

Treatment of Infant Tongue Tie and Lip Tie

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Overview

- Normal infant biology (breastfeeding)
- Impact of Tongue Tie and Lip Tie on breastfeeding
- This is a paradigm shift

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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

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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

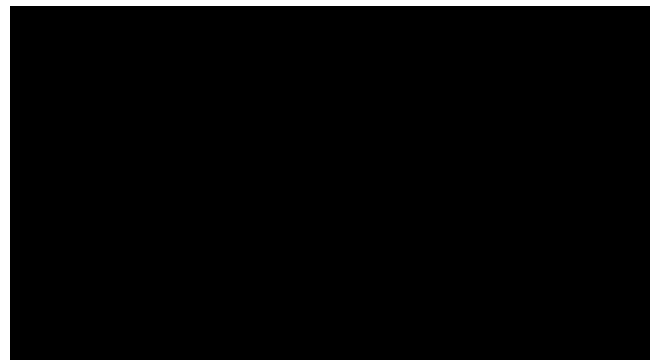
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Mechanism of Breastfeeding

- 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

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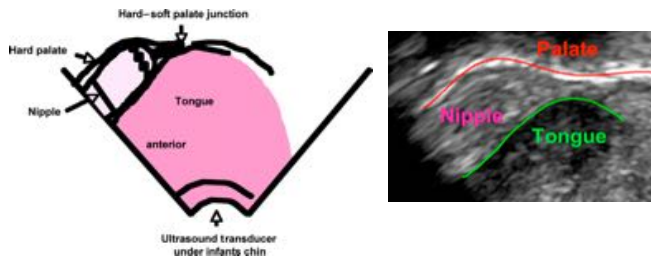
Peristalsis Theory



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Mechanism of Breastfeeding

- Geddes (2008) and Elad (2014)



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Elad et al (2014)

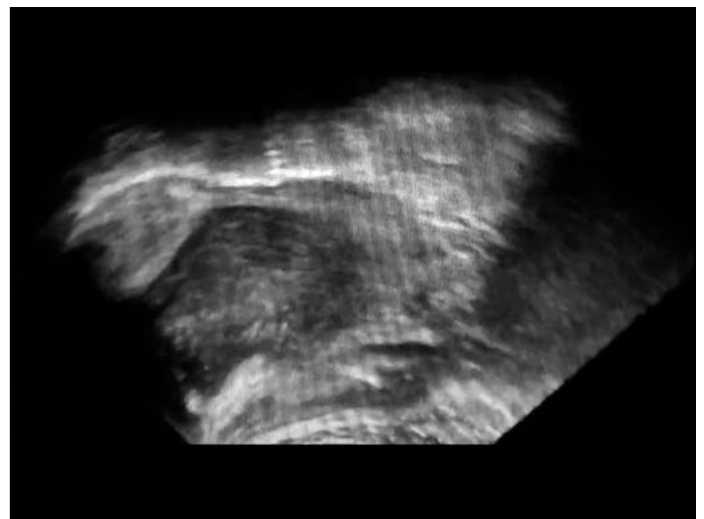
- “Biomechanics of Milk Extraction During Breast-feeding” - PNAS 2014
- “The results demonstrated that the rigid movement of the anterior tongue was dictated by the mandible oscillations, while the posterior tongue was undulating to facilitate swallowing and coordination with breathing.”
- “The subatmospheric pressure oscillations required to extract milk from the breast are most likely generated by changes in mouth volumes due to the mandible oscillations and the posterior tongue peristalsis.”

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Tongue Function in Breastfeeding



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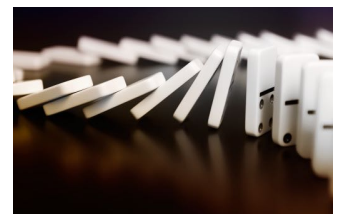
Understanding Compensations

- The ability of a baby to compensate for tethered tissue doesn't justify inaction. These compensations cause negative downstream effects
- Lip Tie (to some extent buccal tie) effects:
 - small mouth opening
 - inadequate flanging
 - can force a shallow latch

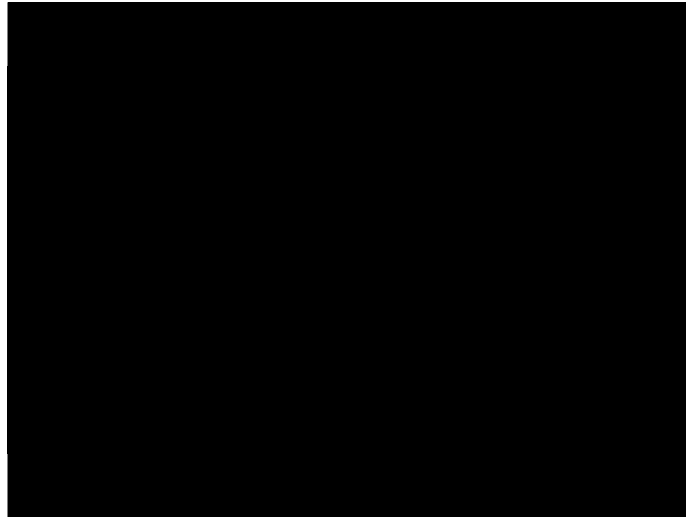
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Understanding Compensations

- Tongue Tie
 - Impeded movement up = no seal
 - No seal = no latch
 - No latch = compensation



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Must treat the dyad

- In most of medicine/dentistry, 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

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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%

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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

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Significance

- Ahluwalia et al (2005)
 - 32% of moms don't initiate breastfeeding
 - 4% stopped BFing in 1st week, 13% more stopped by 4th week
 - Only 51% breastfed beyond 4 weeks

Reason*	<1 wk (n = 1105), % (95% CI)	1-4 wk (n = 4687), % (95% CI)
Sore/cracked/bleeding nipples	34.9 (30.0–39.8)	30.2 (27.8–32.6)
Not producing enough milk	28.1 (23.7–32.6)	38.8 (36.3–41.3)
Sick/couldn't breastfeed	7.0 (4.4–9.5)	7.9 (6.5–9.3)
Baby had difficulty	48.4 (43.3–53.4)	34.0 (31.5–36.4)
Baby not satisfied with breast milk	22.2 (18.1–26.3)	38.6 (36.1–41.1)

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Breastfeeding Rates and PPD

New Evidence on Breastfeeding and Postpartum Depression: The Importance of Understanding Women's Intentions

Cristina Borra · Maria Iacovou · Almudena Sevilla

- Maternal Child Health Journal, Aug 2014
- Lowest risk of PPD - moms who wanted to breastfeed who were able to breastfeed
- Highest risk of PPD - moms who wanted to breastfeed but couldn't (2x the risk)

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Financial Burden

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

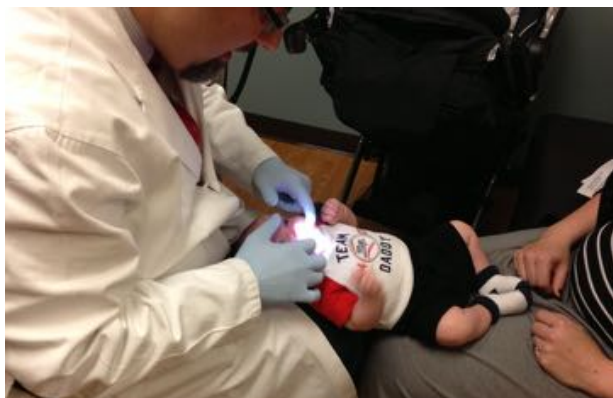
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Examination Technique

- 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

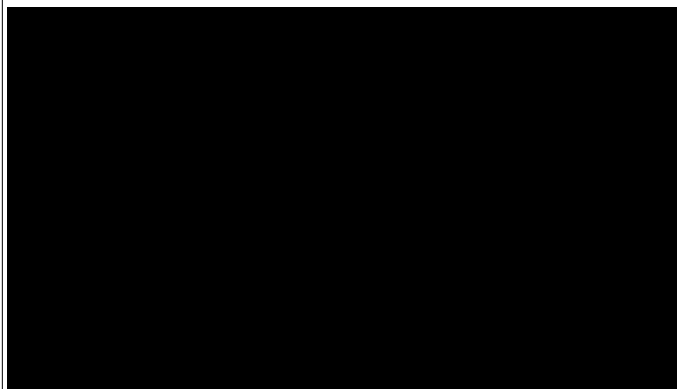
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Examination Technique



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Examination Technique

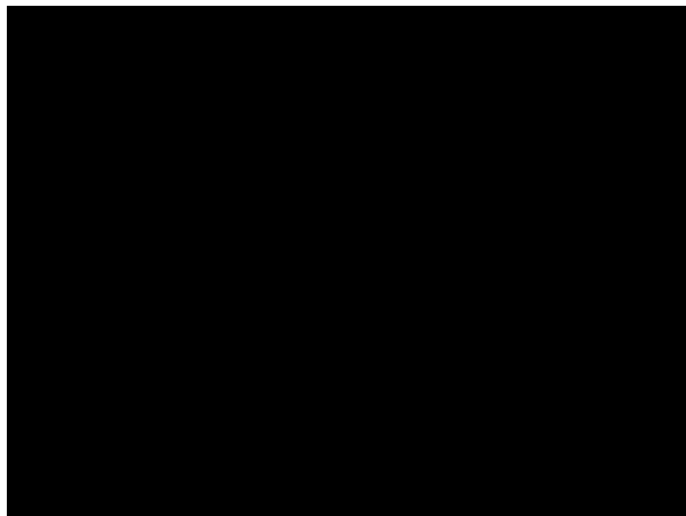


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Normal Labial Frenulum



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Normal Lingual Frenulum



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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

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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

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Anterior TT vs Posterior TT

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

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Anterior TT vs Posterior TT



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Anterior TT



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Posterior TT



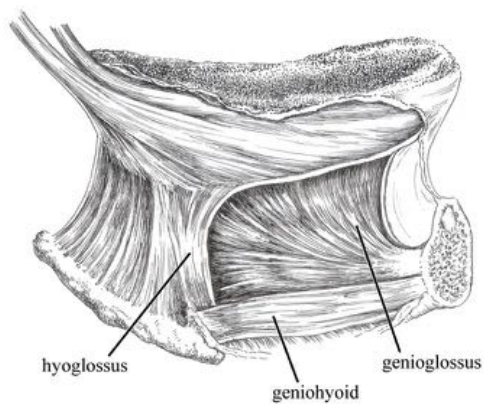
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Posterior TT



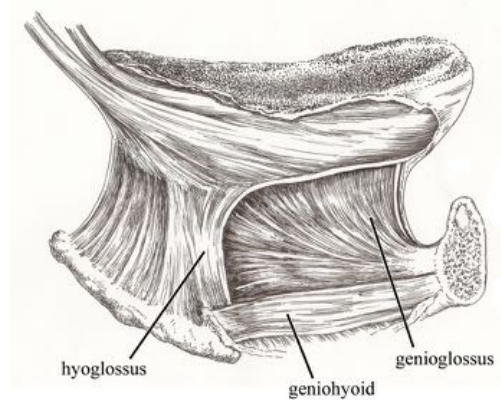
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Anterior TT



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Posterior TT



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*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

Lactation Kotlow 2005 2001

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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

Lactation Kotlow 2005 2001

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Flinck et al (1994)

- “Oral Findings in a Group of Newborn Swedish Children” - Int’l J. of Paediatric Dentistry
- Examinations on 1021 newborns
- Ankyloglossia in 2.5% (4:1 M:F)
- 6.7% had class 1 or 2 lips
- 76.7% had class 3 lips
- 16.7% had class 4 lips

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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**
- **Ricke et al 2005** “The presence of tongue tie triples the risk of weaning in the first week of life”

• Midline defect constellation - May occur with other midline defects

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

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Genetic Predisposition

- **Genetic (Han, et al 2012)**
 - 149 babies with TT revision
 - Used pedigree analysis
 - **Results:**
 - 67% boys, 33% girls
 - Seems to follow an X-linked pattern
- **Klockars 2009** - Autosomal Dominant with Variable Penetrance
- **Take home message**
 - If your dyad has a family history of TT or ULT, that should be a strong consideration if problems arise

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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”

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“Here’s a nipple shield”

- Decreased stimulation = decreased supply
- Inconvenient
- Risk of latch refusal once mom tries to get off the shield
- If a patient needed oxygen, but we never found out why, would it be ok to just say “keep using oxygen”?



- Best use: Getting a mom to “hang on” until a real treatment is available

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“Just Pump - Your Milk Still Gets In”

- Rarely sustainable
 - Remember, the goal is to nurse as long as possible
- Decreased milk supply
- Horribly inconvenient
 - can add hours to each day for just pumping
- Loss of emotional experience
- Facial developmental changes

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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

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Efficacy

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

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Available Studies

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

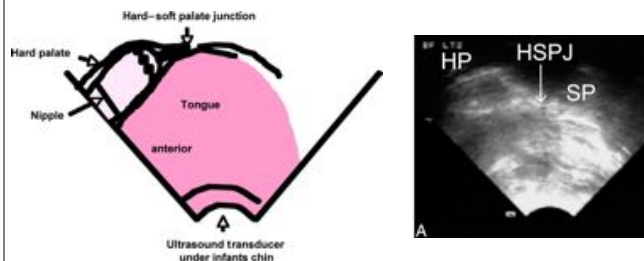
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Geddes et al (2008)

- 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

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Geddes et al (2008)

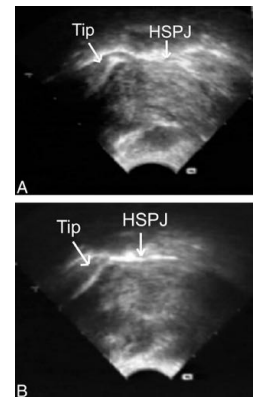


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Geddes et al (2008)

A: Pre-frenotomy, showing nipple compression

B: Post-frenotomy, showing less nipple compression



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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

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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)

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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

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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

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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

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Treatment

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

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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)
 - Arnica – inflammation (has been shown to help edema)
 - 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

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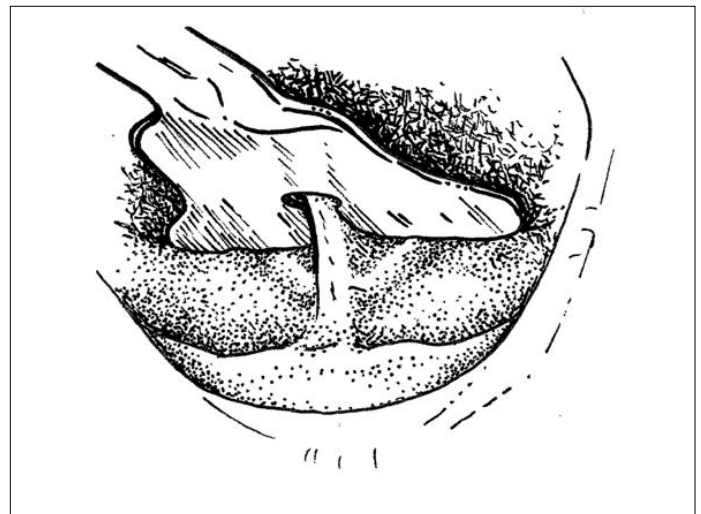
Treatment Goals - Tongue

- 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

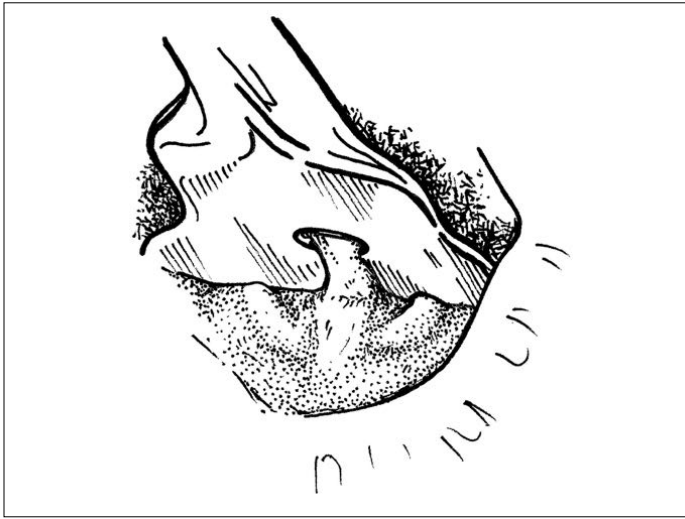
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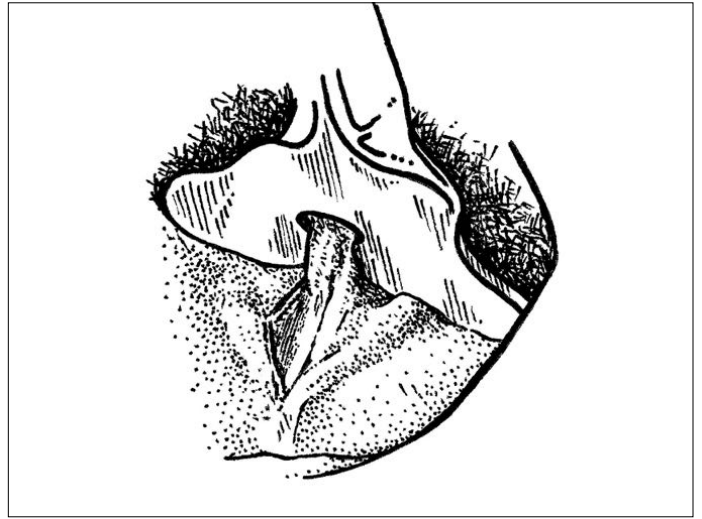
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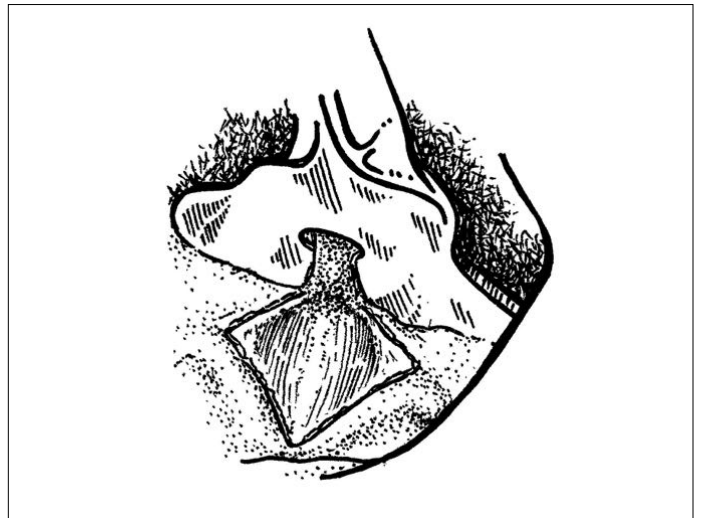
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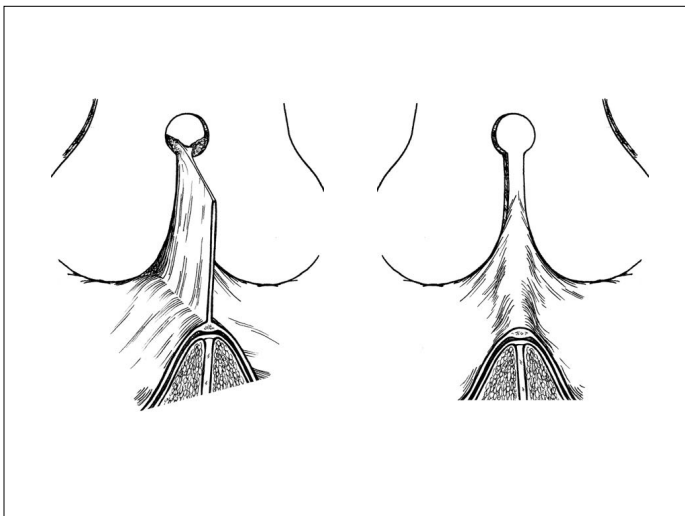
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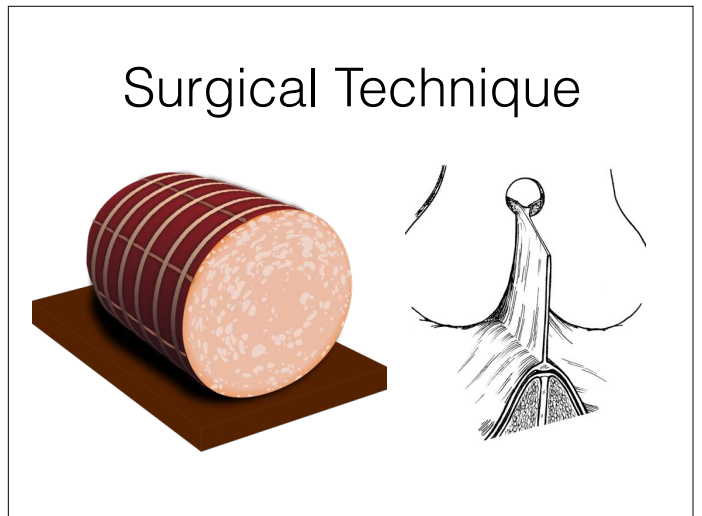
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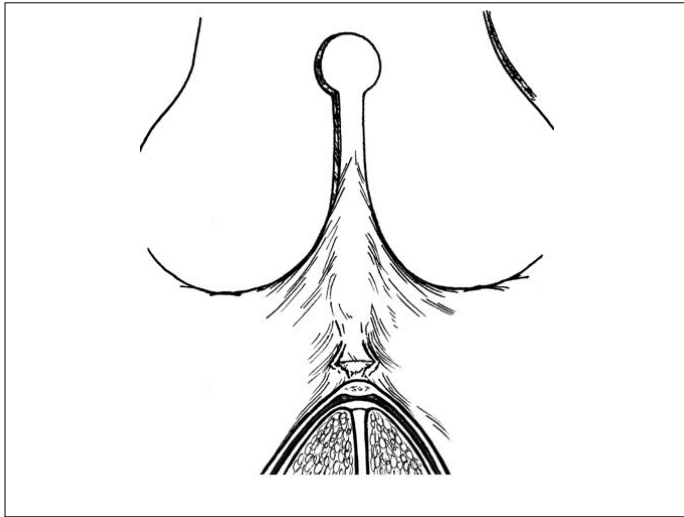
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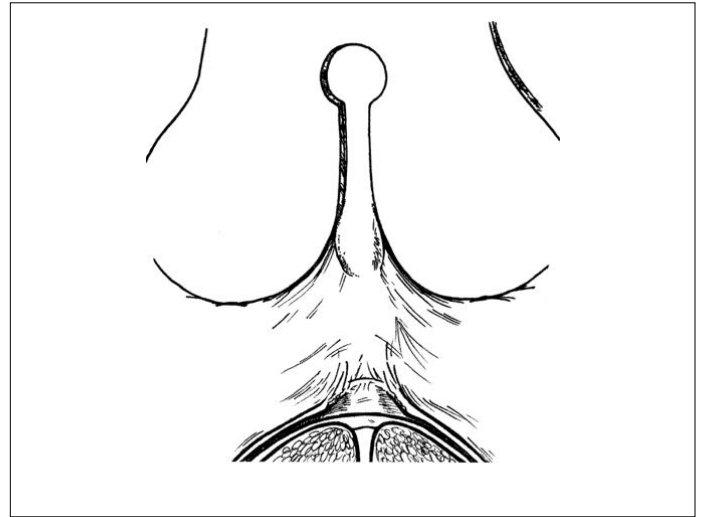
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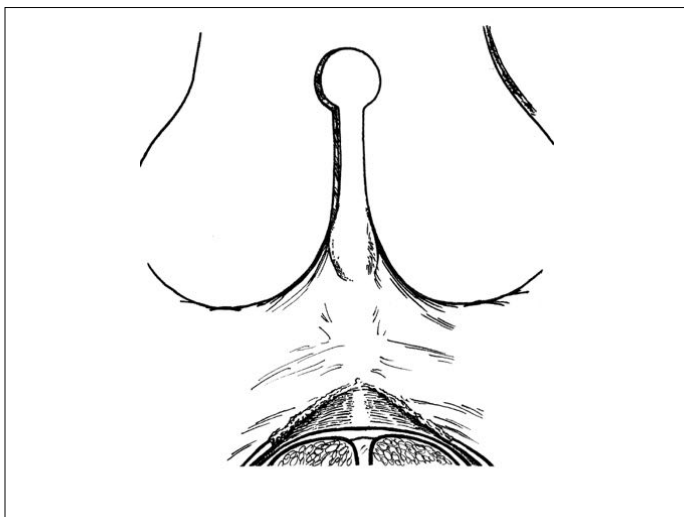
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Treatment Goals - Upper lip

- Try to stay as close to periosteum as possible to minimize swelling and bleeding
- Release up to the mucogingival junction for best result
- Avoid cutting into the orbicularis muscle **at all costs**
- The result should be effortless flanging of the upper lip

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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

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Scissor Revision



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Scissor Revision



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Scissor Revision



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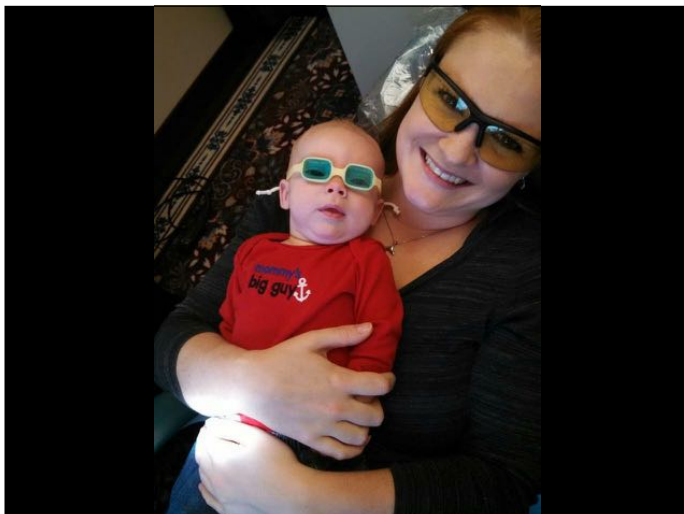
Scissor Revision

- 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 supraperiosteal
 - 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

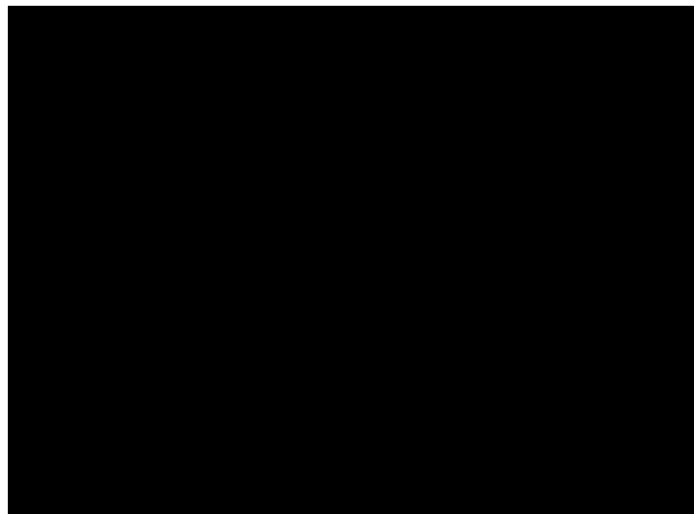
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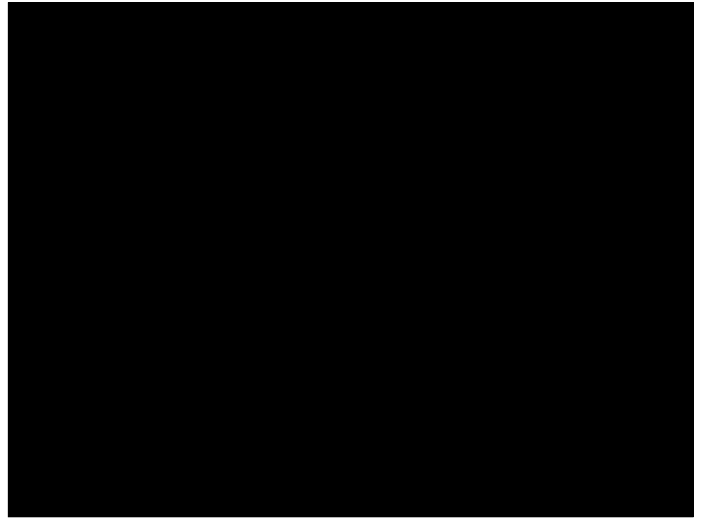
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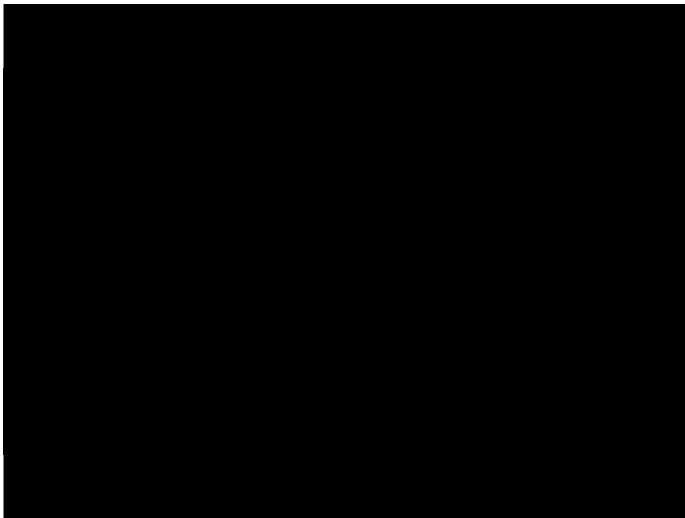
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How to Manage Bleeding

- 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

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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

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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

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Laser Revision

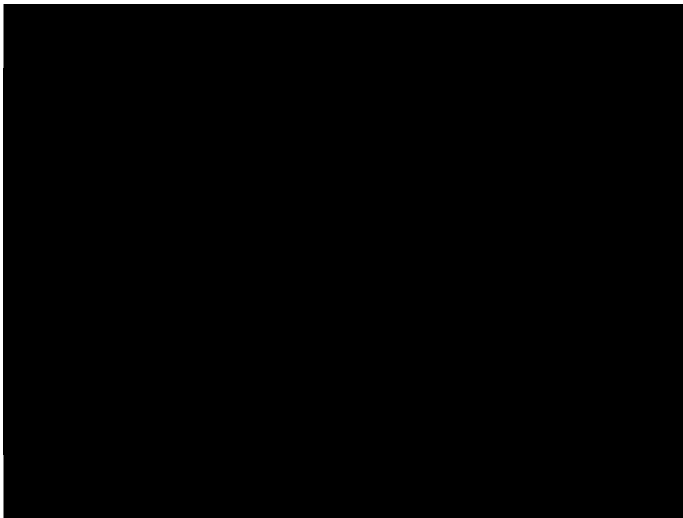
- Differences from scissor revision
 - No parents in the room (laser safety, liability)
 - Little to no bleeding (erbium may be an exception)
 - No need to inject epi-containing local anesthetic
 - Much more precise - lack of blood allows for gradual division of fibers with tissue preservation
 - Complete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

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Laser Revision

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

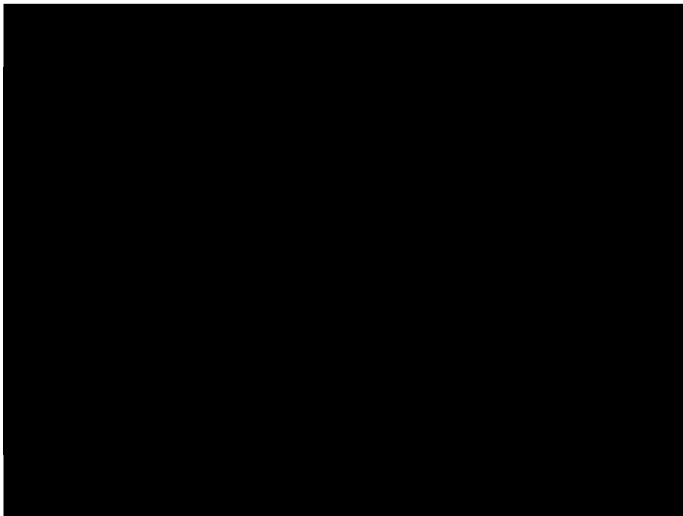
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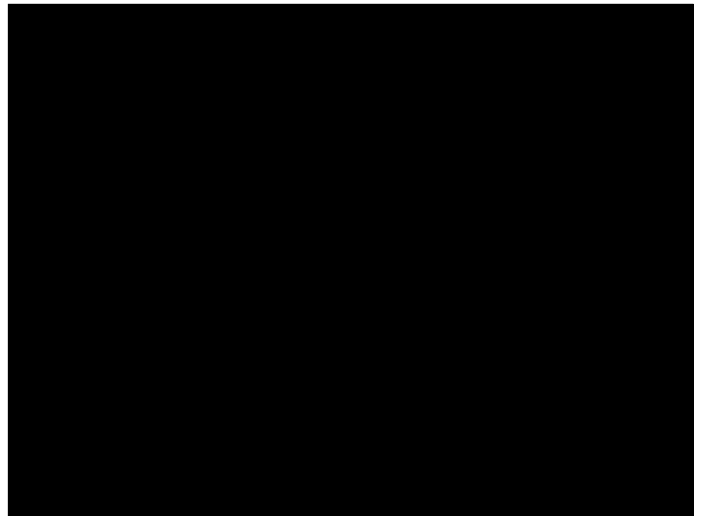
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Wound Care Principles

- 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

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Wound Care Principles



Courtesy of Shervin Yazdi DDS

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Proper Stretching



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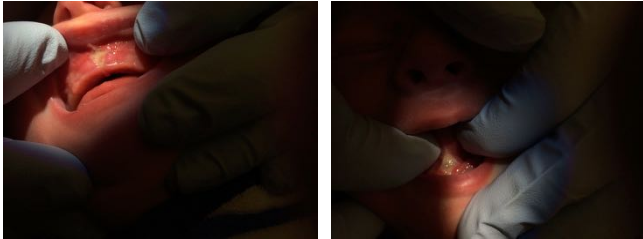
Improper Stretching



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Appropriate Wound Healing

The wounds always look infected
Mirrors a tonsillectomy wound



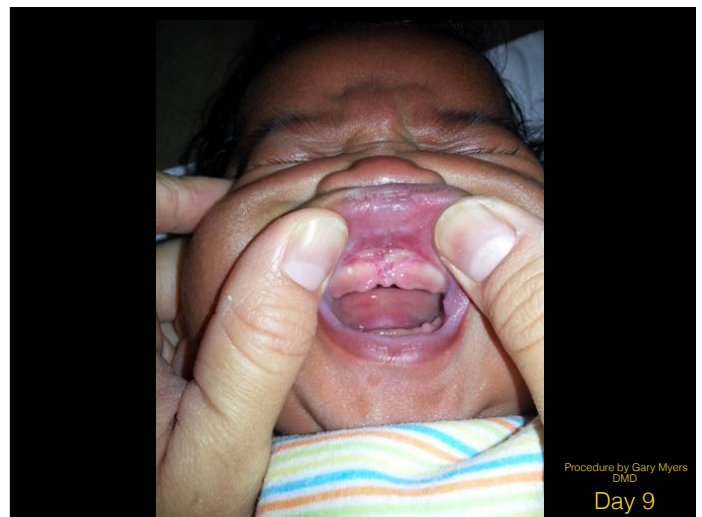
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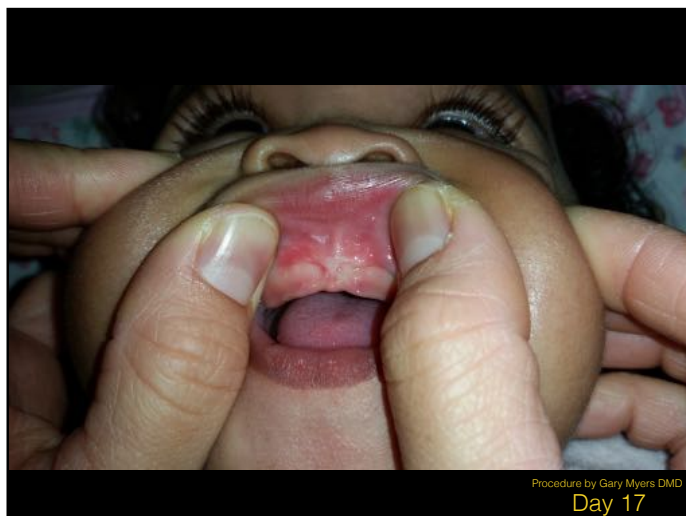
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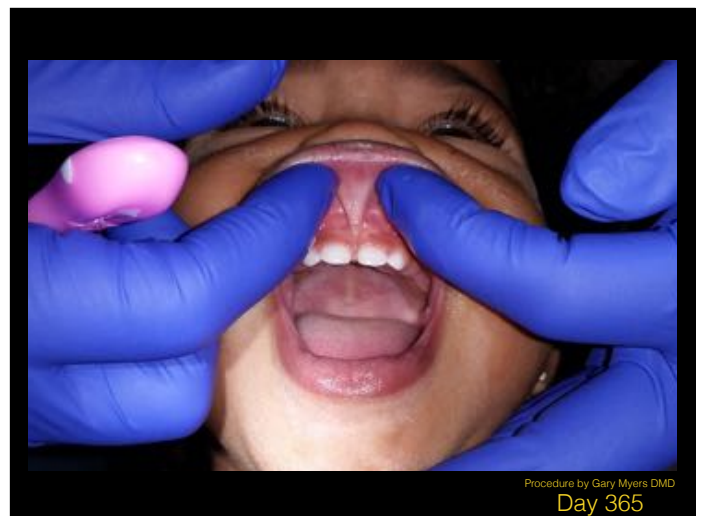
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Our Experience

- 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).

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Our Experience

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

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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

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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

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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
1 week postoperative 4.9mL

p < 0.001 for all 4 measures

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Conclusions

- TT and ULT are real phenomena. This is not a fad. Posterior tongue tie is not “controversial”
- If all other interventions fail to improve breastfeeding quality, TT/ULT is a potential cause
- TT and ULT revision is safe and extremely effective

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