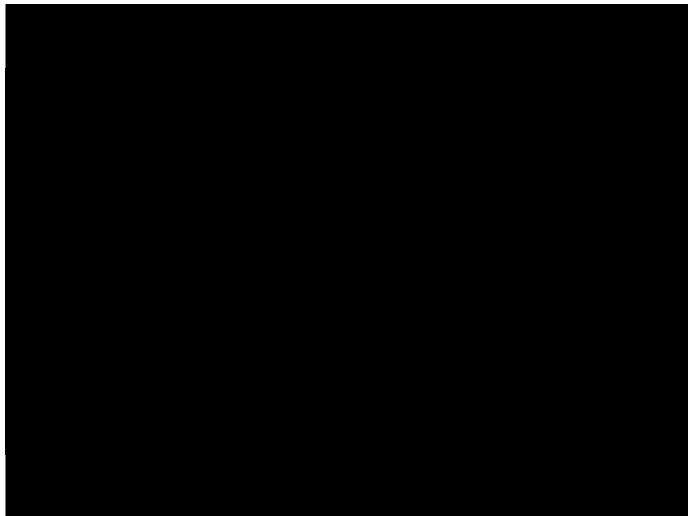
- These lasers are typically dental lasers
 - Diode
 - Erbium (Er,Cr:YSGG or Er:YAG)
 - CO2
- More than just a tool
 - Must prepare for laser safety with training and specific precautions

Laser Revision

- Differences from scissor revision
 - No parents in the room (laser safety, liability)
 - Little to no bleeding (erbium may be an exception)
 - No need to inject epi-containing local anesthetic
 - Much more precise - lack of blood allows for gradual division of fibers with tissue preservation
 - Complete removal of desired tissue

Laser Revision

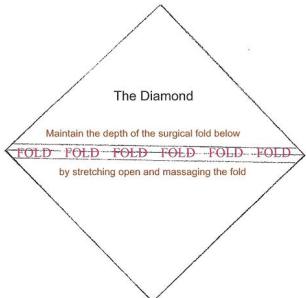
- What do you need?
 - Swaddle
 - Assistant
 - Grooved Director
 - Topical numbing agent (I use 3% lido/tetra)
 - Benzocaine contraindicated under age 2
 - Gauze
 - Laser goggles



Wound Care Principles

- A proper release of the tongue allows the genioglossus to “fall” back under the tongue
- Management of the wound helps to shape scar tissue, not prevent it
- The goal is formation of a neo-frenulum that is not bound to the genioglossus and has more vertical length

Wound Care Principles

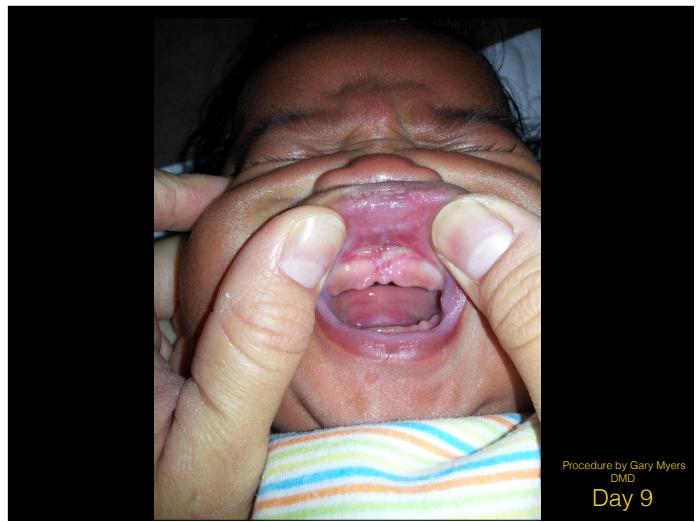


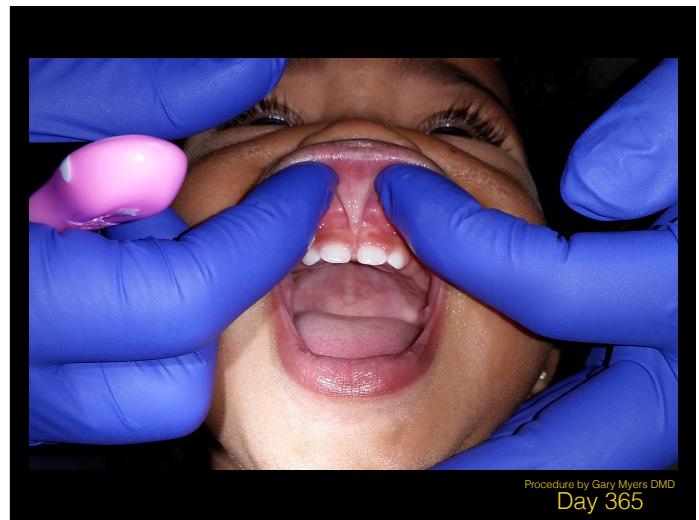
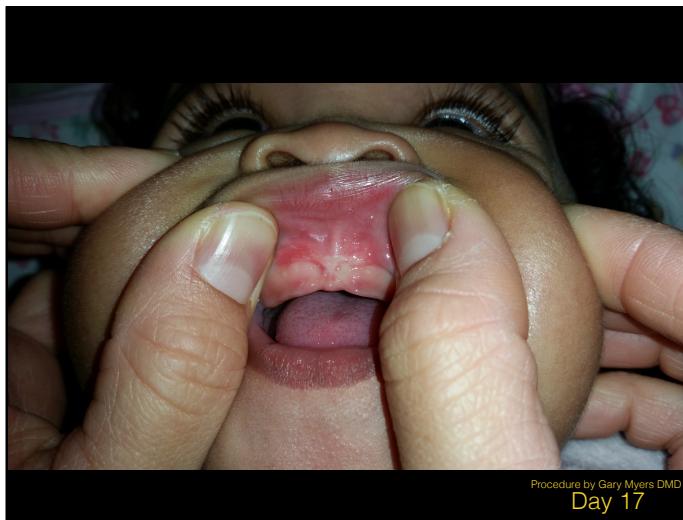
Courtesy of Shervin Yazdi DDS

Proper Stretching



Improper Stretching





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, 2016 (epub).

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

- Results
 - 56:44 M:F
 - 78% posterior tongue tie
 - 75% had lip tie with tongue tie. Only 1 baby with isolated lip tie
 - 1 week/1 month responses, followed for 6 months

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 (epub).
- 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)

Revision Paper

Breastfeeding Outcome Measures:	Preoperative Mean [\pm SD]	1-week postoperative Mean [\pm SD]	1-month postoperative Mean [\pm SD]	F-test statistic ($df=2$)	p-value*
BSES-SF Total Score	45.0 [\pm 10.9]	51.8 [\pm 12.0]	56.7 [\pm 12.2]	41.7	<0.001
I-GERQ-R Total Score	15.7 [\pm 6.0]	12.0 [\pm 5.1]	10.5 [\pm 4.9]	23.1	<0.001
VAS Pain Score	4.8 [\pm 2.8]	2.1 [\pm 2.1]	1.6 [\pm 2.0]	46.6	<0.001

Comparison

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]
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VAS Pain Score	4.6[2.7]	2.2[1.8]	1.5[1.7]
Previously untreated			
BSES-SF Total Score	45.0 [\pm10.9]	51.8 [\pm12.0]	56.7 [\pm12.2]
I-GERQ-R Total Score	15.7 [\pm6.0]	12.0 [\pm5.1]	10.5 [\pm4.9]
VAS Pain Score	4.8 [\pm2.8]	2.1 [\pm2.1]	1.6 [\pm2.0]
Previously treated			

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

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