Feeding and Oral Motor Disorders

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Disclosure Statements

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Learner Objectives

At the conclusion of this presentation, participants should be able to:

- Identify NICU infants at risk for oral motor and oral sensory based feeding and swallowing disorders.
- Identify necessary components of preterm infant development that signal readiness to begin and sustain oral feeding.
- Identify stages of preterm development and impact on feeding skill progression, common infant behaviors and stress signs during feeding, and strategies to support PO progression.

A list of sources will be cited at the end of this presentation

Agenda

The infant oral mechanism and development of the aerodigestive tract.

Neurodevelopmental care in the NICU and supporting transition to oral feeding in the extrauterine environment.

Foundations for feeding in the NICU: developmental stages, feeding techniques, and problem solving

This is our goal...

- Supporting development and families
- Positive oral experiences and transition to safe and efficient oral feeding
- Infant driven, cue-based feeding
- Long-term outcomes post-discharge

Pediatric Feeding and Swallowing Disorders

- Dysphagia, or difficulty swallowing, is a symptom of many different medical conditions.

- A pediatric feeding disorder is defined as “impaired oral intake that is not age appropriate, and is associated with medical, nutritional, feeding skill, and/or psychosocial dysfunction” (Goday et al., 2019)

- Swallowing is a complex event that modulates sensory input to produce coordinated motor output for safe and efficient feeding. (Miller, 2008).

Feeding problems in the NICU and beyond

- “Problematic feeding is highly prevalent in prematurely-born children in the first 4 years of life regardless of degree of prematurity.” 42% of infants demonstrate feeding problems after discharge from the NICU within the first 4 years of life (Pados et al. 2021)
- Even for infants without signs of feeding problems while in the NICU, 42% of infants demonstrated feeding problems within the first year of life (Robinson, Heng, and Fucile, 2022)

Feeding problems in the NICU and beyond…

Meta-analysis of 67 articles in pre-term through 7 years of age

Oromotor problems affecting eating in 25% preterm infants

Challenging eating behaviors in 20%

Mothers of preterm infants

– Heightened anxiety while feeding

– Used coercive food parenting practices

Preterm compared to term infants

– Received less human milk
– Started solid foods earlier
– Had poorer diet quality

Walton et al. 2022

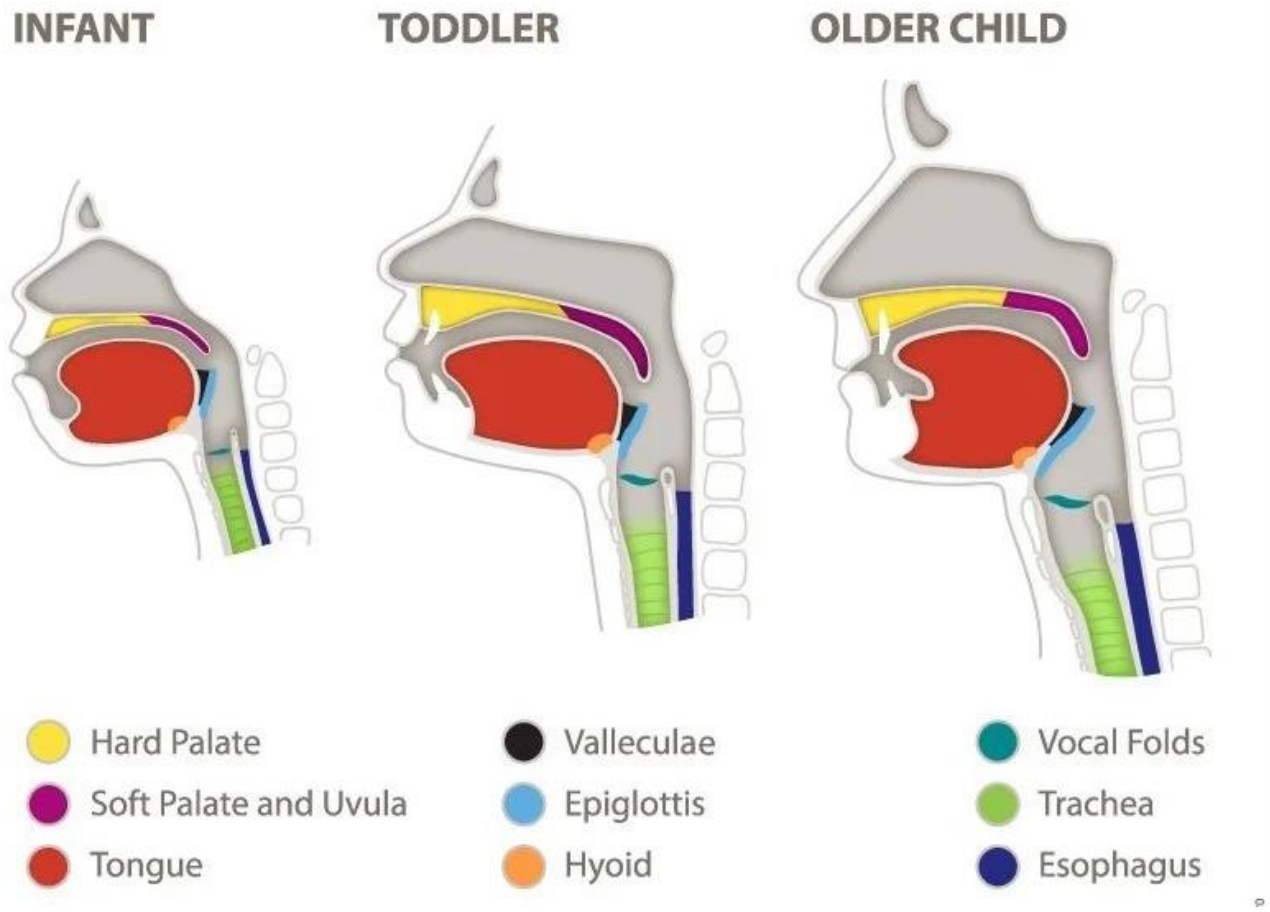
Identifying Infants at Risk in the NICU

Admission to the NICU is primary risk factor for a feeding/swallowing disorder.

- Born at < 28 weeks GA
- Cardiac Defects including PDA
- BPD
- Congenital anomalies/syndromes (Pierre-Robin Sequence, Down's Syndrome)
- Hyperbilirubinemia
- IDM
- Airway anomalies (laryngomalacia, laryngeal cleft, micrognathia); multiple intubations
- Neurologic injury/altered state (HIE, IVH, seizure)

Advisable to consult a neonatal therapist (SLP/OT)

The Infant Aerodigestive Tract



American Speech-Language-Hearing Association (n.d).

In a term infant:

The oral space is filled by the tongue, oral structures are vertically compressed, buccal pads provide stability, reduced length of pharynx, distance from oral cavity to upper esophageal sphincter is shorter, and the epiglottis has more contact with base of tongue. Additionally, the larynx is ~ 1/3 size of adult, has great elasticity, and is easily compromised by edema, secretions, abnormal neuromuscular tone.

In pre-term infants:

The esophagus is shorter and there is lower esophageal peristaltic velocity and amplitude (30-34 weeks), reduced esophageal high-pressure zones (≤ 33 weeks), longer duration of LES relaxation, and poor coordination of non-peristaltic esophageal contractions

Central Pattern Generator

"The central patterning of aeroingestive behaviors include volitional and reflexive control mechanisms, and benefit from sensory feedback to modify the spatiotemporal organization of the feed sequence to ensure safe swallow."

"Central pattern generators (CPGs) are primarily composed of adaptive networks of interneurons that activate groups of motor neurons to generate task-specific motor patterns"

Think of it as a closed loop system – with synchronized sucking, swallowing, breathing, esophageal function with feedback occurring to stop, delay, or maintain sucking.

Barlow 2009

Phases of Swallowing

Oral Phase

- Expression/transfer of fluid -> Bolus -> propulsion to posterior oral cavity using positive (compression) and negative (suction) pressure.
- Example: infant creates seal to breast/bottle nipple, jaw moves down, paired with seal, creates a negative space that draws fluid into mouth.
- Cleft palate – relies on compression
- If poor suction, why? – purposeful to manage flow rate, neurological, structural, immaturity?

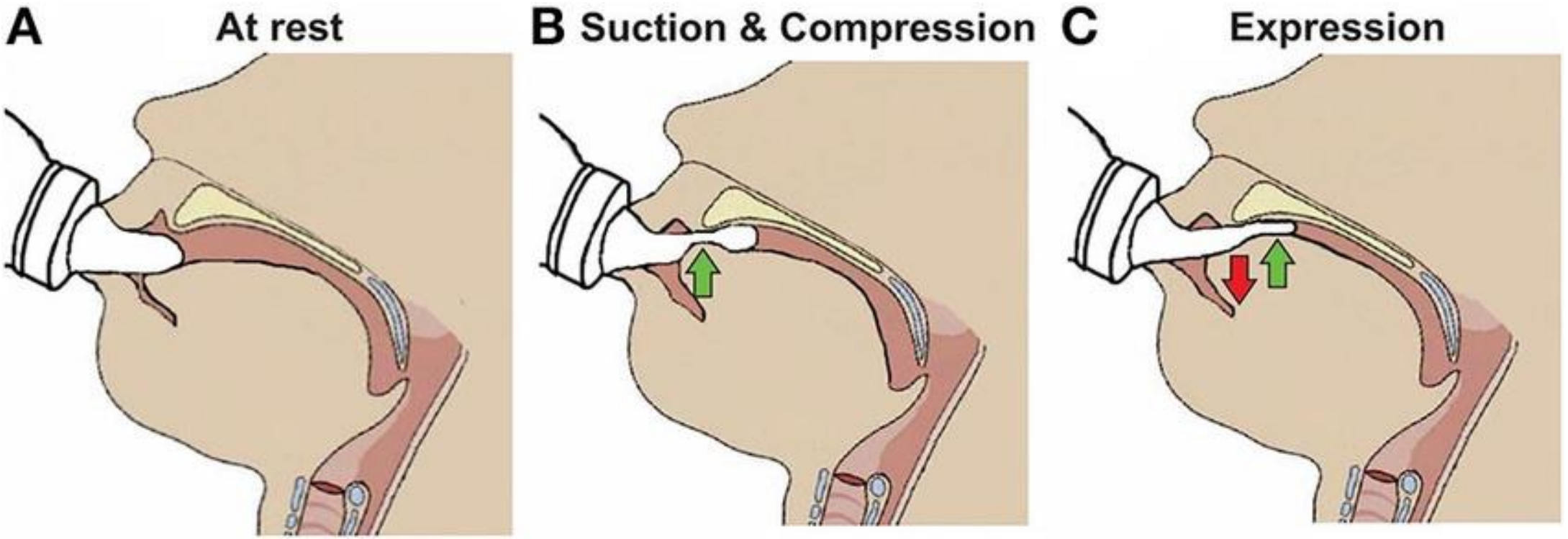
Pharyngeal Phase

- Closure of velopharynx, elevation of hyolaryngeal complex, arytenoid adduction, epiglottic inversion, pharyngeal stripping.
- Pressure moves the bolus from the oral cavity through the upper esophageal sphincter

Esophageal Phase

- Upper esophageal sphincter relaxes, peristalsis, opening/closure of lower esophageal sphincter
- Significant differences between preterm infants studied at 33-and 36-weeks PMA, and full-term infants . There are differences in the duration, propagation, and peristaltic velocity. Jadcherla 2002; Jadcherla et al. 2006

Compression and Suction for Fluid Extraction



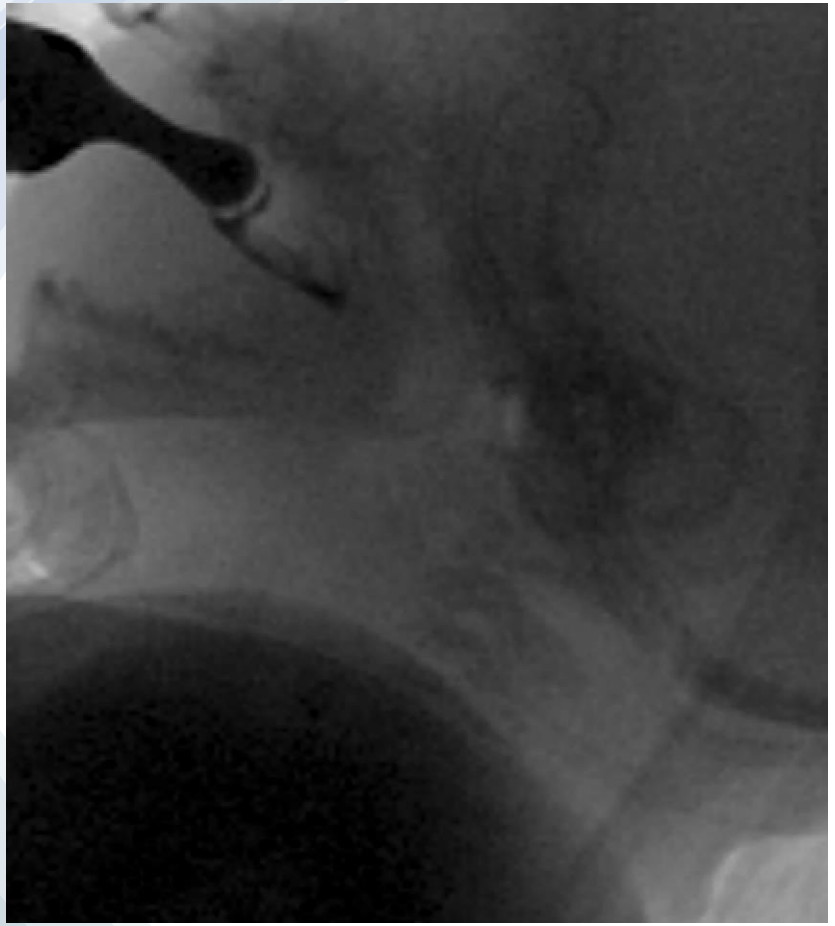
A) At rest; B) Suction applied to draw nipple in, compression with jaw and tongue to hard palate; C) Expression with lingual peristalsis.

Shandley et al. 2021

Phases of Swallowing in Real Time

Modified Barium Swallow Study (MBSS)

Do you perceive any functional deficits?



Additional Physiologic Considerations of the Pharyngeal Phase

The Laryngochemoreflex (LCR)

- In mammals, the LCR is mainly present in neonates and infants, with typically more robust and prolonged responses occurring in premature infants. Can result in A/B/D.
- Theory is that it is feto-protective to prevent aspiration during birth and in immediate post-natal period.
- Airways bathed in HYPERchloremic pulmonary mucous; fetus is surrounded by HYPOchloremic amniotic fluid. In utero, this differential may set a receptor threshold that prevents aspiration of amniotic fluid during birth with apnea and glottic closure.
- However, in postnatal period, these laryngochemoreceptors may continue to be sensitive. Age and maturation of neural circuits may allow for the progression of the primitive LCR moving from a prolonged apnea and glottic closure to a cough reflex thus expelling foreign material from the airway.

Pathak et al. 2020

Fetal Oral-Motor Development

- 15 weeks - NNS and swallowing
- 21 weeks - tongue thrusting
- 22-24 weeks - consistent sucking and swallowing
- 24-28 weeks - rooting
- 26-29 weeks - lungs capable of breathing air; bitter tastes distinguished
- 36 weeks - swallowing amniotic fluid at 500-1000 ml/day

• Ludwig, 2022

Oral Motor Disorders – An Overview

- Tethered oral tissues:
  - Ankyloglossia
  - Posterior, lip, buccal ties
  - But does it impact function?
- Cleft lip, cleft palate, submucous cleft
- Syndromes
- Poor reflexes: root, suck, phasic bite
- Oral lesions of the newborn
- Metabolic disorders
- Neurologic disorders
- Acquired structural defects: high vault palate, palatal groove due to prolonged ET intubation. Can we use NIV? Better taping?

Oral Motor Disorders - An Overview

- Pre-term infants born lacking fatty buccal pads thus impacting jaw stability, lip closure, and appropriate establishment of latch.
- Oral intubation at birth – development of high vault palate, palatal grooving, and later, dental abnormalities, that impact feeding success.
- Laryngeal anatomic differences – laryngomalacia, congenital vocal cord paralysis, etc.
- Global tone – hypotonia of oral structures?

Burklow

Infant Oral Reflexes

Table 2–5. Infant Oral Reflexes Present at Term and Age They Disappear in Typical Infants

Reflexes Present at Birth	Stimulus	Response	Cranial Nerve	Age Reflexes Disappear
Rooting	Touch to cheek or corner of the mouth	Turns head toward touch	V, VII, XI, XII	3–6 months
Tongue protrusion	Touch to tongue or lips	Tongue protrudes	XII	4–6 months
Tongue transverse	Touch to tongue	Lateral tongue motion	XII	6–9 months
Phasic bite	Pressure on gums	Rhythmic closing	V	9–12 months
Gag	Touch posterior tongue or pharynx	Contraction of palate and pharynx	IX, X	Persists

Arvedson 2020

Development of Non-Nutritive Suck

27-28 weeks: weak, single sucks with long variable pauses

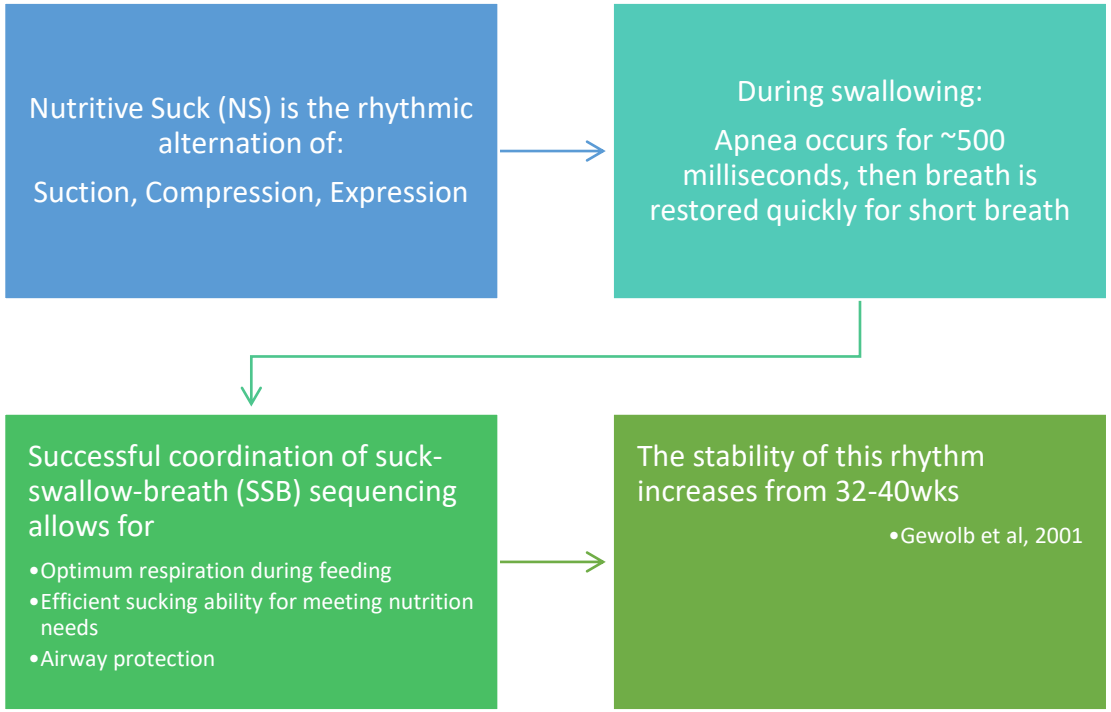
30-33 weeks: short but stable suck bursts with long irregular pauses (1-2 sucks per sec). RR may increase

34+ weeks: longer suck bursts, more regular pauses

By 37 weeks: Stability of sucking rate and pattern. Intermittent swallows every 5-6 sucks

Lau et.al, 2016

Development of Nutritive Sucking



Development of Nutritive Suck

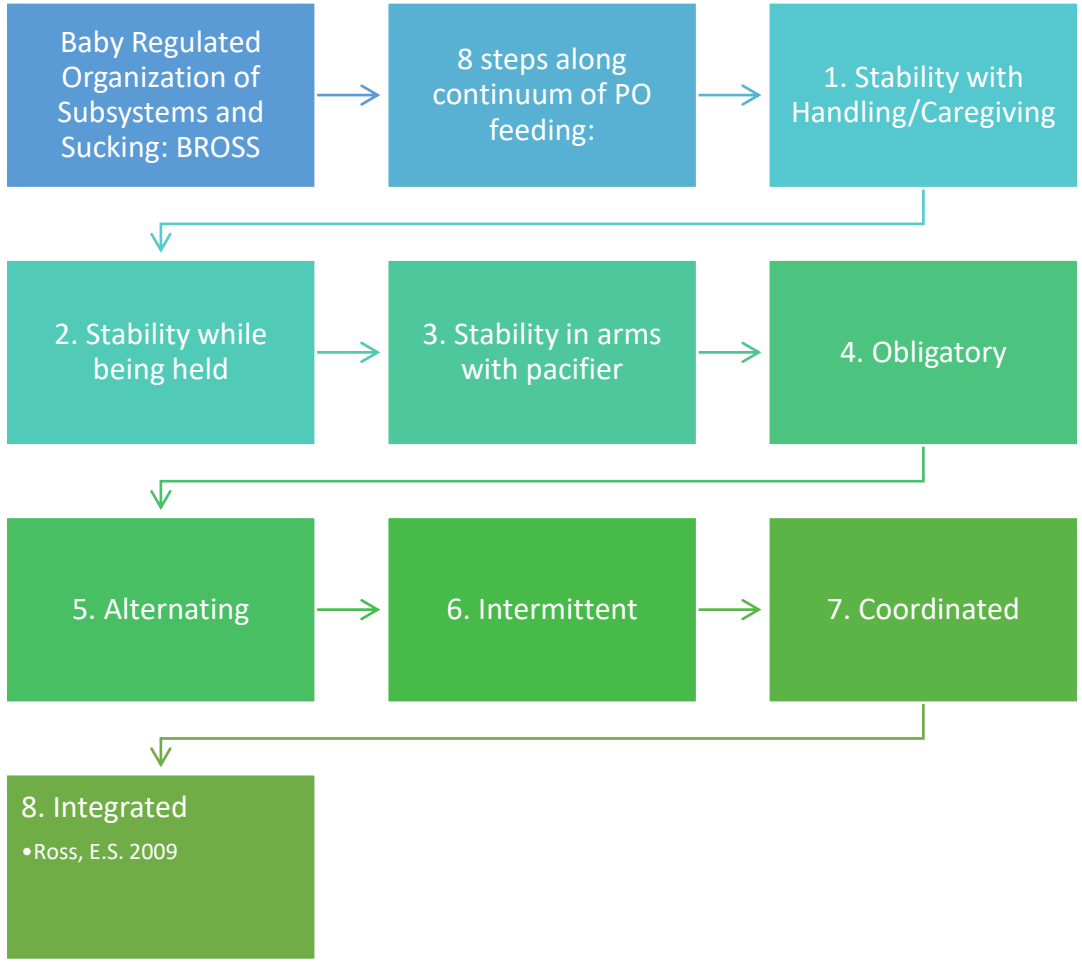
Typical feeding (term infant without comorbidities) has:

- 1 or 2:1:1 SSB ratio
- 4-6 SSB bursts (more in older infants)
- A break for respiration without unlatching
- A duration of 30 min or less

Gewolb et al, 2001

Acquisition of Oral Feeding Skill

BROSS



Homeostasis is the guide!

The infant requires internal regulation, then progresses to limited challenges, then small challenges, then challenge with integrating oral motor system with non-nutritive sucking.

1. Stability in bed with handling – emerging alert state, VSS, maintains flexion, tone, and color, alert for > 5 min.

2. Stability with handling OOB – hands to mouth, maintains flexed/tucked with support, alert for > 10 min.

3. Stability in arms with pacifier – beginning to awaken/cue for feedings, maintains latch/suck to pacifier, flexion with support.

- Ross, E.S. 2009

Evolution of the nutritive sucking pattern

4. Obligatory - infant does not stop to breath, requires caregiver to provide pacing (drops in RR, prolonged apneas)

5. Alternating - infant alternates between breathing/sucking bursts (2-5 sucks), without assistance from feeder (B/D's, fatiguing, quickly transitions to light sleep to self-regulate)

6. Intermittent – beginning to take intermittent breaths during suck bursts, though irregularly. Suck bursts may be > 5 sucks. (O2 stable, improved efficiency, alert for feeding duration)

7. Coordinated – fully coordinates Suck:Swallow:Breath (SSB) sequencing; ratio may be 2:1:1 or 1:1:1. Suck bursts as long as 10-30 SSB in a row. Patter is sustained and consistent. (VSS, greater volumes)

8. Integrated – baby can now begin exploring environment while maintaining coordination and stamina. (Efficient, alert/cueing, interactive intra and post-feed)

- Ross, E.S. 2009

Neurodevelopmental Care and Relevant Practice Theories

Neuroprotective Care

- Neurobehavioral Organization of the Preterm Infant

Synactive Theory of Development

Co-Occupation

Dynamic Systems Theory

Neonatal Integrative Developmental Care Model

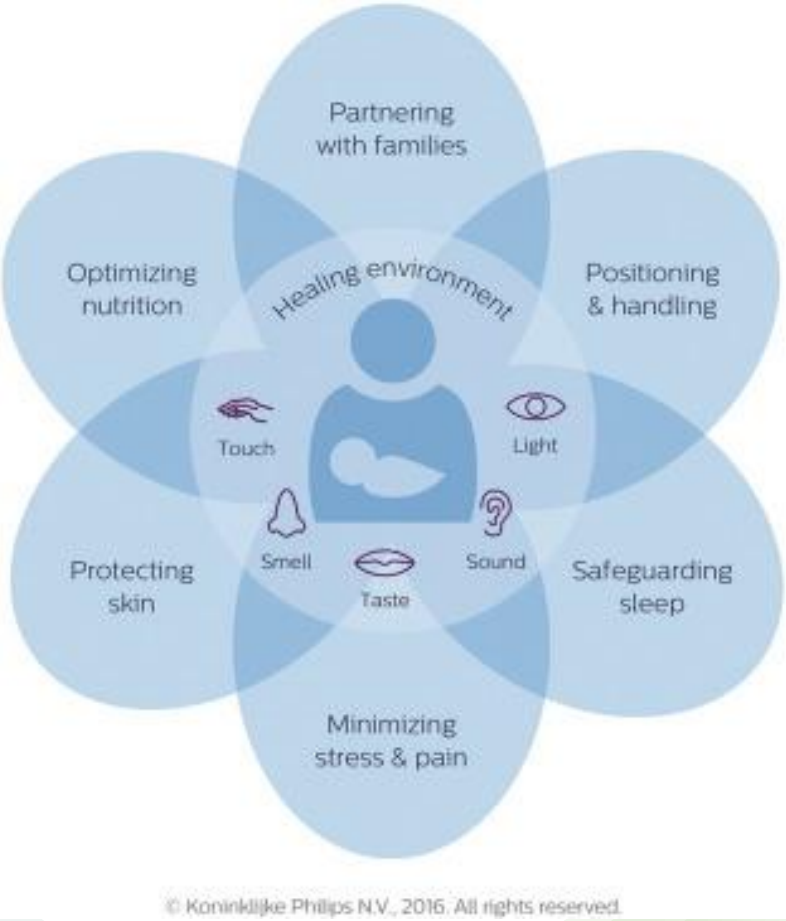
Neuroprotective Care

“Neurons that fire together, wire together” – Donald Hebb

Strategies that protect neuronal cell death.

Feeding is a part of this – positioning/handling, minimizing stress, optimizing nutrition, taste.

Altimier et.al 2016



Neurobehavioral Organization of the Preterm Infant

In-Turning (< 28 weeks GA)

- Infant's inability to maintain the most basic functionality, autonomic stability.

Coming Out (29 to 34 weeks GA)

- Increasing autonomic stability as well as an initial responsiveness of the infant to interact with his/her environment.

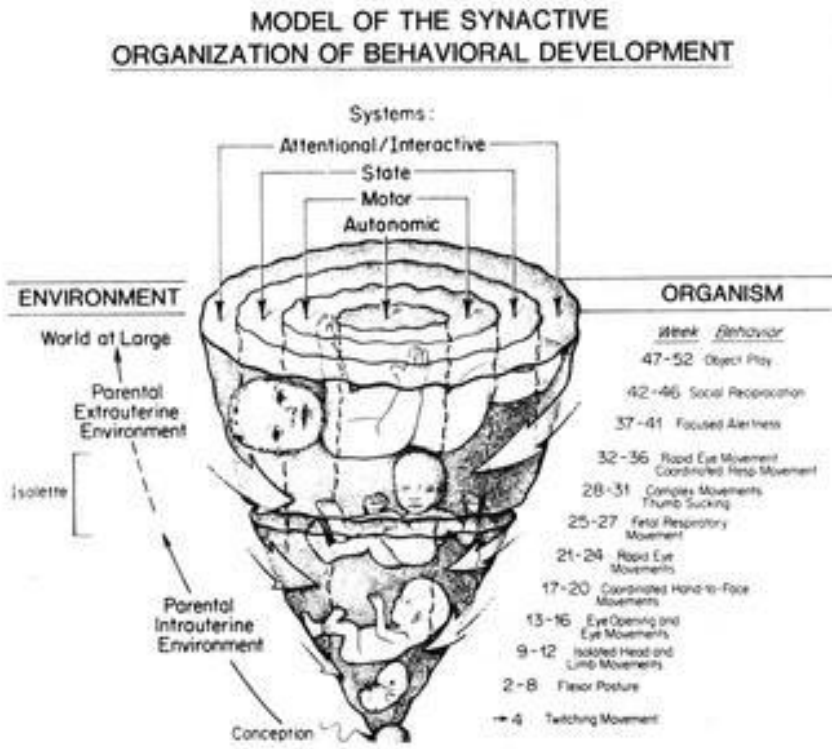
Active Reciprocity (35 weeks GA +)

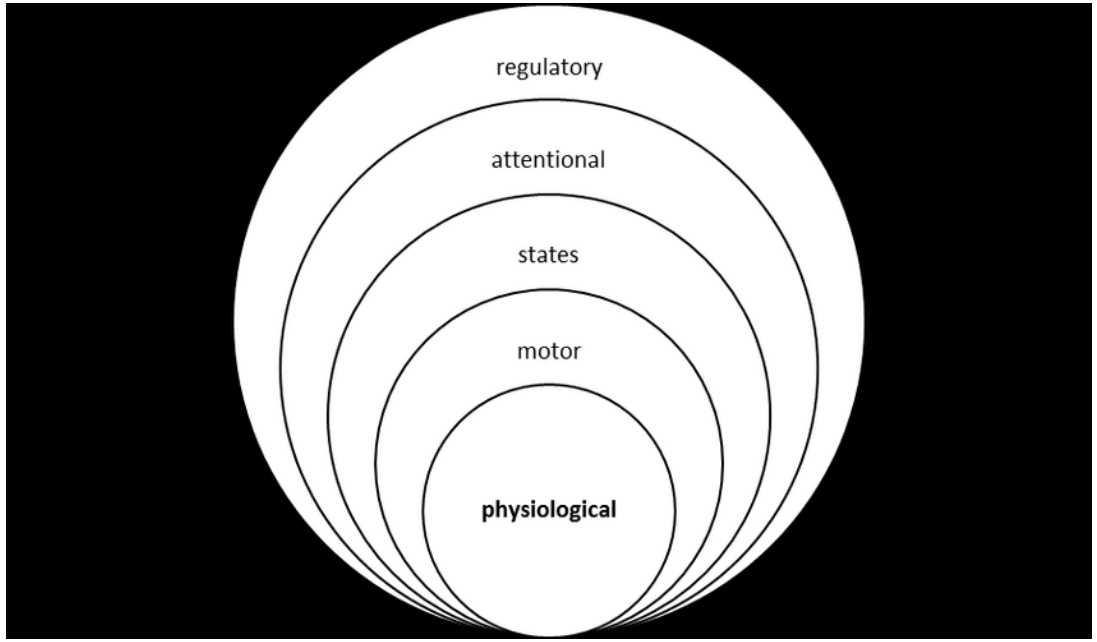
- Infant is capable of interacting with his/her environment in an increasingly predictable manner with autonomic and motoric stability.

- Gorski, Davison, and Brazelton, 1979

Synactive Theory of Development

The Synactive Theory of Infant Development provides a framework for understanding the behavior of premature infants. The infant's behaviors are grouped according to five "subsystems of functioning.”

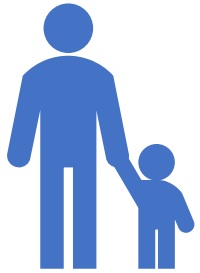




Synactive Theory - 5 Subsystems

Motor – tone, posture, movement, activity
Autonomic – basic physiologic function. Easily observable indicators are skin color, tremor, startles, heat, respiratory rate.
States – categorizing central nervous system arousal: deep sleep, light sleep, drowsy, quiet alert, active alert, crying.
Attention/Interaction – is the infant available for interaction? Alertness and robustness of interaction.
Self-Regulatory – presence and success of the infant's efforts to achieve and maintain balance in the previous four subsystems.

Co-Occupation and Dynamic Systems Theory



Co-Occupation

Relationship between the occupation of the infant and the occupation of the caregiver.

Shapes the involvement of both parties

Dynamic Systems Theory (Thompson et al. 2023)

Developmental framework emphasizing the importance of processes, mechanisms of change, and stability

Interactions and resulting behavior patterns are the result of the individual organizing itself around current parameters.

For successful feeding outcomes...

- There must be coordination of the following systems:
  - Autonomic
  - Motor
  - State

Why emphasize theories of infant development?

- Infant feeding begins with reflexive motor patterns – babies WANT to suck
  - **HOWEVER, coordinated NNS does NOT always translate to immediate oral feeding success.**
- Integration of these patterns at 2 – 4 months post-term
- Using infant development theories, we build neural networks that support feeding across the transition from reflexive to volitional periods. Classical conditioning.
- Think aversion – we may be developing pathways for refusal and PFD's that are not immediately apparent in the NICU.
- Are we supporting oromotor development or creating dysfunction?

Feeding Readiness Cues - Physiologic stability is the prerequisite

- Stable Vitals
- Physiologic Flexion/Tone
- Appropriate Arousal State

Feeding Readiness Cues

FLEXION, SMOOTH MOVEMENTS OF EXTREMITIES, CONSISTENT TONE THROUGHOUT BODY

STABLE, SMOOTH RESPIRATIONS, COMFORTABLE WOB, COLOR, APPROPRIATE HR

QUIET ALERT, SMOOTH SLEEP/WAKE CYCLES, WAKING BEFORE OR WITH HOC RESPONDING TO SOFT SOUNDS, SELF-SOOTHING (NNS, MOUTHING HANDS/FINGERS)

Infant Driven, Cue-Based Feeding

Ways to Support Positive Oral Experiences and Pre-Feeding Readiness:

Skin to Skin

Scent Hearts

Colostrum oral care

Pacifier dips

Hands to face

Non-nutritive breastfeeding

Infant Driven, Cue-Based Feeding Approach

Cue-based feeding practice, infant driven feeding

- Follows infants' developmental progression and is more developmentally supportive.
- Feeder supports/strengthen the infant’s effort.
- Respecting/protecting the infant’s limits
- Feeder assesses and responds to infant’s physiologic/behavioral cues from feed to feed

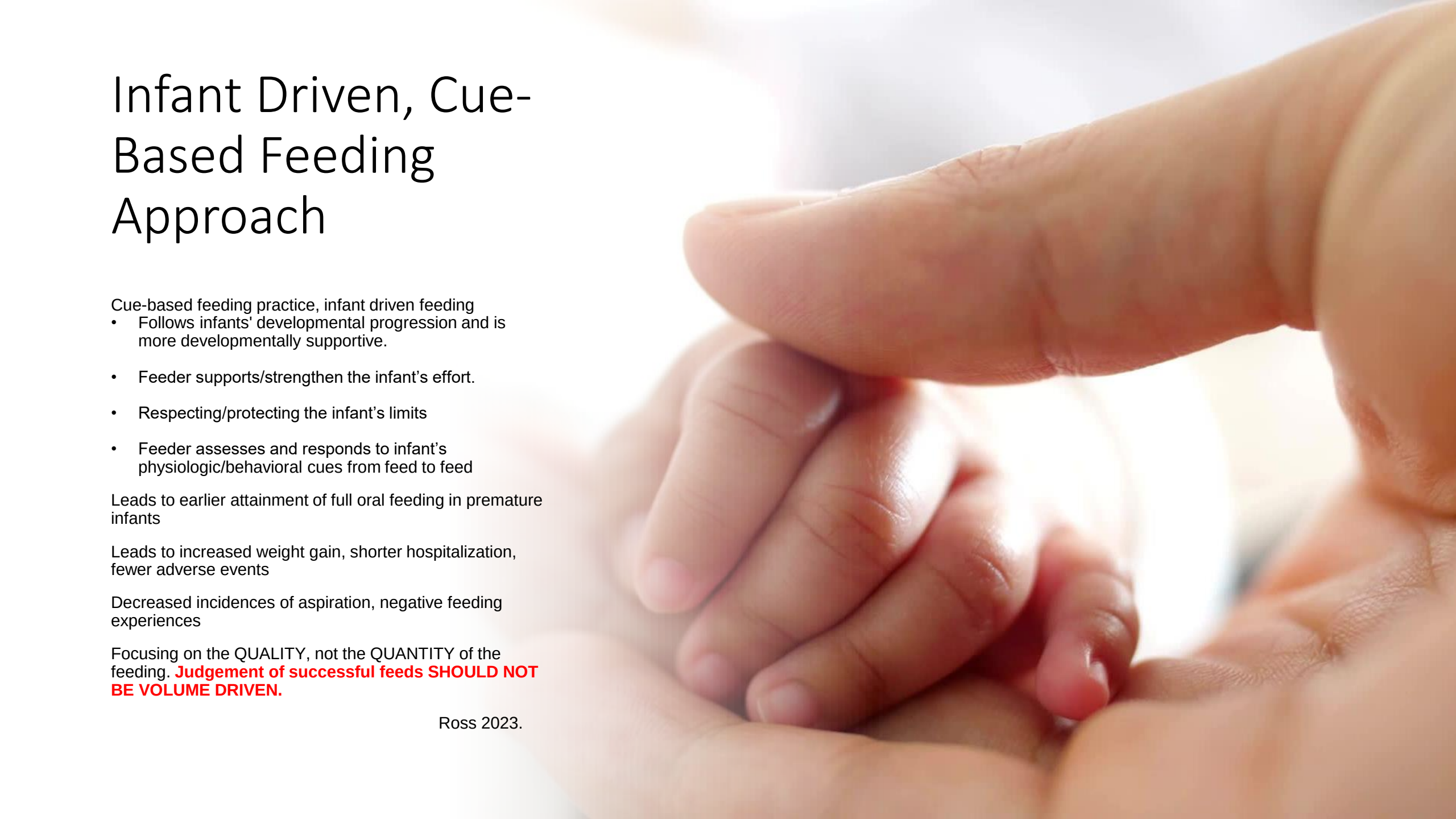
Leads to earlier attainment of full oral feeding in premature infants

Leads to increased weight gain, shorter hospitalization, fewer adverse events

Decreased incidences of aspiration, negative feeding experiences

Focusing on the QUALITY, not the QUANTITY of the feeding. **Judgement of successful feeds SHOULD NOT BE VOLUME DRIVEN.**

Ross 2023.



Examples of Infant Driven Interventions

Breastfeeding
Cue-based
Coregulatory
Parental involvement – what are the mother/family/caregiver's goals?
SOFFI – Supporting Oral Feeding in Fragile Infants

Positioning, Pacing, and Flow Rates, Oh My!

Feeding Position

Elevated Sidelying - Permit maximum postural support

- Easier to maintain head and trunk alignment
- Easier anterior-posterior rib cage movement, increases lung compliance
- Decreases airway resistance/work of breathing (less anti-gravity movement during breathing)

Increase O2 sats, less HR variability

Biological norm

- Like football or cross cradle position at breast

Horizontal milk flow

Allows for SSB vs SB

Clark et al, 2007; Park et al,.2014

IMAGE: (2020, November 1). *PEDIATRIC NEWBORN MEDICINE CLINICAL PRACTICE GUIDELINES*

Flow Rates

”While medium and high flow nipples help to “empty the bottle”, there is no evidence that increasing the flow facilitates a safe swallow or promotes cardio-respiratory stability.”

Lau et al., 1997

Flow Rates

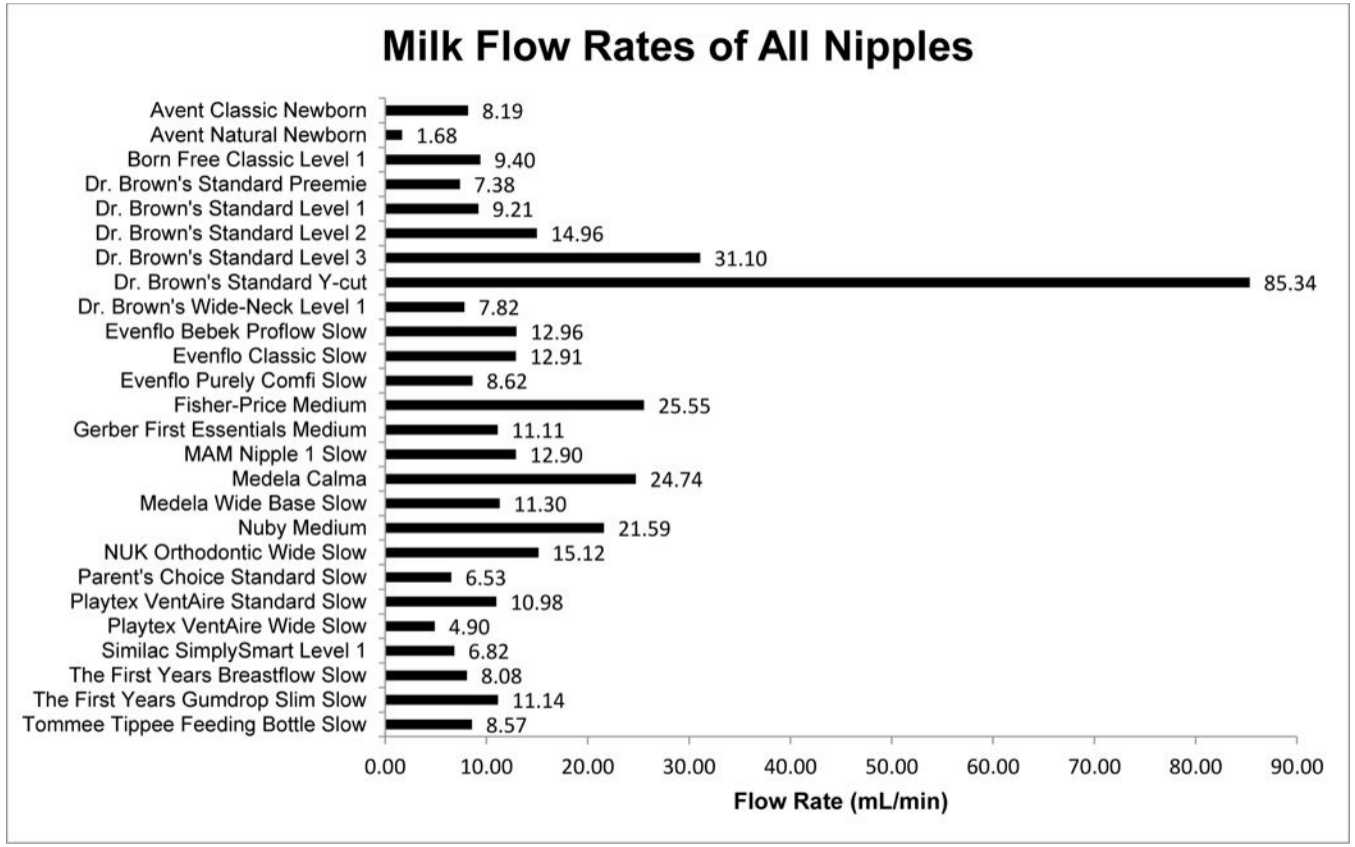


Figure 1.
Milk Flow Rates of All Nipples Tested

Flow Rates

- Nipple flow rate is likely one, if not the most, critical consideration for safe and successful oral feeding.
- In Nutritive Suck (NS) infant will utilize rhythmic alternation of suction and compression:
  - Coordination of suction and compression allows infant to optimize milk flow into the mouth prior to swallowing
- The amount of milk entering the mouth dictates the swallow event
  - During swallowing, airflow falls to zero for ~500 milliseconds (apnea) and is rapidly restored.

Barlow 2009; Chang et al. 2007, Sayed, Schrank, & Thach,1994; Mathew, 1991

Flow Rates

- If flow is too fast, infant will overfill mouth and pharynx
  - This triggers repeat swallowing with interruption of breathing (suck/swallow/suck/swallow etc. with no break)
- Leads to increased time swallowing and decreased time breathing
- Leads to decrease in ventilation as flow rate increases apnea/bradycardia
- Creates less efficient sucking pattern as the infant may decrease suction/expression to decrease flow = decreased intake. They are trying to self-regulate and can't!
- **Result is both physiologic stress and negative feeding behaviors for the infant, who may struggle to breathe when swallowing.**

Flow Rates

Offering a manageable flow rate promotes “islands of stability” for respiration and reduces urgent breathing

When swallowing and breathing compete, the infant defers to breathing, which can then result in movement of the bolus into/toward the airway, **leading to either symptomatic or silent aspiration**

An unmanageable fast flow inhibits “windows of opportunity” to breathe, and thus the infant must “fight the flow” to breathe

Goldfield et al., 2006; Goldfield, 2007

Some bottle systems/nipple types in our NICU

Flow Rates

- Main determinant of milk flow is the size of the feeding hole
    - Lower sucking pressures were observed with high-flow nipples (compared with low-flow nipples)
- Decreases in ventilation and breathing frequency were greater with high-flow nipples.
    - Suggests milk flow contributes to reduction in ventilation during bottle feeding
- Infants given a “restricted” flow during feeding fed more fluid per feeding than infants given “unrestricted” flow
    - With slower flow:
        - Increased physiologic stability
        - More efficient sucking pattern
        - Increased intake
        - Shorter feeding times

Matthew, 1991; Al-Sayed, Schrank, & Thach, 1994; Barlow, 2009

Pacing

“Paced infants demonstrated significant decrease in bradycardic episodes and more efficient sucking patterns at discharge”

Law-Morstatt et al., 2003

Pacing

External Pacing

- Should be done every 4-8 SSB's if not independent
- Anticipatory and preventative

Tilt the bottle to the side to empty nipple

- Do not move the bottle excessively
- Avoid removing the bottle nipple from the oral cavity, promotes maintenance of latch, organization.

See if the infant will stop sucking within 2-3 sucks

- if the infant does not, then remove the nipple from the infant's mouth
- Allow for 3-5 breaths or more as needed

Co-Regulated Pacing

- Contingent on infant's communication and feedback from moment to moment
- Tilt the bottle to the side to empty nipple
- Do not move the bottle excessively

See if the infant will stop sucking within 2-3 sucks

- if the infant does not, then remove the nipple from the infant's mouth
- Allow for 3-5 breaths or more as needed

Re-fill the nipple with milk OR re-latch the nipple with an empty nipple if you removed the bottle from their mouth.

- Count SSBs and/or watch for stress cues.

Stress Cues

Extended Airway Closure: Pulling away, finger splay, pushing nipple, eyebrow raise, eyelid flutter, furrowed brow, gaze aversion, flailing, “shutting down”, a rapid transition to sleep or disengagement. Fluctuating state cycles.

Threats to Airway Invasion: Drooling, wet breathing, multiple swallows, sputtering, gulping, coughing, nasal congestion, “fremitus” (referred sounds, wet/congested airway sounds).

Aberrant Respiratory Patterns: Increase WOB, head bobbing, head extension, stridor, grunting, color change, retractions, nasal flaring

Thoyre et al 2005

Stopping the ”Bad Feed”

How does a caregiver know it’s time to stop the feed?

What is permissive stress vs toxic stress during a feeding?

Specific Interventions

- SOFFI
- PIOMI
- Beckman Oral Motor
- Family Centered Care
- Specialty feeding equipment (specialty valves, SNS)
- Neonatal Touch and Massage
- Lymphatic Massage
- Bedside Feeding Guides

Problem Solving

- Have we emphasized supporting family centered care, supporting infant-caregiver dyad. Is there continuity in feeder beyond staff? Does the family have competence and confidence?
- Have we been culturally responsive in our care and feeding expectations?
- **Every feed is reassessment.** DAILY collaboration within IDT, nursing, and therapy as a MUST.
- Are we revisiting key components of positioning, pacing, and flow and adjusting based on clinical observations? If instrumental evaluation of swallowing indicated, how have subsequent recommendations been implemented?

Instrumental Swallowing Evaluations

- FEES – Fiberoptic Endoscopic Evaluation of Swallowing
- MBS – Modified Barium Swallow Study

- When is an instrumental evaluation indicated?
  - It's a team decision with input from the SLP.
  - If known anatomical or physiological defect, more compelling argument for instrumentation earlier rather than later. (Congenital vocal fold immobility, laryngomalacia, etc.)
  - However, likely only AFTER therapeutic interventions have been trialed with appropriate data collection. (ie: A/B/D events, have we adjusted flow, positioning, pacing?)

MBSS

VIDEOFLUOROSCOPIC SWALLOW STUDY	
Advantages	**Disadvantages**
Visualizes swallowing during bolus passage through the oral, pharyngeal and esophageal phases of swallowing.	Limited duration of exam with infants/children due to radiation exposure.
Defines anatomy and physiology of the swallowing mechanism during swallowing, including bolus formation in oral cavity/transfer in oral cavity, velopharyngeal function, laryngeal excursion, pharyngeal motility, residue, presence and timing of aspiration, response to aspiration.	Requires transport to radiology suite; equipment limits positioning options in the fluoroscopy suite.
Identifies bolus and positioning variables in feeding strategies or maneuvers that enhance swallowing safety.	Barium can alter taste and texture of liquid/food.

The ASHA Leader, Volume: 25, Issue: 1, Pages: 40-42, https://doi.org/10.1044/leader.OTP.25012020.40

FEES

FIBEROPTIC ENDOSCOPIC EVALUATION OF SWALLOWING	
Advantages	**Disadvantages**
No radiation exposure to limit test length, allowing a full feeding to be assessed.	Patient discomfort during scope insertion.
Direct view of laryngeal and pharyngeal structures and function during swallowing: vocal fold mobility and airway protection, velopharyngeal insufficiency, normal and abnormal anatomy of pharynx and larynx.	No direct assessment of oral and esophageal phase of swallowing (can assess pharyngeal and laryngeal structures only before and after the swallow); limited view of pharyngeal phase during the swallow with a period of "white out."
Completed at the bedside with positioning in typical feeding position with actual food and liquid.	Fast successive swallows in infants can make images difficult to interpret.
Can assess secretion management.	
Can assess infant swallow function during breastfeeding.	

The ASHA Leader, Volume: 25, Issue: 1, Pages: 40-42, https://doi.org/10.1044/leader.OTP.25012020.40

Bilateral vocal fold mobility with complete glottic closure:

Sequential Swallows thin liquids with Similac slow flow nipple (PA3):

Sequential Swallows thin liquids with Dr. Brown's transition nipple (PA2):

Penetration/Aspiration Scores:

Thin:

8 - Contrast passes glottis, visible sub-glottic residue, absent patient response

Half-Nectar:

5 - Contrast contacts vocal folds, visible residue

Interdisciplinary Feeding Team

- Establish and clarify practice standards and cohesive competencies, delineate roles, modernize practice
- Champions from:
  - SLP/OT
  - Nursing/APRN
  - Lactation
  - MD

  - https://nicudesign.nd.edu/

White Paper

First Fragile Infant Forum for Integration of Standards:
Feeding, Eating, and Nutrition Delivery
Monrovia, CA
July 13-15, 2022

based on the
Recommended Standards, Competencies and Best Practices for Infant and Family Centered Developmental Care in Intensive Care

August 2022
White Paper Prepared by:
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Forum Planning Committee
Joy V. Browne, PhD, PCNS, IMH-E
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Erin Ross, PhD, CCC-SLP
Mitchell Goldstein, MD

Case Study

Male infant born at 27w4d now 37w4d (as of date of SLP evaluation). Admitted to NICU for management of prematurity including ARPKD, congenital syphilis, ROP, cholestasis of newborn, and congenital pulmonary hypoplasia with respiratory distress. MRI with possible small germinal matrix hemorrhage. In remained in NICU on A/B/D countdown with persistent feeding difficulty, significant A/B/D events frequently during PO offers requiring stimulation.

OT working with baby since January 1st, SLP consult ~ 3 weeks later on 1/22. The 24 hours prior, infant with 7 B/D events during feeding and sleep requiring vigorous stim or pausing of feed. Had a significant a/b/d event around midnight with apnea for 10-15 seconds followed by b/d, turned dusky while receiving NG component of feed requiring blow-by (whole episode lasted about 45-60 seconds). NG feeds now over 1 hour instead of 30 minutes. Infant had recently attempted PO challenge but NG replaced due to concern for events.

Case Study

- Intact age-appropriate oral reflexes. Cueing.
- Repetitive suck/swallow sequencing without break to breath.
  - In BROSS: He's state 4-5 Obligatory to Alternating.

"When coordinated, Malaki demonstrated periodic rhythmic SSB sequencing though more frequently, he exhibited repeated suck/swallows without break to breath. Mild anterior formula spill. Intermittent lingual snapback appreciated. Provided strict external pacing ~ 3-4 suck to assist with oral clearance and coordination of appropriate SSB sequencing. He benefited from breaks to burp throughout PO offer (x3) which he did well. With right sidelying, ultra preemie nipple, and STRICT visual monitoring and external pacing, Malakai consumed full volume in ~ 25 minutes without overt clinical indicators of aspiration and VSS throughout. No B/D events appreciated this session."

Case Study

- Start on Ultra Preemie nipple
- Establishment of feeding guide
- Caregiver and parent education on supportive feeder techniques to assure carryover.
- Appropriately deferred need for instrumental evaluation as therapeutic feeding strategies mitigated events.
- Neonatal therapists assisted RN with nipple progression as infant continued to habilitate skills. Discharged on a Dr. Brown’s Transition flow nipple.
- This infant is feeding well at 7 months CA, eating PO ad lib, full volumes. No adverse feeding outcomes apparent upon chart review.

Key Take-Aways

- Our team goal is a safe discharge without readmission as well as long term developmental outcomes. Is there an opportunity to focus on habilitation of skill more wholistically than just volume progression?
- Feeding abilities are influenced by medical comorbidities, maturation and experiences.
- Feeding experiences are modifiable through staff and parental interactions during feedings.
- Feeding interventions that are infant-led focus on enjoyment thus improving quality of feedings.
- Parental inclusion, competence, and confidence are imperative.
- Without a consistent focus on pleasurable feeding experiences and parental involvement, parents may lack the understanding of why feeding is challenging. They will go home and feel like they are failing. Baby may experience adverse feeding outcomes.

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