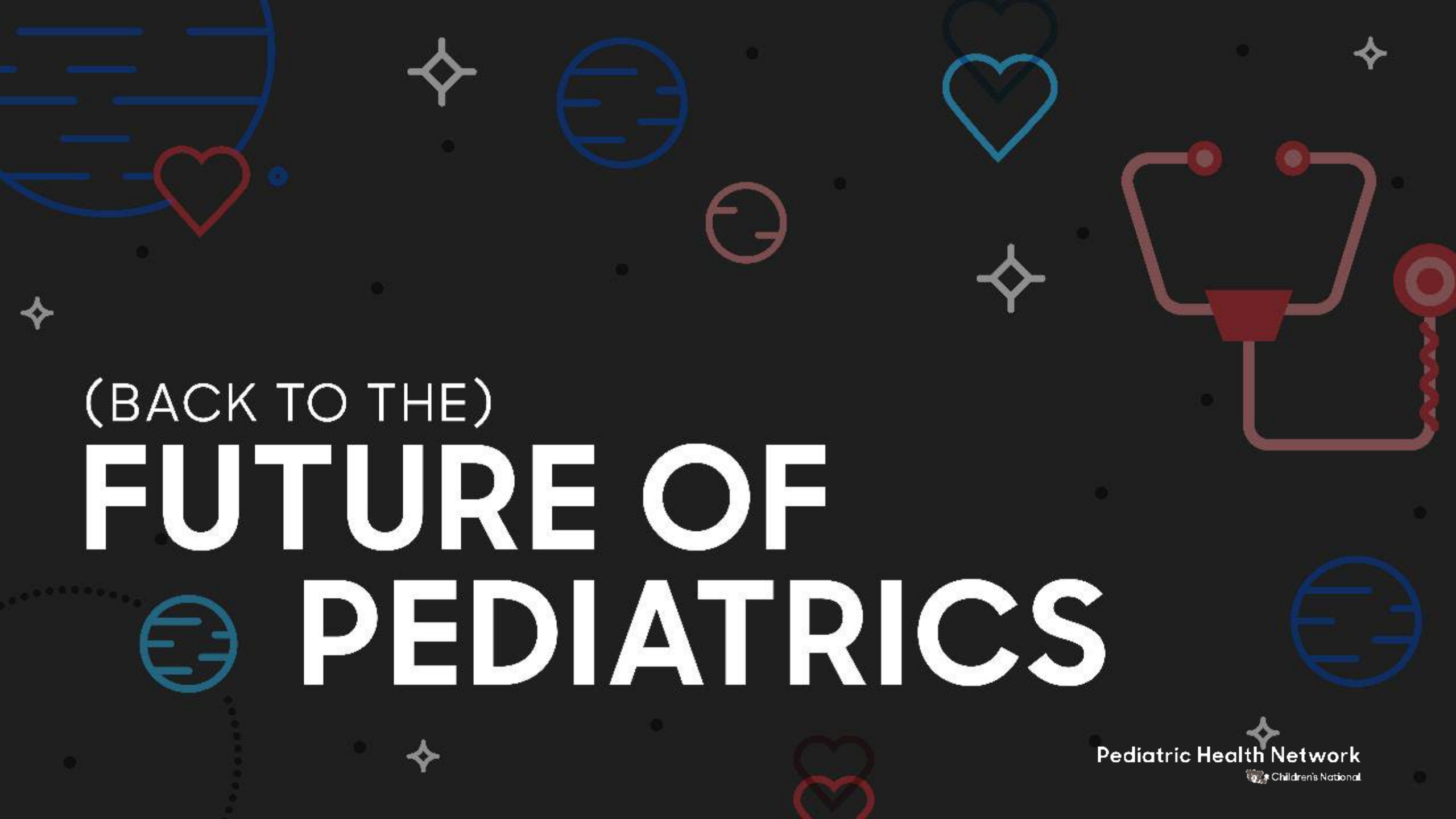
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Multiple Formula Changes and my Infant Patient Still Cannot Eat…

The Infant Dysphagia Conundrum

Nancy M. Bauman, M.D.

Maura Collins, S.L.P

Claire M. Lawlor, M.D.

Sona Sehgal, M.D.

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Disclosures

No conflicts to disclose:

- No financial or business interest, arrangement or affiliation that could be perceived as a real or apparent conflict of interest in the subject (content) of their presentation.
- No unapproved or investigational use of any drugs, commercial products or devices.

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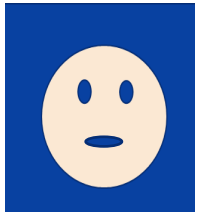



Anna Huynh



Aerodigestive Team Children's National

3 month old, full term, breast and bottle fed baby who, when feeds, displays…

irritability,

back arching,

intermittent coughing and….

recently saw a lactation consultant who

diagnosed a tongue tie.

Speaker Bios

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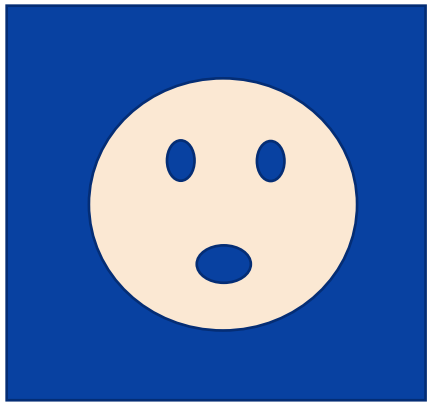
Case Report
Definitions
Normal swallow



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History
Bedside Evaluation of Feeding
Compensatory Strategies
Diagnostic Tools
- Modified Barium Swallow
- FEES (Functional Endoscopic Evaluation of Swallow)

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Cow's milk protein allergy vs GERD
Formula options

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Anatomic causes of dysphagia
Ankyloglossia

Children's National

Dysphagia

"Difficulty with swallowing"

- Includes
  - **Any feeding difficulty**
  - **"Aspiration": bolus passes below vocal folds**
  - **"Penetration": bolus reaches vocal folds**

Affects 1% of otherwise healthy infants

Consider in infants with respiratory problems of unknown etiology

Normal swallow features

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Involuntary in neonates and infants

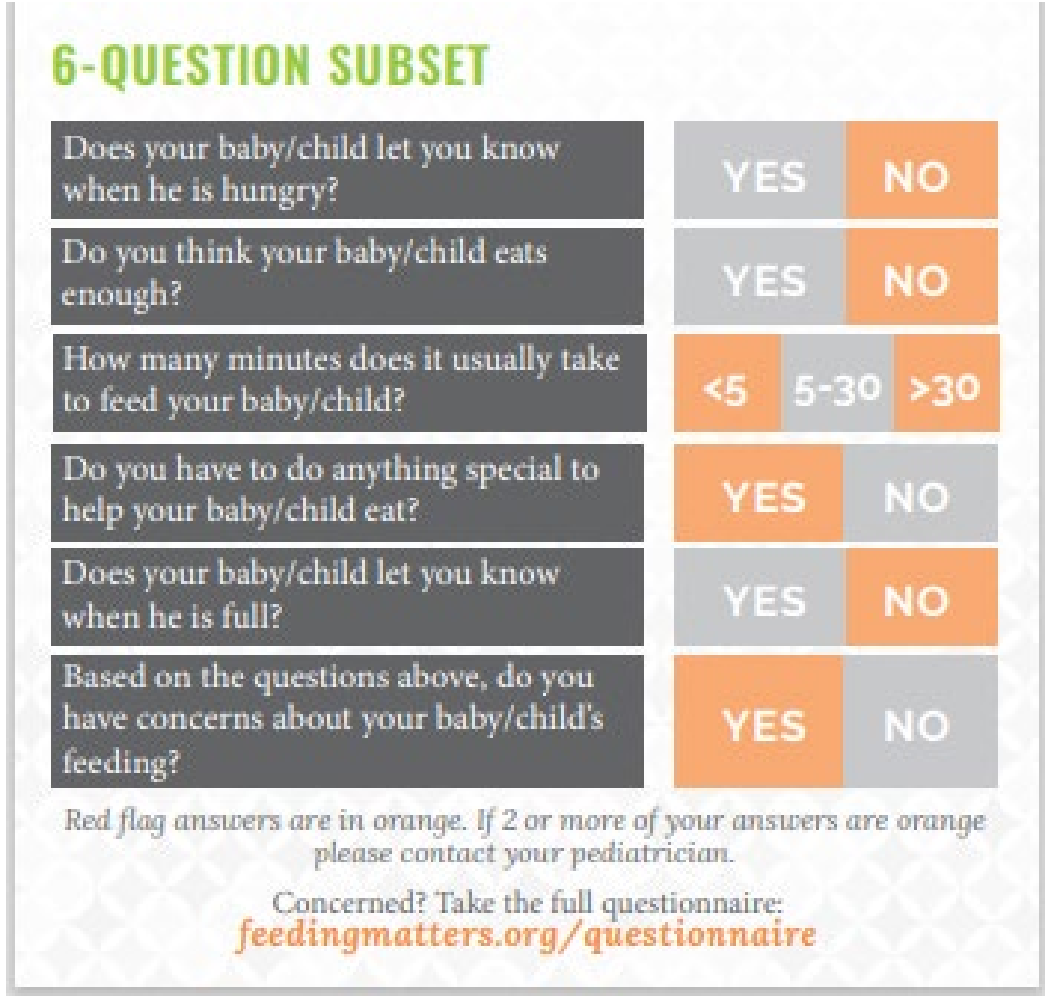
- Brainstem mediated activity

3 phases

- Oral phase
  - **Sucking and transfer of milk from oral cavity to pharynx**
  - **Tongue, hard palate and jaw elevation**
- Pharyngeal phase (vallecula)
  - **Closure of nasopharyngeal port by velum**
  - **Contraction of the pharyngeal constrictors**
  - **Elevation of larynx**
  - **Opening of the upper esophageal sphincter**
- Esophageal phase:
  - **Transfer through upper esophageal sphincter to stomach**

Referral For Clinical Swallow Evaluation

When to refer to a feeding specialist (SLP or OT)



6-QUESTION SUBSET

Does your baby/child let you know when he is hungry?	YES	NO	
Do you think your baby/child eats enough?	YES	NO	
How many minutes does it usually take to feed your baby/child?	<5	5-30	>30
Do you have to do anything special to help your baby/child eat?	YES	NO	
Does your baby/child let you know when he is full?	YES	NO	
Based on the questions above, do you have concerns about your baby/child's feeding?	YES	NO	

Red flag answers are in orange. If 2 or more of your answers are orange please contact your pediatrician.

Concerned? Take the full questionnaire:
feedingmatters.org/questionnaire

- Coughing or choking with feeds
- Breathing disruptions and episodes of apnea during feeds
- Unexplained refusal of bottle/ breastfeeding
- History of recurrent upper respiratory infections of unknown etiology

Clinical Swallow Evaluation

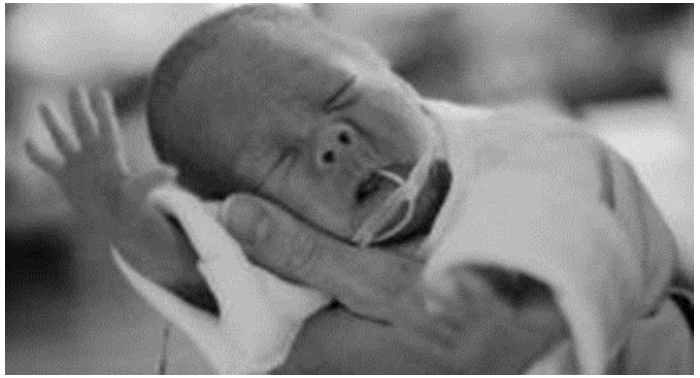
- Parent interview: infant’s feeding history and recent changes in feeding
- Observe infant’s baseline state and respiratory function
- Assess infant's oral reflexes
- Observe infant feeding bottle or breastfeeding
- Assess infant’s oral motor skills, sensory impairments and/or behavioral issues during feeding.

Infant Stress Cues when Feeding

Anterior loss of formula
Increased respiratory rate or work of breathing
Coughing

Facial grimace or furrowing eyebrows
Pulling away from the bottle
No rooting or opening of the mouth to accept the nipple

- Hand splaying
- Rapid Shutdown



Compensatory Feeding Strategies

- Changing the flow rate of the bottle nipple or breast milk
- Pacing
- Positioning

Parent/ caregiver education and training

- Thickening formula or breast milk

Compensatory Strategies: Adjusting the Flow Rate

- Indications:
  - Infant stopping feeding
  - Formula or breastmilk spilling out of infant's mouth
  - Formula or milk pooling in infants' cheek
  - Infant is gulping when drinking
  - Tongue clicking when drinking

Compensatory Strategy:
Adjusting the Flow Rate

TABLE 3. Results of Cluster Analysis

Flow Category	Nipple Brand and Type	Mean Flow Rate (Range)
Extra Slow	Philips Avent Natural First Flow	0.86 (0.15-1.19)
	Philips Avent Natural 0mos+	2.25 (1.49-2.74)
	nfant Labs Extra Slow	3.30 (2.6-3.77)
	Dr. Brown's UltraPreemie	4.92 (4.09-5.73)
Slow	nfant Labs Slow	5.99 (5.10-6.62)
	Dr. Brown's Preemie	7.22 (4.35-8.37)
	Playtex Ventaire Full Sized	7.35 (5.65-10.29)
	Playtex Ventaire Breastlike	7.37 (6.10-9.86)
	Similac single-use Slow Flow	8.04 (6.59-13.28)
	Playtex Baby Naturalatch 0-3m	9.47 (7.66-12.88)
	Comotomo Slow Flow (0-3 mos)	9.76 (6.05-12.49)
	nfant Labs Standard	10.32 (9.12-11.79)
Medium	Enfamil single-use Slow Flow	13.24 (9.93-17.39)
	Gerber First Essentials	13.26 (9.85-20.17)
	Dr. Brown's Level 1	13.31 (11.51-14.59)
	Evenflo Classic Slow Flow 0m+	13.63 (10.66-20.64)
	MAM Anti-colic 0mos+	13.83 (13.04-15.68)
	Tommee Tippee Closer to Nature 0m+	15.90 (14.05-17.08)
	Tommee Tippee Anti-colic 0m+	16.23 (11.28-20.30)
Fast	Philips Avent Anti-colic 0mos+	17.44 (16.31-18.5)
	Similac single-use Standard Flow	18.49 (10.55-26.61)
	Enfamil single-use Standard Flow	19.14 (14.09-21.78)
	Similac single-use Premature	19.17 (13.53-26.82)
	Medela Wide-Base Slow Flow	22.03 (17.97-25.61)
Very Fast	Medela Calma	37.61 (35.54-39.96)

Compensatory Strategies:
Adjusting the Flow Rate

Strategies for breastfeeding:

- Feeding infant in a semi-reclined position
- Having the mother pump through her let down and then bringing infant to breast

Compensatory Feeding Strategies

- Changing the flow rate of the bottle nipple or breast milk

Positioning

- Pacing

Parent/ caregiver education and training

- Thickening formula or breast milk

Compensatory Strategies: Positioning and Pacing

Indications for changing positions:

- Infant is breathing at a faster rate at rest
- Infant has reflux
- Need to slow the flow rate down during breast feeding

Left side-lying position

Indications for Pacing:

- Infant is not pausing to take a breathing break when feeding
- Infant is tiring before end of the feed

Compensatory Feeding Strategies

- Changing the flow rate of the bottle nipple or breast milk

Positioning

- Pacing

Parent/ caregiver education and training

- Thickening formula or breast milk

Compensatory Strategies:
Caregiver Training and Thickening

Indications for caregiver training:

- Infant showing stress cues while feeding and caregiver not providing breaks
- Feeding infant while he/she is sleeping (dream feeds)

Indications for thickening formula or expressed breast milk

- Infant has aspiration of thin liquids on a modified barium swallow study or flexible endoscopic evaluation of swallowing
- Gastro esophageal reflux

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Modified Barium Swallow Study/ Video Fluoroscopic Swallow Study

Advantages

- Visualize the oral, pharyngeal and cervical esophageal phases of swallowing
- Can trial therapeutic strategies to determine their effectiveness
- Can correlate swallowing impairment and amount of aspiration

Limitations:

- Radiation exposure
- Requires contrast
- Limited positioning options

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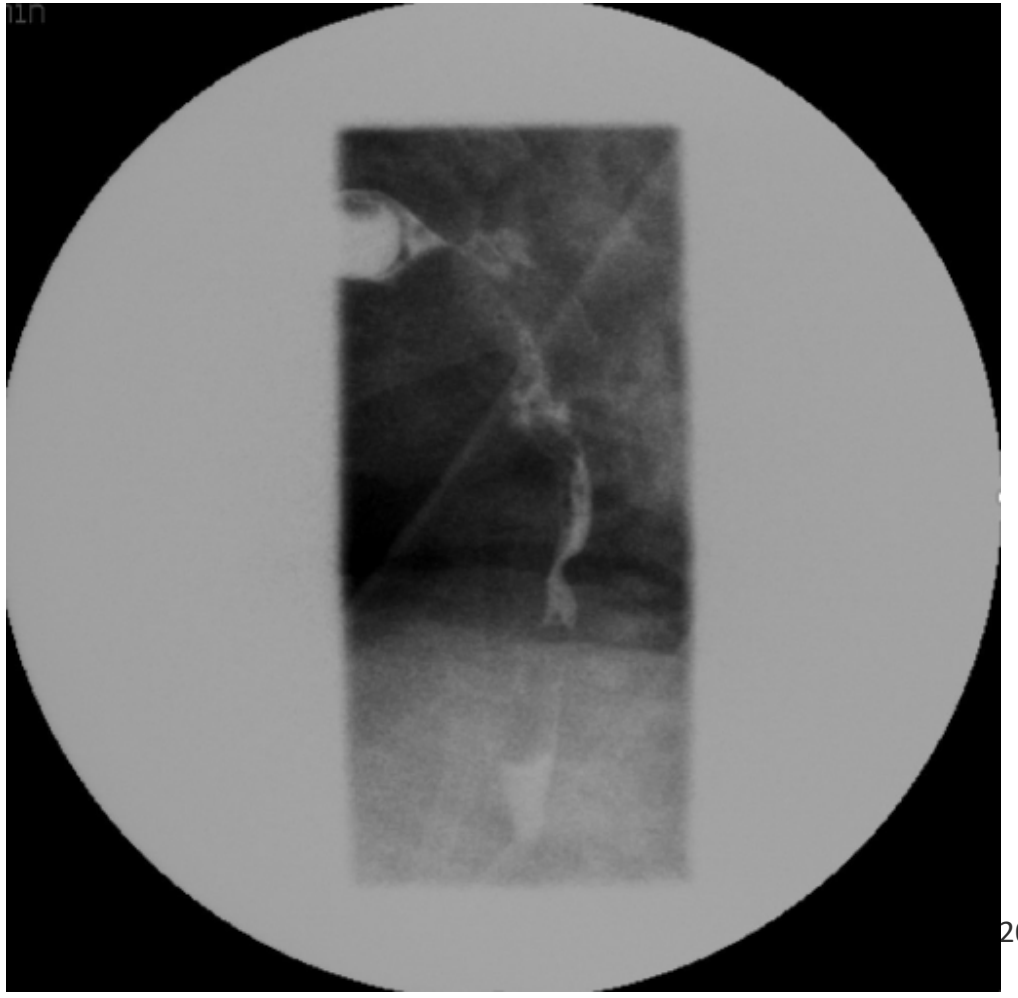


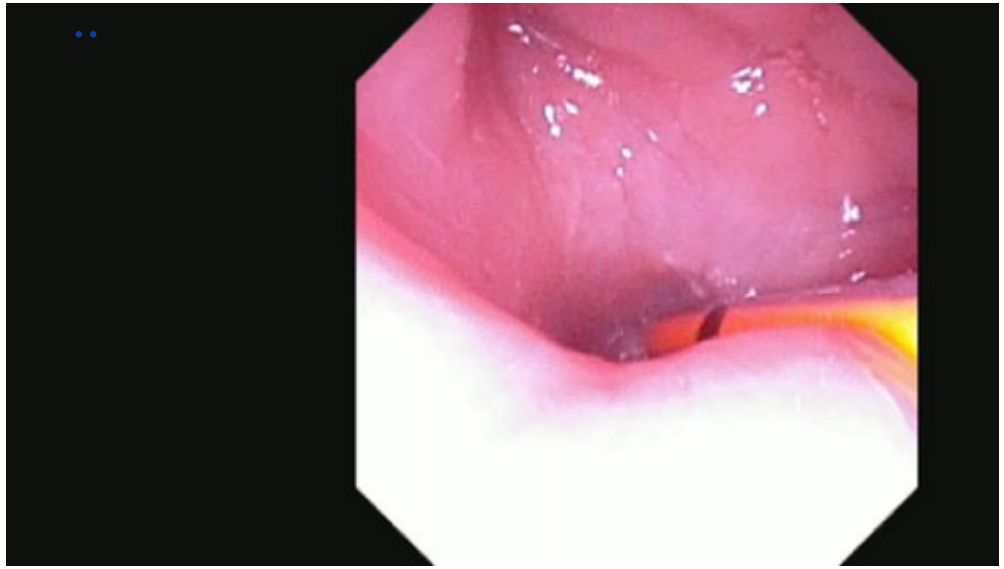
Fiberoptic Endoscopic Evaluation of Swallowing

Advantages:

- Visualize nasal, pharyngeal and laryngeal structures and their impact on swallowing, breathing and vocal quality
- Can assess breastfeeding
- No radiation exposure
- Uses actual formula or breastmilk

Limitations:

- Minimally invasive- may be uncomfortable
- Does not allow visualization during the swallow
- Risk for vasovagal reaction or bleeding
- Cannot do if infant has a nasal obstruction



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Development of a Feeding Treatment Plan

Goal: Infant is fed in a safe and developmentally appropriate manner

Factors to consider:

- Parent report/ Infant's clinical history
- Results of clinical swallow evaluation, MBS or FEES
  - Does infant require alternative means of nutrition/ hydration?
  - May allow infant to continue to drink small volumes of formula or expressed breast milk even if infant is aspirating to promote maintenance of oral skills
- Need to refer to additional specialists (Otolaryngology, Gastroenterology/ Nutrition, Pulmonology)
- Need for feeding therapy

What does the infant have…

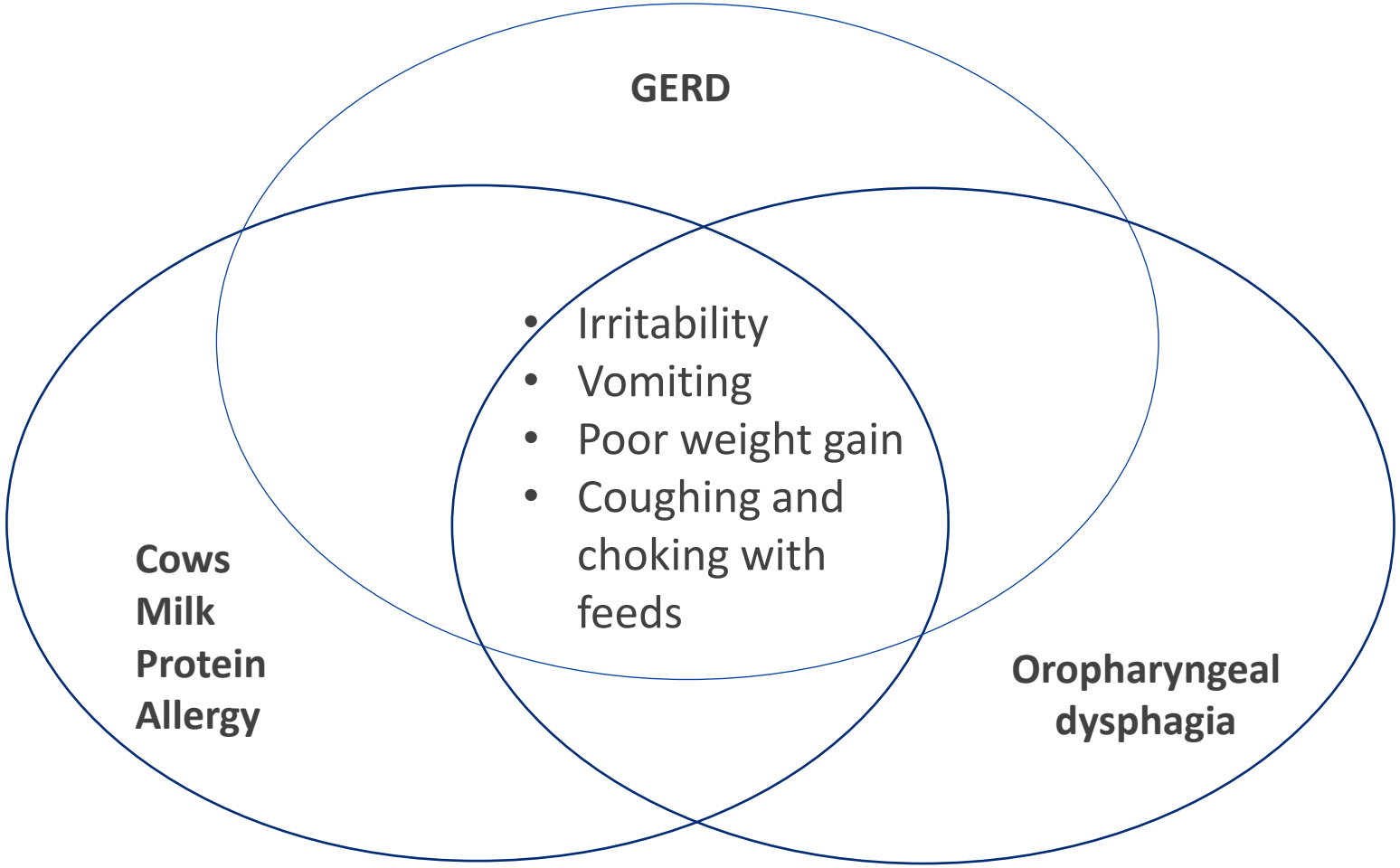
Infants are frequently referred for feeding difficulty and respiratory symptoms and misdiagnosed as having reflux

This results in inappropriate medical management…

- prescribing unnecessary acid-suppressing
- risk of unaddressed pulmonary damage from ongoing aspiration
- poor growth and nutrition
- oral aversion

Differential from a GI standpoint

Sona Sehgal M.D.



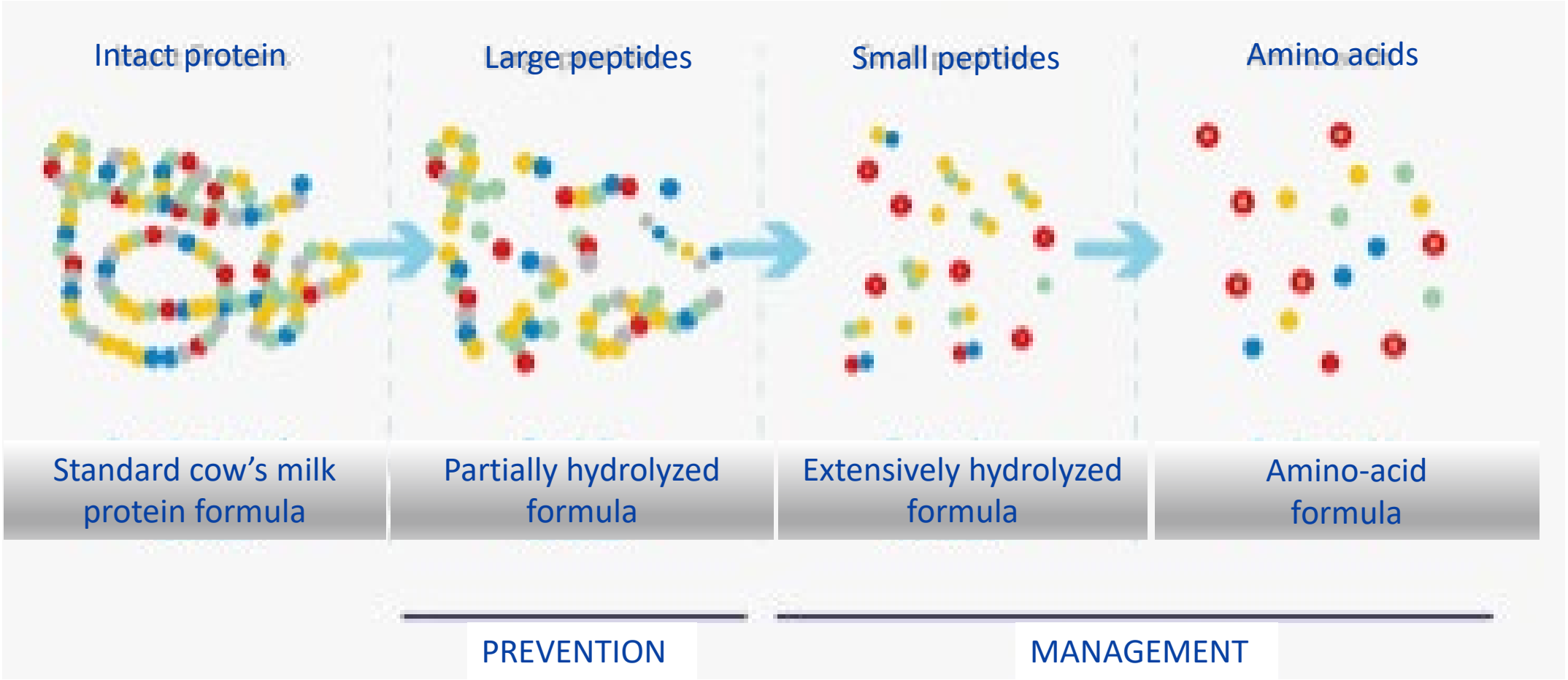
Overlapping symptoms of GERD and Aspiration

Infant GERD Questionnaire-Revised (I-GERDQ-R)	Ped Eating Assessment Tool (P-EAT-10)
How often does your baby spit up	My child does not gain weight due to his swallowing problem
How much does your baby spit up	Swallowing problem of my child interferes with our ability to go out for meals
How often was the spitting up uncomfortable	Swallowing liquids takes extra effort for my child
How often did the baby refuse the feeding when hungry	Swallowing solids takes extra effort for my child
How often did the baby stop eating soon after eating even when hungry	My child gags during swallowing
Did the baby cry a lot during or within 1 hour after feedings	My child acts like he is in pain while swallowing
Did the baby cry or fuss more than usual	My child does not want to eat
On average how often did the baby cry or fuss during a 24-hr period	Food sticks in my child's throat and my child chokes while eating
How often did the baby have hiccups	My child coughs while eating
How often did the baby have episodes of arching back	Swallowing is stressful for my child
Has the baby stopped breathing while awake or struggled to breathe	
Has the baby turned blue or purple	

Cows Milk Protein Allergy (CMPA) in infants

- Prevalence 2-3% of infants
- Usually, non-IgE mediated
- Presents with irritability, regurgitation, poor weight gain, diarrhea, blood in the stool
- 90% respond to extensively hydrolyzed formula
- Outgrown by 1-2 years

Types of Hypoallergenic Formulas



Types of Thickeners

	Thickener type	Primary ingredient	Calories	Can thicken breast milk	Approved age/weight	Limitations/notes
Cereal	Rice cereal	Rice	5 kcal per teaspoon of cereal	No	No restriction	
	Oatmeal cereal	Oatmeal	5 kcal per teaspoon of cereal	No	No restriction	
	Other grain cereals	Varies	Varies depending on grain	No	No restriction	depending on grain
Commercial	GelMix	Carob bean gum	Adds 5 kcal per ounce for nectar consistency	Yes	> 42 weeks corrected age, weight > 6 lbs	Heating required for thickening but can be used for breast milk
	SimplyThick	Xanthan gum	Adds 5 kcal per ounce for nectar consistency	Yes	> 12 months–3 years corrected age depending on institution	
	Thick-It	Corn starch	Adds 4 kcal per ounce for nectar consistency	No	> 12 months corrected age	
	Purathick	Tara gum	Adds 2 kcal per ounce for nectar consistency	Yes	> 12 months corrected age	Thickens both hot and cold liquids
Puree	Food purees	Fruit, vegetable, yogurt, other pureed foods	Varies depending on foods used	Yes	Typically after 4 months of age	Important to work with dietician and feeding specialist to insure appropriate nutritional content and consistency

- Concern about arsenic
- Cannot be used with breastmilk.

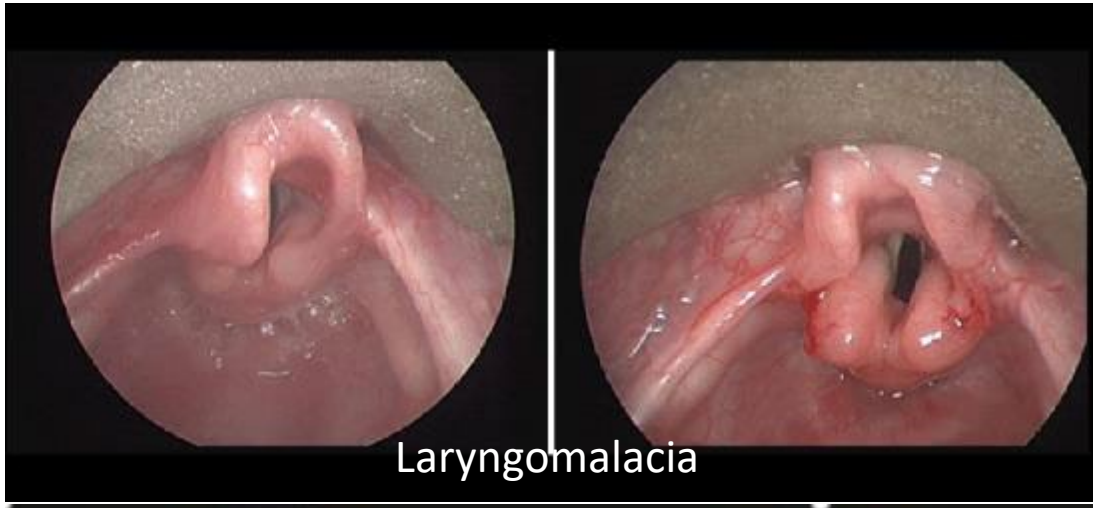
- Baby should be > 12 months
- Risk of NEC

What would I do for our patient…

3-month-old, full term, breast fed baby with irritability and crying that worsens with feeds, back-arching and intermittent coughing and choking. Weight gain is low.

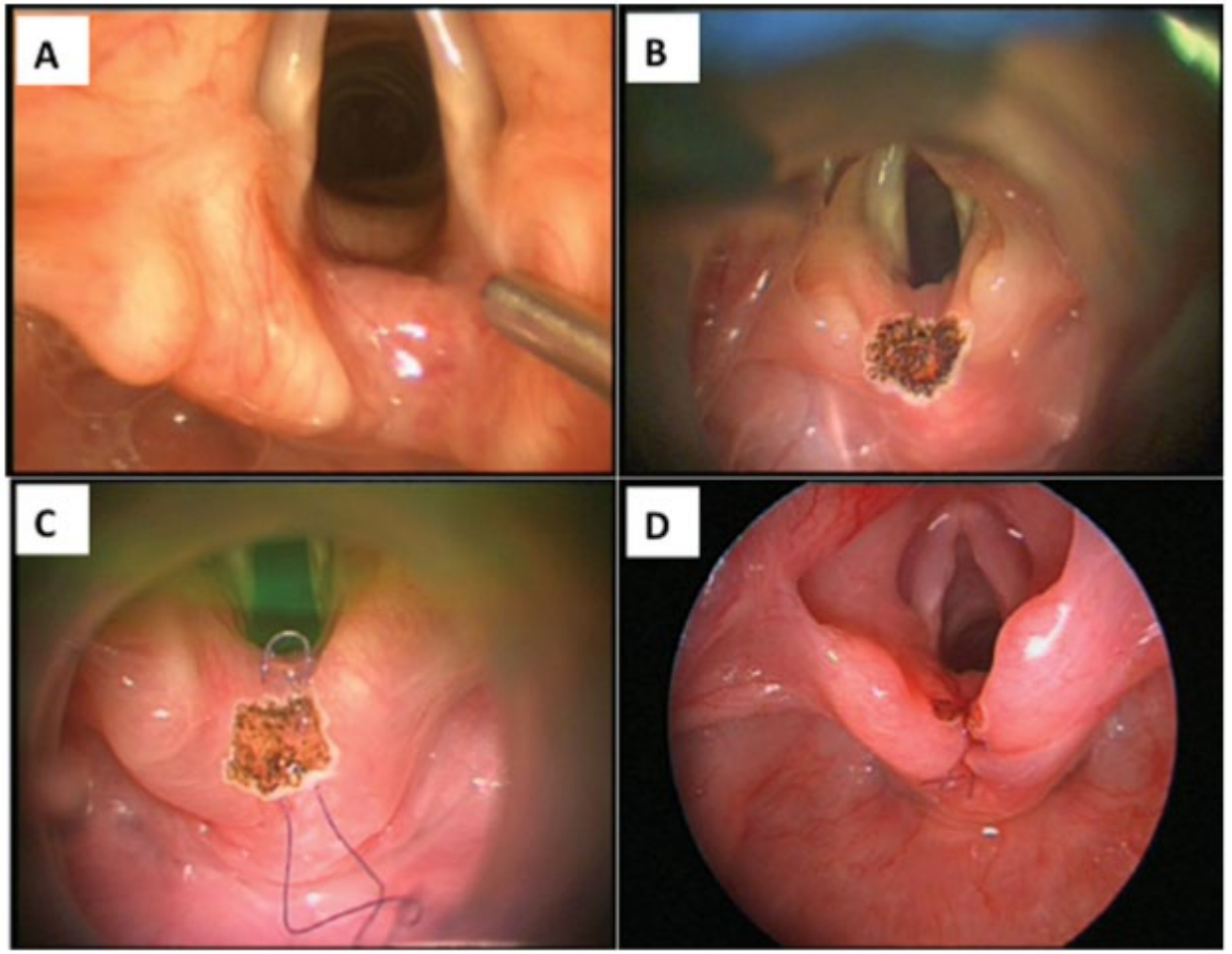
- ❑ Would NOT prescribe PPI/H2RA as first line of therapy
- ❑ Trial of an extensively hydrolyzed formula/mom to eliminate cow's milk
- ❑ Thicken the formula
- ❑ Modified barium swallow (MBS)
- ❑ Speech language pathologist referral

Dysphagia and the Airway



Laryngomalacia

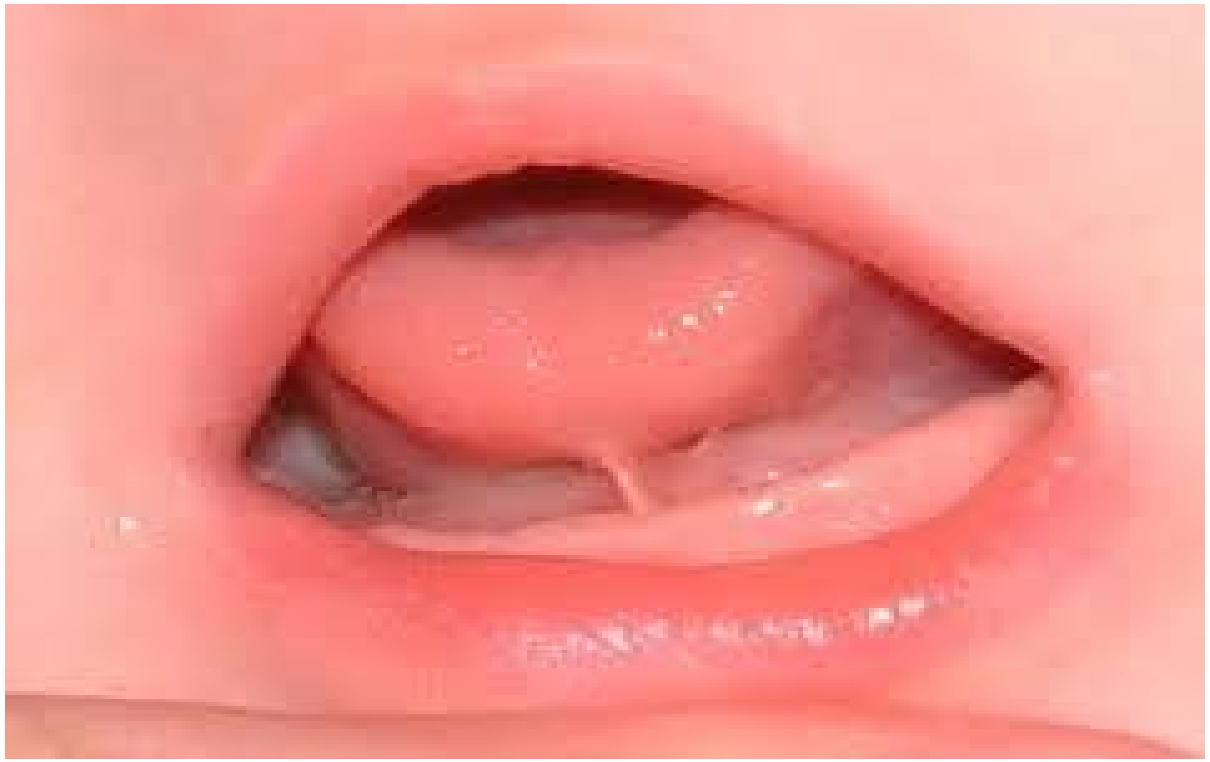
Left vocal fold paralysis
Injection medialization



Laryngeal cleft

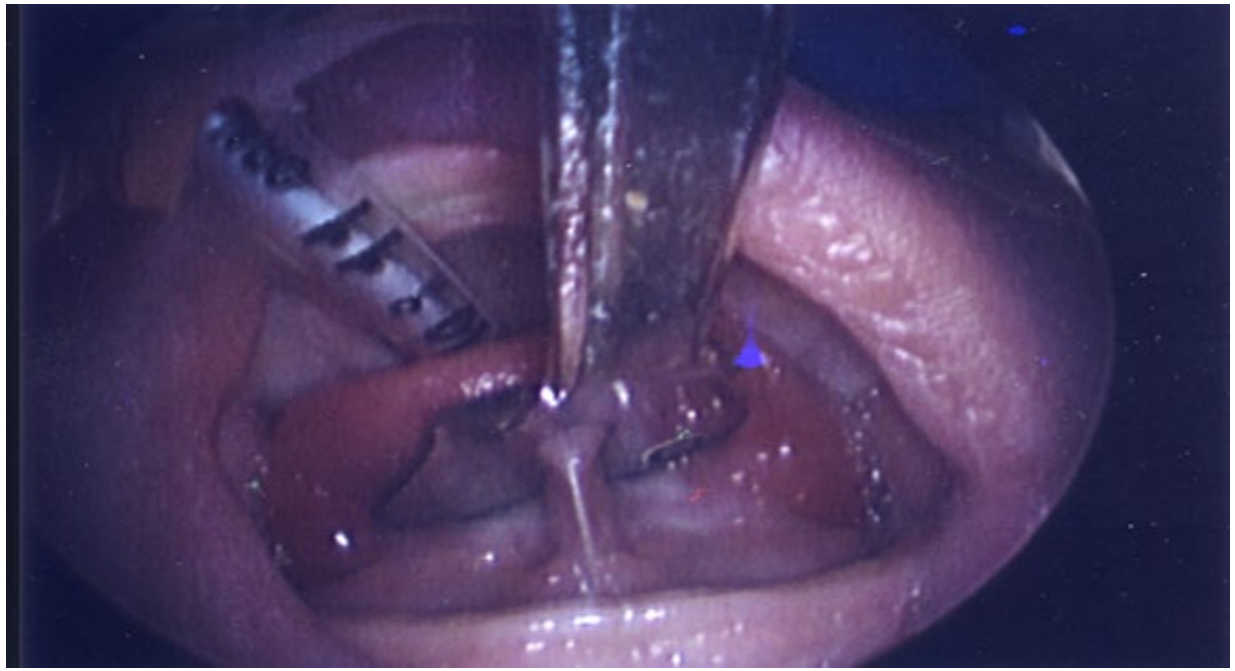
Tongue Tie

- 2 month old FT baby
- Mom desires exclusive breastfeeding
- Significant pain with latch, bleeding cracked nipples
- Now mom exclusively pumps, supply is full



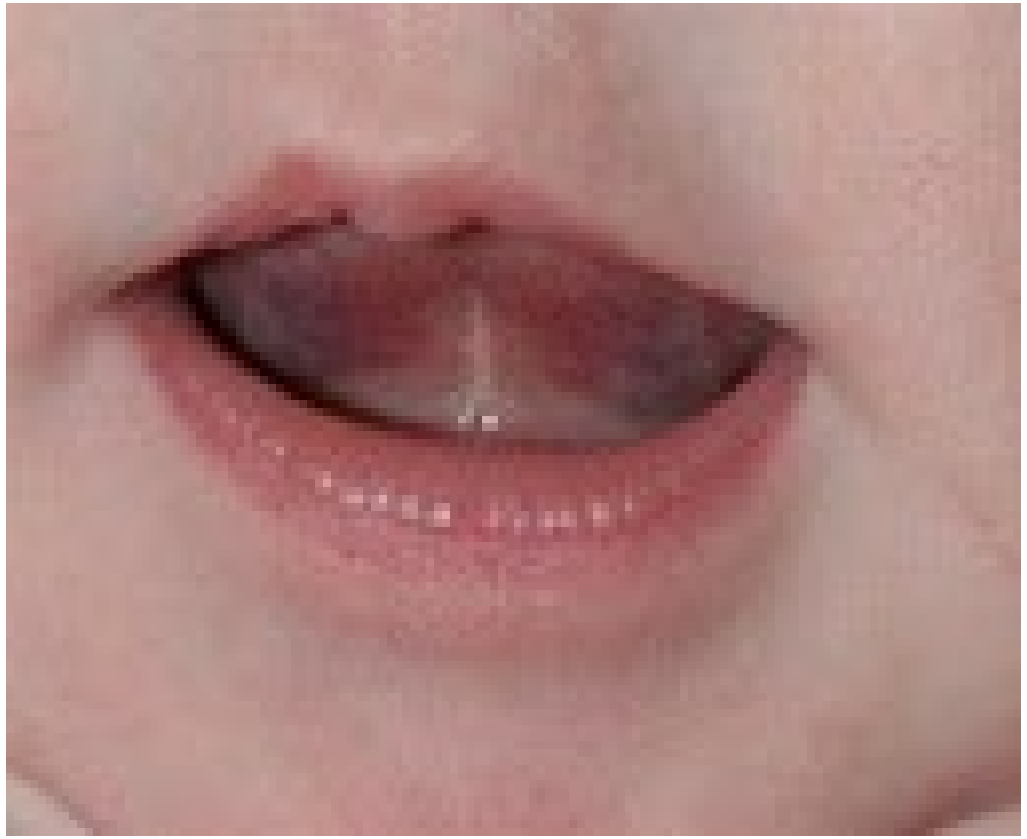
Tongue Tie

- To clip or not to clip
- Laser vs scissor
- Anesthesia?
- Post-frenotomy exercises

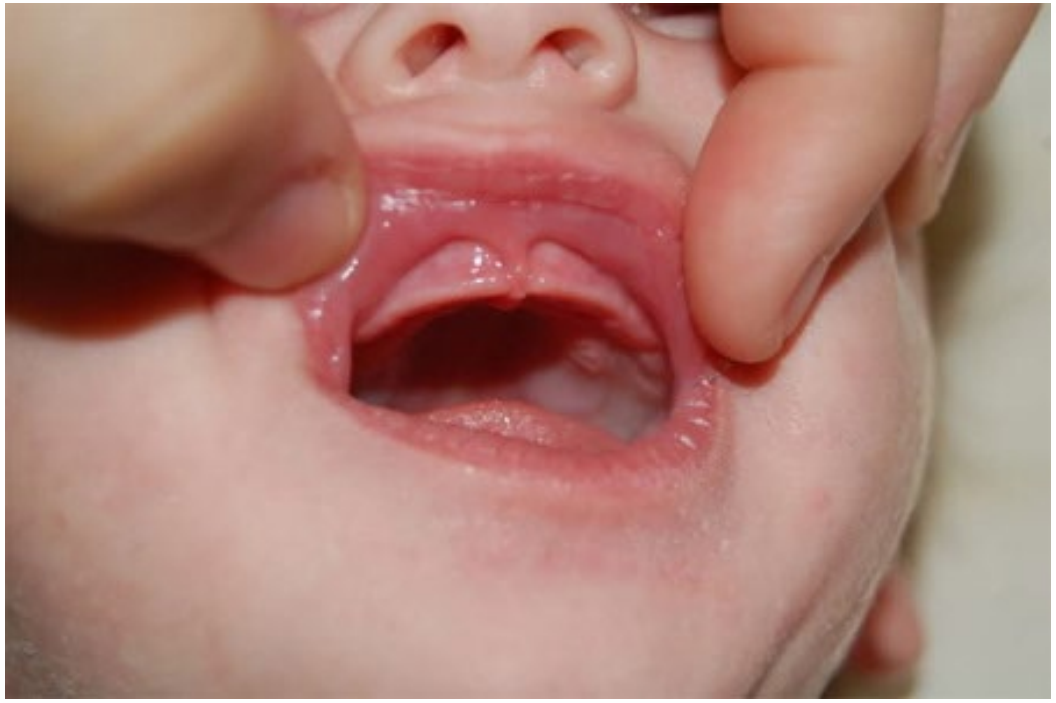


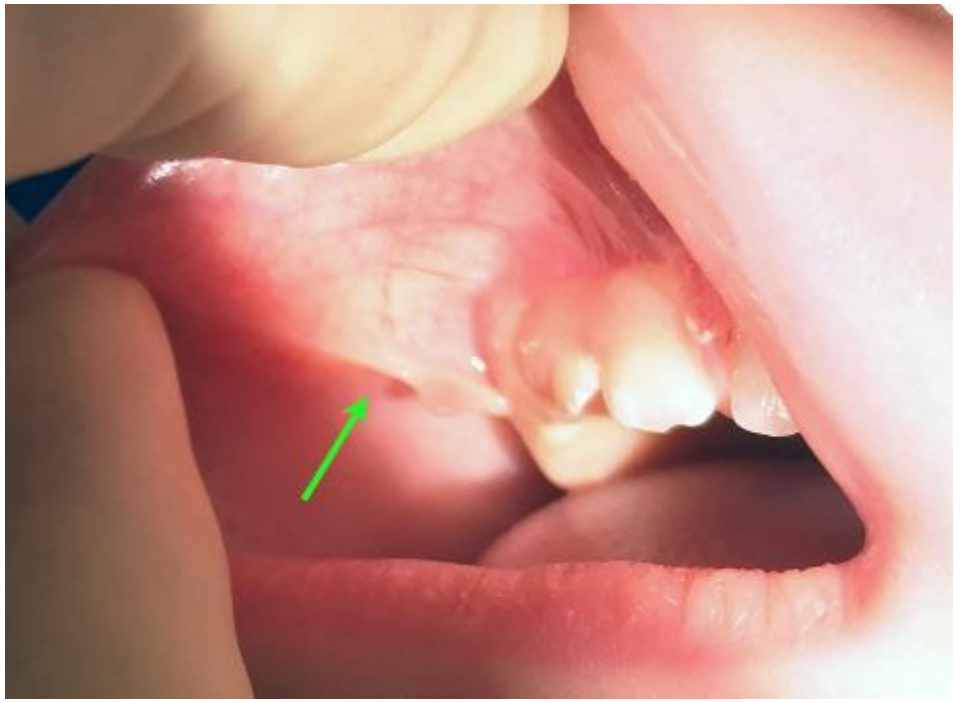
Tongue Tie

- 6 week old full term baby
- Poor latch. Clicks and nipple is "shaped like a lipstick." Latches better on the right.
- Baby very gassy, fussy in the evenings
- Lactation consultant told them there is "definitely a tongue tie."
- Baby has mild torticollis and micrognathia
- Supplementing with formula overnight



Lip Tie and Buccal Ties





Thank You!
Enjoy the Meeting!

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