



Cue Based Feeding: Improving Consistency to Improve Outcomes

Cindy M. Lund, M.S., CCC-SLP, C/NDT
Assistant Professor, Concordia University Wisconsin
PhD Candidate, Northern Illinois University

Background

- ▶ Over than 50% of G-tube placements are in children under 1 year of age (Fox, 2014)
 - ▶ Surgical and PEG
- ▶ Transition from dependent to independent feeding happens during first year of life (Pridham, et al., 2007)
 - ▶ Preterm infants require additional support for transition to self-regulated feeding (Dodrill, Donovan, Cleghorn, McMahon, & Davies, 2008)

- ▶ Premature infants are at increased risk for:
 - ▶ Prolonged length of stay in the NICU
 - ▶ Feeding difficulties including emesis, decreased appetite, prolonged feeding times, oral motor impairments, physiological instability, impaired transitions across textures (DeMauro, et al., 2011; Dodrill, et al., 2008, Thoyre, 2014)
 - ▶ Compromised growth (Ross and Browne, 2013)
- ▶ Growth of preterm infants is negatively impacted by medical issues **and** lack of feeding skill development (Ross & Browne, 2013)
- ▶ Shift from volume driven feeding to cue-based feeding (Ross & Philbin, 2011; Shaker, 2013)
 - ▶ Transition to cue-based feeding remains inconsistent

A successful feeding is one built on **QUALITY**

Quantity	Quality
<ul style="list-style-type: none"> ▶ Frequency of feedings ▶ Volume intake ▶ Caloric density of formula/breastmilk ▶ Duration of feedings ▶ Weight gain 	<ul style="list-style-type: none"> ▶ Skill ▶ Physiologic stability ▶ Motor stability ▶ State regulation ▶ Pleasure ▶ Safety/aspiration risk

Research supports putting **Quality** first

"If the **QUALITY** of the feeding takes priority over the **QUANTITY** ingested, feeding skills develop pleurably and at the infant's own pace."

Ross & Philbin, 2011

Cue-Based / Co-Regulated Feeding	Volume-Driven / Scheduled Feeding
<ul style="list-style-type: none"> ▶ Reciprocal approach based on readiness cues ▶ Defined stop and stress cues identified for caregiver ▶ Feeding discontinued if infant passive, disengaged, or demonstrates change in physiologic stability 	<ul style="list-style-type: none"> ▶ Pre-defined feeding schedules and volumes ▶ Focus on volume ingested rather than skill development ▶ Success viewed as skill of caregiver not skill of infant ▶ May result in increase of feeding aversions and lack of feeding skill progression

(Horner, et al., 2014; Ross & Philbin, 2011; Shaker, 2013; Thoyre, et al., 2014) (Ross & Philbin, 2011; Shaker, 2013; Thoyre, 2007)

Ultimate Goal of Cue-Based Feeding

Safe and pleasurable consumption of age-appropriate foods while maintaining adequate growth and nutrition.

Inconsistencies that Impact Cue-Based Feeding Success

- ▶ Inconsistent definitions of cues
- ▶ Nursing education and support
- ▶ Parent education and support

Lund-Hrdi, C. & Fannin, D., 2017

Oral Feeding Readiness

The infant's condition immediately prior to the nipple feeding. Readiness affects feeding skill AND long term feeding success.

Readiness to feed?

- ▶ State/Level of Alertness
- ▶ Physiological Cues
- ▶ Postural Stability
- ▶ Readiness vs. Stress/Stop Cues

State/Level of Alertness

- ▶ Awake/alert
- ▶ Calm/alert
- ▶ Frantic
- ▶ Drowsy
- ▶ Asleep/shut down

Physiological Cues

- ▶ Respiration Rate
 - ▶ Tachypnea –
 - ▶ Decreased RR
 - ▶ Apnea/Breath holding
- ▶ Heart Rate
 - ▶ Bradycardia
 - ▶ Tachycardia
- ▶ Oxygen Saturation
 - ▶ O2 desaturation less than 90%
 - ▶ Unstable O2 saturations

Behavioral Readiness Cues

- ▶ Moving head toward nipple
- ▶ Hands to mouth
- ▶ Suckle
- ▶ Mouthing
- ▶ Rooting
- ▶ Smacking lips
- ▶ Happy/yum sounds

Stress/Stop Cues:

- ▶ Raised eyebrows/ furrowed brow
- ▶ Worried look
- ▶ Crying
- ▶ Audible Swallows
- ▶ Shut down/fall asleep
- ▶ Excessive drooling
- ▶ "stop" hands / splayed fingers
- ▶ Hiccups
- ▶ Mottling
- ▶ Stridor
- ▶ Retractions
- ▶ Multiple swallows
- ▶ Turn head away
- ▶ Pushing nipple out with tongue
- ▶ Pursed lips/pushing
- ▶ Altered/increased respiratory effort
 - ▶ Head bobbing
 - ▶ Nasal flaring
- ▶ Cough/choke/gag
- ▶ Color change
- ▶ Red/watery eyes

If not ready, feeding is deferred:

- ▶ Offer rest break
- ▶ Environmental changes (light, noise, etc)
- ▶ Assist with body organization/stability
- ▶ Stabilize behavioral state
- ▶ Stabilize physiology

STOP and gavage feed if instability continues

Ensure **ACTIVE** participation

- ▶ Necessary for learning coordinated, well-regulated feeding behaviors
- ▶ Infants can be **MADE** to suck by stimulating the suck reflex BUT can have **detrimental** consequences such as:
 - ▶ Poor coordination of airway protection
- ▶ Defensive feeding behaviors
- ▶ Association between feeding and aversive experience may result in feeding aversion.

Indicators of ACTIVE participation

- ▶ Physiologic stability
- ▶ Behavioral state: awake/alert
 - ▶ May have eyes closed but awake
- ▶ Movement and tone
- ▶ Spontaneous sucking
 - ▶ If strong seal as try to remove the nipple, actively involved
 - ▶ If allows nipple to slide out of mouth, passive - defer

When to STOP:

- ▶ Physiologic instability
- ▶ Decreased engagement in the feeding
 - ▶ Passive sucking
- ▶ Change in tone (increase or decrease)
- ▶ Fatigue
- ▶ Difficulty integrating suck-swallow-breathe pattern despite feeder efforts

Supports for Cue-Based/ Co-Regulated Feeding

- ▶ Nipples/bottle systems
- ▶ Swaddling
- ▶ Positioning
- ▶ Pacing
- ▶ Supplemental oxygen use
- ▶ Non-nutritive experience
- ▶ Video Swallow studies

Positioning/swaddling

- ▶ Swaddled: how and why
- ▶ Semi-upright
- ▶ Sidelying
 - ▶ Right vs. left

Positioning and Pacing

- ▶ MAINTAIN physiological stability
 - ▶ NOT to respond to distress
- ▶ Pacing can provide neurobehavioral "practice" that facilitates development of mature suck-swallow-breathe coordination

Oxygen

- ▶ Maintain airway patency (e.g., laryngomalacia)
- ▶ Maintain appropriate O2 saturation levels
- ▶ Maximize stamina/endurance
- ▶ Balance
 - ▶ Too high can damage vision

Non-nutritive Experience

When to use:

- ▶ Not stable for nipple feeding
 - ▶ Maintain association between sucking and satiation
- ▶ Positive oral input/experience
 - ▶ Vent dependent
 - ▶ Aversive/disinterested
- ▶ To improve organization prior to or during nipple feeding
- ▶ Silent aspiration

Characteristics of Late Preterm Infants

- ▶ 34 – 36 6/7 weeks gestation
- ▶ Similar rates of feeding dysfunction as early preterm infants
- ▶ More likely to require multidisciplinary feeding evaluation than early preterm infants.
- ▶ More immature feeding behaviors at 35-36 weeks PMA than early preterm infants
 - ▶ Positive feeding experience leads to more mature feeding skills
- ▶ Sensory modulation impairments

DeMauro, et al., 2011

Parents as Partners

- ▶ Improved definitions of cues
- ▶ Improved training, which comes from improved standard definitions of cues
- ▶ Improved parent support

References

- DeMauro, S.B., Patel, P.R., Medoff-Cooper, B., Posencheg, M., & Abbasi, S. (2011). Postdischarge feeding patterns in early-and-late-preterm infants. *Clinical Pediatrics, 50*(10), 957-962. [Doi: 10.1177/0099922811409028](https://doi.org/10.1177/0099922811409028)
- Fox D, Campagna EJ, Friedlander J, Partrick DA, Rees DI, Kempe A., (2014). National trends and outcomes of pediatric gastrostomy tube placement. *Journal of Pediatric Gastroenterology and Nutrition, 59*(5), 582-8.
- Hawdon, J. M., Beauregard, N., Slattery, J., & Kennedy, G. (2000). Identification of neonates at risk of developing feeding problems in infancy. *Developmental Medicine and Child Neurology, 42*(4), 235-239. [doi:10.1111/j.1469-8749.2000.tb00078.x](https://doi.org/10.1111/j.1469-8749.2000.tb00078.x)
- Horner, S., Simonelli, A.M., Schmidt, H., Cichowski, K., Hancko, M., Zhang, G., & Ross, E.S. (2014). Setting the stage for successful oral feeding: The impact of implementing the SOFFI feeding program with medically fragile NICU infants. *Journal of Perinatal & Neonatal Nursing, 28*(1), 59-68.

References

- Mathisen, B., Worrall, L., O'Callaghan, M.O., Wall, C., & Shepherd, R.W. (2000). Feeding problems and dysphagia in six-month old extremely low birth-weight infants. *Advances in Speech-Language Pathology, 2*, 9-17.
- Pickler, R. H., Wetzel, P. A., Meinen-Derr, J., Tubbs-Coolley, H. L., & Moore, M. (2015). Patterned feeding experience for preterm infants: Study protocol for a randomized controlled trial. *Trials, 16*doi:10.1186/s13063-015-0781-3
- Pridham, K., Steward, D., Thoyre, S., Brown, R., & Brown, L. (2007). Feeding skill performance in premature infants during the first year. *Early Human Development, 83*(5), 293-305. [doi://dx.doi.org/cuw.ezproxy.switchinc.org/10.1016/j.earhumdev.2006.06.004](https://dx.doi.org/cuw.ezproxy.switchinc.org/10.1016/j.earhumdev.2006.06.004)
- Ross, E. S., & Philbin, M. K. (2011). Supporting oral feeding in fragile infants: An evidence-based method for quality bottle-feedings of preterm, ill, and fragile infants. *The Journal of Perinatal & Neonatal Nursing, 25*(4), 349-357. [doi:10.1097/JPN.0b013e318234ac7a](https://doi.org/10.1097/JPN.0b013e318234ac7a)

References

- Ross, E. S., & Browne, J. V. (2013). Feeding outcomes in preterm infants after discharge from the neonatal intensive care unit (NICU): A systematic review. *Newborn and Infant Nursing Reviews, 13*(2), 87-93. [doi://dx.doi.org/cuw.ezproxy.switchinc.org/10.1053/j.nainr.2013.04.003](https://dx.doi.org/cuw.ezproxy.switchinc.org/10.1053/j.nainr.2013.04.003)
- Shaker, C. S. (2013). Cue-based feeding in the NICU: Using the infant's communication as a guide. *Neonatal Network: NN, 32*(6), 404.
- Thoyre, S. M. (2007). Feeding outcomes of extremely premature infants after neonatal care. *Journal of Obstetric, Gynecologic & Neonatal Nursing, 36*(4), 366-376. [doi://dx.doi.org/10.1111/j.1552-6909.2007.00158.x](https://dx.doi.org/10.1111/j.1552-6909.2007.00158.x)
- Thoyre, S. M., Hubbard, C., Park, J., Pridham, K., & McKechnie, A. (2016). Implementing co-regulated feeding with mothers of preterm infants. *MCN, the American Journal of Maternal/Child Nursing, 41*(4), 204-211. [doi:10.1097/NMC.0000000000000245](https://doi.org/10.1097/NMC.0000000000000245)