Ankyloglossia and It’s Significance for Breastfeeding

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I Have No Relative Financial Relationship to Disclose
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Educational Objectives

The learner will be able to:

- Be able to recognize the “At Risk” oral anatomy of a newborn infant relative to breastfeeding
- Be able to perform a simple suck assessment in a newborn infant
- Be able to describe the advantages and disadvantages of the various methods of lingual frenulum and labial frenum release
- Be able to state the variable success rates of these releases at various postnatal ages
Definition of Anatomical Terms 1

- Ankyloglossia Superior is a rare congenital attachment of a fibrous band from the tongue to the roof of the mouth.

- Complete or Full Ankyloglossia is the total fusion of the tongue to the floor of the mouth, requiring more extensive surgical procedures.

- What we call Ankyloglossia is really Partial Ankyloglossia, but most prefer the shorter term.
Culture and Ankyloglossia

- Breastfeeding thus became associated with the “lower classes, savages and beasts of burden”
- Breastfeeding rates fell dramatically as reported by Anne L. Wright, Ped Clin NA Feb 2001\textsuperscript{2}:
  - 1900 – 65-70%
  - 1920’s – 63% → 47%
  - 1930-40 – 47% → 42%
  - 1940-50 – 42% → 24%
  - 1972 – bottomed out at 22%
- In-hospital supine birthing became favored with anesthesia and pain medications use
Culture and Ankyloglossia

- Ankyloglossia is noted in every culture, sparing no ethnic group
- In my group practice in San Diego I have observed and treated this problem in Caucasians, Hispanics, African-Americans, Filipinos, Chinese, and Japanese as well as mixed races. The literature reveals almost all countries are affected and likely the rest as well
- Articles on ankyloglossia also appear in the veterinary literature especially regarding dogs and horses
Definition of Ankyloglossia

1976

“I cannot define pornography BUT I know it when I see it!”

US Supreme Court
Justice Potter Stewart
The International Affiliation of Tongue Tie Professionals (IATP)

- The IATP defines tongue-tie as:

  An embryological remnant of tissue in the midline between the undersurface of the tongue and the floor of the mouth that restricts normal tongue movement.
USUAL, COMMON ≠ NORMAL
Potential Consequences of Missing a Clinically Significant Tongue Tie

- Poor milk transfer from mom to infant AND
- Poor stimulation of the breast by the nursing infant leading to
- Delay in milk production and inevitably leading to
- Excessive wt loss + poor hydration, or poor wt gain
- Exacerbation of physiologic jaundice
- Painful breast engorgement → Lactiferous duct obstruction → noninfectious mastitis and/or
- Nipple breaks/erosions/scabs → infectious mastitis
Benefits of Immediate Release - 1

- Removes the anatomic barrier to optimal tongue function
  - Benefit includes reducing the risk for many potential problems now and in the future including
    - chewing (moving food around in the mouth)
    - fatigue of speaking (esp. articulation issues)
    - swallowing pills and large lumps of food
    - cleaning the teeth using the tongue between brushings
    - social embarrassment, bullying

- Downside
  - short period of discomfort for mom and baby during release
  - +/- need to stretch the wound with each feeding until healed

- Removes the mechanism of injury to mom's nipples allowing rapid healing of the nipples to occur and rapid increase in mom's milk supply
Benefits of Immediate Release - 2

- Allows for a much deeper latch with a much better seal of the mouth on the breast which
  - Allows the tongue to cover the lower gingival ridge providing a cushion for the nipple and bite inhibition
  - Allows more areola (milk ducts) to enter the mouth
  - Significantly reduces the infant’s work of milk transfer
  - Allows the infant’s jaw to drop much further creating a much better suction and causing the milk transfer rate per minute to double
  - Shortening the time of nursing (occasionally to only 5 minutes every 2-3 hours causing mom to think the infant is not getting enough milk despite many, many stools)
What Constitutes a “Good” Latch?

- **Appearance**
  - Mom is in a relaxed position (Cradle, Cross-cradle)
    - Semi-reclining resting back and shoulders, no neck tension
    - Knees elevated above the level of the hips to allow gravity to bring baby to mom without further action
    - Pillows elevate the baby to the level of the breast
  - Baby is optimally positioned for nursing effortlessly
    - Hip, shoulder and ear are aligned with spine in neutral position
    - Looking straight at the breast or chin raised a little using minimal effort to maintain this position assisted by gravity
    - “Fish lips” visible with no audible air or visible fluid leak
    - Good amount of areola in the mouth, a crescent of areola visible above the infant’s upper lip and none below the chin
What Constitutes a “Good” Latch?

- **Comfort** - Mom reports
  - no strain on her neck, back, shoulders or arms
  - little to no discomfort from the baby nursing. (“Little” means Level 1-2 due to normal infant pulling and sucking movements)
  - both hands free to read a book, use a remote control or text a friend “Still nursing beautifully” (for a larger breast will need to use 1-3 rolled up washcloths under the breast to support it)

- **Baby**
  - Is too busy nursing steadily to report anything
  - Has no tension in the body, may choose to use the free arm on mom’s chest or breast to steady his/her body
What Constitutes a “Good” Latch?

- **Function** – much breastmilk is being transferred
  - sustained audible swallows/gulps of milk, and/or
  - big jaw drops are sustained
  - infant is happy and nursing contently
  - good voids and stools appropriate to day of life

- **With all of these**
  - Mature milk arrives 24-72 hr after delivery → wt gain
  - Nursings are brief with good interval sleep periods
  - Mom experiences the natural oxytocin high
  - Exclusive breastfeeding indefinitely is the norm

- It is necessary to have all 3: Appearance, Comfort and Function to declare the latch a “good” latch

- Just ask mom and baby! ACF!
The Oral Exam

- Every newborn should be examined for:
  - Ability to open the mouth widely
  - Symmetrical seating of the mandible
  - Intact upper and lower gingival ridges without teeth
  - Intact hard and soft palates (note shape, pockets)
  - Upper and Lower Lips intact and evert easily
- Thorough suck assessment to include:
  - Strength of suction (quality of the seal on the breast)
  - Cupping of the tongue around the examiner’s finger
  - Rhythmic Rolling of the tongue from tip to posterior of the tongue
  - Pinky finger sweep under the tongue for obstruction
Items of Concern

- Limited or asymmetrical mandible excursion
- Deep bubble (sand trap) or high arched palate, cleft palate
- Bifurcated uvula (asso w submucosal cleft palate)
- Lip Tie - restricts lip eversion from full “Fish Lips”
- Abnormal suck pattern: suction, cupping, and peristalsis
- Mouth floor sweep reveals any midline obstruction
Functional or Dysfunctional Suck Pattern

- Poor seal on finger
  - Allows swallowing of a lot of air, requiring burping often
- Fails to generate good suction
  - Fair suction – there is a “pop” when the finger is pulled out but the head never moves forward
  - Poor suction – the finger slides in and out easily
  - Terrible – there is a constant or nearly constant air leak
  - may indicate general hypotonia
- Poor cupping
  - is examiner dependent but can be significant
  - The cupping of the nipple allows for efficient transfer of the milk from the nipple to the posterior pharynx for swallowing
  - Tongue extension protects the nipple from the lower gingival ridge and provides bite inhibition during nursing
Tongue Elevation = Tongue Extension

- Tongue elevation with crying
  - Normal = leading edge is level and above mid-mouth, no notch is seen at rest or with forward movement
  - Suspect = small “U” shape leading edge at mid-mouth with minimal or no notch, elevation is usually 10 mm
- Abnormal
  - moderate or deep “U”, any “V” shape, elevation 0-9 mm
  - elevation of tip below the mid-mouth, the shorter the mm above the lower gingival ridge the more clinically significant the latch difficulty and pain to mom. May have a notch at rest; usually has a moderate to deepening notch with forward movement
  - heart shape = tongue pulled fully up with short frenulum
Rolling Peristalsis

- Peristalsis assessment requires some experience
  - Normal = full strong rolling wave-like movement from tongue tip to the base of the tongue
  - Always abnormal = weak rolling movement from tip or from mid-tongue to base & absence of rolling movement
- Highly variable abnormal tongue movements include
  - Slapping of the tongue on the finger, no peristalsis
  - Rolling of the tongue onto the finger, tip to base without peristalsis
  - Tongue is hardly felt on the finger. All that is noted is a chompy (biting) suck using the gingival ridges
  - Sliding of the tongue forward and backward on the finger, no peristalsis or alternating tongue tip then base on the finger (See-Saw)
  - Snap-back is the forward movement of the tongue over the lower gingival ridge in preparation for a suck then a sudden withdrawal of the tongue back into the mouth causing a soft suck to suddenly become the vice grip of gingival ridges only. This may be an intermittent finding or happen with every suck
The Finger Sweep

- Insert your 5\textsuperscript{th} finger, \textit{pad down}, into the left side of the infant’s mouth under the tongue.
- Advance the finger until meeting firm resistance.
- Holding the finger at this depth, move the finger directly to the right side of the infant’s mouth.
- No resistance = no Tongue Tie.
- Tongue vibrates only = Small Speed Bump = Small Risk of latch problems.
- Tongue moves far to the right then swings back = Large Speed Bump = usually a problem.
- Won’t move to the right = a fence = always a problem at some point in life, now or later.
Anatomical Feature Importance

- The thickness, shape and percentage length of the tongue tie (from the base to the tip of the tongue) are not predictive of the degree of difficulty of latching, degree of trauma to the nipples, duration of nursing or ultimately the success or failure of breastfeeding.

- Some infants are able to adapt and overcome the worst anatomical tongue ties while other infants cannot overcome the smallest defect. There is much more here than meets the eye (or finger)
The Organized Suck Pattern

- With your 5\textsuperscript{th} finger upside down in the infant’s mouth you should feel:
  - Good seal & suction (pulling finger back moves the infant’s head a little before releasing the finger)
  - Cupping of the infant’s tongue around your finger to a point at least halfway up the side of your finger.
  - A strong rolling peristalsis wave from the front of the infant’s mouth to the back of the tongue repeatedly
  - No snap-back – tongue always covers the lower gingival ridge during suckling
Type 1 - attached from the very tip of the tongue to 4-5 mm from the tip with a sail; Type 1, submucosal without a sail.
Type 2 - attached 4-5 to 10 mm from the tongue tip with a sail; Type 2 submucosal without a sail.
Types 1&2 = Lipstick Deformity
Type 3 - attached >10 mm from the tongue tip with any visible membrane above the mouth floor
Type 4 - attached >10 mm from the tongue tip with no visible membrane above the mouth floor. It is all Submucosal
T3&4 Tend to injury the base of the nipple or remove a chunk
Finding a Type 4 Tongue Tie

Sometimes it’s obvious

Sometimes it’s not
1. Shallow U little elevation
2. A little more
3. A closer look
4. T4 no membrane visible
5. Barely visible
6. T4 by finger sweep
7. T4 Stretched Hourglass View
Definition of Surgical Terms

Terms Typically Used Interchangeably

- **Frenum** = **Frenulum** = little bridle or bowstring
- **Frenotomy** = **Frenulotomy** = Simple incision
- **Frenectomy** = **Frenulectomy** = Excision or Incision with suture repair of the wound
- **Frenuloplasty** = complex surgery +/- Z-plasty

In strict anatomic terminology, an upper oral membrane (Upper Lip) is a Frenum and a lower one (Lower Lip) is a Frenulum. Often each membrane is referred to as a frenum creating some confusion among practitioners.
Proper Patient Positioning
Thumbs Pull Down the Mandible
Wide Gape with Tongue Fixed
Monroe Carell Jr. Children's Hospital at Vanderbilt ENT Frenulotomy
Take Home Point

- Many physicians in the Academy of Breastfeeding Medicine have successfully performed this tongue tie release with straight or curved iris scissors OR straight or curves metzenbaum scissors OR suture removal scissors

- The tongue can be elevated with a grooved director, a wood tongue depressor or just your fingers

- The individual’s skill/experience matters.
Technique varies with each surgeon

- This 4 mm diamond is then enlarged to a 10x10 mm diamond by a finger twist on each side.
- The closer the cut is to the underside of the tongue the more bleeding I have observed.
- Injected anesthetic appeared to both increase the complication of bleeding and cause the infant to fall asleep immediately post-op.
- Topical anesthetic caused the infant to cry more loudly and be more difficult to calm after the procedure and delayed the latch process. *No* anesthetic is used nor beneficial to the infant.
Just Prior to Release
Final Wound Appearance
Laser Release

- Everyone must wear laser protective glasses including the newborn
- Infant is held still while the laser is active
- The very tiny fiber head burns through the tissue slowly causing NO bleeding (cauterizes as it goes), No pain (nerves are stunned or cut) and leaves a slightly charred border with a wound the same size as scissors release.
- The same risk applies to closure needing stretching for some infants but not all.
- Outcomes are very similar to scissor release.
Preparations

- To have the infant be hungry and motivated to latch and nurse immediately after the frenulotomy, the mother is asked not to feed for about 60 minutes prior to the appointment. Tylenol & 24% sucrose solution are given 30 & 2 minutes pre-op.

- About 20 minutes is required to obtain all the needed information and sign the informed consent form, conduct a Time-Out, and have both forms witnessed.

- From incision to breast is 20 seconds if there is no bleeding; a few minutes if there is some bleeding.

- The infant goes directly to the breast once any bleeding is controlled.
Relative Contraindications

- Any airway compromise which could worsen with increased tongue mobility (macroglossia, small mandible)
- Any genetic anomaly suggesting that this patient represents a more complex genetic disorder than previously appreciated. Initial workup should be done prior to frenulotomy.
- Any familial bleeding disorder until coagulation studies & platelets are determined to be normal
- The rectal temp is taken at clinic check-in to screen for illness and allow a dose of Tylenol
Parental Expectations

- The infant is born with software and hardware that do not work together.
- My job is to restore the hardware to the manufacturer’s default specifications.
- Immediately after the procedure the infant will be put to the breast and expert latch assistance provided. Expressed Breastmilk may be needed by catheter at the breast to encourage a quick latch.
- At times the infant will just wish to rest and not eat right away. If this refusal to nurse is prolonged a follow-up visit the same or next day for latch assistance may be necessary.
- Provisions are made for ready access by the parents to our after hours service and clinic appointment service.
Further Advice

- We have a staff member restrain the infant for the procedure unless a parent insists on being the holder.
- The mother will experience 4 times the discomfort that the infant experiences as she is imagining all sorts of bad outcomes and is unlikely to tolerate the infant crying even briefly.
- A recommendation is made for mom to step out of the room while the procedure is done as this has time tested beneficial results.
- Mom may remain at her discretion and prepare to begin nursing the infant immediately.
Postop Recovery

- Rarely requires more than a few seconds to minutes
- Bleeding is minimal in 95% of patients
- The infant cries due to being restrained not due to pain and ceases crying as soon as he is comforted by mom. This procedure is no more traumatic or painful than giving an immunization
- It is best to nurse the infant immediately to soothe and nourish him/her and to calm the mother.
- Infants almost always nurse extremely well immediately postop and act as if nothing was done
- Later he/she often repeatedly plays with the tongue and looks as if to say “What’s different here?”
- Linear wounds (solid frenulum) heal in a few days but the larger diamond shaped wounds (asymptomatic in minutes) may take up to 2 weeks to disappear totally with or without really good stretching
Stretching the Wound

- A 10-12 mm diamond shaped wound is created in the mouth floor (superficial membrane only)
- Desirable healing is for the two side points to come together. Undesirable healing has the top and bottom points reuniting with little benefit to show for the experience
- To maximize the increase in tongue length that results from the frenulotomy, the parent is asked to wash their hands then use a wood tongue depressor to push the tongue straight back to stretch the wound in the desired direction (slit to diamond) just prior to or after each nursing (hold 3 seconds) until the wound heals in 10-14 days
Post-frenuloplasty Tongue Exercises

- Do each exercise 5 times a day to reduce scarring
- 1. Push tongue in and out of mouth—5 repetitions
- 2. Open your mouth as far as you can. Try to touch tongue to the back of your upper teeth—5 repetitions
- 3. With tongue in mouth, move tongue side-to-side 5 times (try to keep jaw in middle position)
- 4. Place food of choice in your mouth, between your back teeth and cheek. Move food to other side of mouth using your tongue and then move it back – 5 repetitions
- Patients are instructed to perform the above series of exercises 3-5 times daily for several weeks post-op
Immediately After Frenulotomy

- The infant latches deeper and better as he reactivates his innate breastfeeding software
- Mom notes a painless or nearly painless (level ≤30) with a good seal and a much deeper latch
- The “snake-like” rolling peristalsis of the tongue is felt distinctly by the mom for the first time ever or more strongly than ever
- The mechanism of nipple injury is gone and mom will heal a little each day until completely normal, usually zero discomfort in ≤4 days
- The diamond wound heals by epithelial covering or as a vertical white line.
In the Week After Frenulotomy

- Milk supply increases in 24-48 hrs due to the absence of pain and presence of normal stimulation activity with effective milk removal.
- The infant plays with the “new” tongue sticking it out a lot, licking the lips often and looking puzzled at times.
- The yellow diamond shrinks and disappears.

- And they lived happily ever after……maybe. This all depends on really good wound stretching to prevent contracture and return to compromised tongue function once again.
Final Outcome

- Highly variable depending on
  - When the infant was identified early and effective temporary intervention begun to adequately feed the child and maintain mom’s milk supply = 100% success
  - The size of mom’s breasts and size and shape of her nipples – inverted or retractile nipples are the most challenging to establishing the perfect latch resulting in prolonged nipple shield use and “Bait & Switch” often.
  - If mom has not maintained her milk supply, some supplementation at the breast is needed and may be cumbersome or impossible for mom to do
  - Babies trained to feed with a regular flow bottle are highly reluctant to go to a breast without good milk flow and may refuse to nurse even with a nipple shield
4-6 Weeks of Age

- Mom’s begin to have a less vigorous Let-Down requiring the infant to do more of the work
- An infant who just barely was able to nurse and gain weight at an acceptable level may now burn more calories to nurse and markedly slow their weight gain, usually not noted until 2 wks
- The slower flow may result in very prolonged nursing sessions or any infant who pulls off crying and is then given a bottle to top-off
- Some moms/infants just give up at this point
Follow-up Visit

- It is mandatory to call every mom about 2-3 days postop to determine if things are going well.
- They just will not call when they are having difficulty.
  - Some wait until they are in real trouble.
  - Others just elect to pump and bottle feed or switch to formula and say nothing.
- They will come back if you call and tell them you want to see them, otherwise...?
Credentialing

- Training is anywhere you can get it
- Your institution determines how much observation of your performance is sufficient to warrant the privileges granted to you
- Usually your ENT staff will provide the expert guidance though a Fellow of the Academy of Breastfeeding Medicine may be available for this
- Your department head signs off on the package and sends it to the credentials committee
Manual Milk Expression\textsuperscript{17}

http://newborns.stanford.edu/Breastfeeding/HandExpression.html

- 9 Minute video created by Jane Morton, MD, Lucille Packard Children’s Hospital, Stanford University, Palo Alto, CA demonstrates a very simple and effective method of removing colostrum on day 1 and mature milk when this arrives

- This nicely debunks the “I Don’t Have Any Milk” Syndrome
Take Home Points

- Symptoms of dysfunctional nursing not resolved by skilled lactation assistance in the presence of a sail frenulum or speed bump frenulum is all the evidence needed to release a tongue tie
- Sail type frenulum – all Peds/FP should clip
- Speed bump type – all ENT and all experienced Peds/FP should clip
- Pain is no worse that getting the 2 mo vaccines in 99% of infants
- Bleeding is minor in 95%, controlled by AgNO3 in the remaining 5%
Questions?