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A Review of the Principles and Benefits of Cue-Based Feeding

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A Review of the Principles and Benefits of Cue-Based Feeding

Abstract

Literature reflects that neonatal clinical practices are increasingly infant-driven, and promote, developmentally based care. Particularly, in the area of oral feeding, practitioners are moving away from traditional gestational age criteria for the initiation of oral feeding, or progressing feedings based on volume, instead they are trending toward feeding protocols that are based on developmental maturity.

A statement released by the American Academy of Pediatrics (2008), made the attainment of independent oral feeding one of the critical criteria for hospital discharge of preterm infants. This statement not only reflected the increased research attention on oral feeding acquisition and outcomes, it caused neonatal clinicians to seriously reconsider their methods for feeding premature infants, so that premature infants could safely acquire oral feeding prior to going home.

This paper reviews and summarizes the principles and benefits of cue-based feeding that have been presented in the literature. Cue-based feeding is an outgrowth of developmentally-based care. Being increasingly used in feeding plans for premature infants, cue-based feeding is a feeding method, where, the infant directs how and when it will eat, by displaying behavioral cues and eating reflexes.

Keywords

Infant, Developmental Care, Cue-based Feeding, Oral Feeding

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Cover Page Footnote

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A Review of the Principles and Benefits of Cue-Based Feeding

What is cue-based feeding?

Cue-based feeding is a method of oral feeding that is based upon an infant's developmental maturity. It is also commonly referred to as, infant-driven feeding, because the infant indicates a readiness for oral feeding through specific behaviors, or cues (Ludwig, & Waitzman, 2007). The onset and prevalence of feeding-related behavioral cues is linked to gestational development. With increasing gestational age, or post-menstrual age (PMA) physiological systems mature and stabilize. Because the strength of developmental cues is dependent upon the infant's physiologic maturity and stability, cue-based feeding provides a developmentally-supportive progression toward oral feeding competency (Thoyre, Shaker, & Pridham, 2005). The presence of developmental cues allows the infant to indicate to the caregiver that they are ready to eat. Offering feeding when the infant indicates readiness to eat aligns with what the literature refers to as "contingent caregiving." (Pickler, 2004, p. 31)

Self-regulation is the basis for the concept of contingent caregiving, where caregiving plans are individualized and directed toward the infant's demonstration of readiness for stimulation (Pickler, 2004). Behavioral cues then, indicate the infant's behavioral organization, or ability to self-regulate to environmental stimulation. Thus, self-regulation and contingent caregiving have been established as core concepts in developmentally-based feeding protocols (Newland, L'Huillier, & Petrey, 2013; Thoyre, Shaker & Pridham, 2005). Both prospective and retrospective feeding studies incorporating the self-regulatory tenets of the synactive theory, have shown that, breast/bottle feeding is particularly amenable to contingent caregiving, because the infant will demonstrate, "demand" or "self-regulatory" behaviors as indicators of feeding readiness (McCain & Gartside, 2002, p. 188; Pridham et al., 2001).

The infant's physical and behavioral activity is driven by the infant's need to self-regulate and adjust to their environment. Achieving feeding competence takes time, and requires that the infant make ongoing adjustments to changing environmental stimuli, to successfully adapt to the stimulation of eating. Following a comprehensive review of literature examining the relationships between feeding readiness, experience and outcomes, Pickler (2004), linked infant self-regulation and feeding performance, by showing that, infant feeding performance is predicted by behavioral readiness indicators, commonly referred to as cues. Cue-based feeding methods are increasingly being used in the oral feeding plans for premature infants, because those methods support infant stability and development.

Why has cue-based feeding gained so much attention in recent years?

While all aspects of growth and maturation are important, the final developmental milestone that must be achieved prior to discharge home, and is often a stumbling block for many premature infants (born between 24 and 36 weeks gestation), is the acquisition of oral feeding (Crowe, Change, & Wallace, 2012). Oral feeding is the most complex neonatal behavior, requiring the physiological integration of critical body systems, and the motor coordination of sucking, swallowing and breathing (Bertoncelli, *et al*, 2012). The American Academy of Pediatrics (2008), issued a position statement that made the attainment of independent oral feeding one of

the critical criteria for hospital discharge of preterm infants. This statement reflected nearly a decade of increased research emphasis on feeding outcomes, and feeding-related morbidities, and forced practitioners to re-examine their feeding practices so that premature infants could successfully accomplish oral feeding prior to discharge (Shaker, 2012; Thoyre, 2006).

Due to the complexity of oral feeding skills, an infant's inability to wean from tube feeding will likely delay hospital discharge and mother-infant reunion, while increasing medical cost and maternal stress (Lau & Hurst, 1999). Thus, there are two dilemmas caregivers face when addressing oral feeding difficulties: 1) infant inability to complete their feedings safely due to fatigue or physiological instability, and 2) achieving an appropriate rate of advancement to independent oral feeding (Crowe, Chang, & Wallace, 2012, Lau & Smith, 2011).

Cue-based feeding allows caregivers to guide infants toward successful feeding, rather than force them. With a cue-based feeding protocol, nurses will be able to assess the neurologic, physiologic, and behavioral components, of feeding readiness (Pickler, 2004). The nurse and the infant work together to determine when it is appropriate to bottle or breast feed. Thus, the schedule of feeding progression is dictated more by the infant and less by the caregiver (Shaker, 2012). When the infant indicates that they are ready to eat, the feeding is safer, less stressful, and the infant will more likely finish the feeding with more energy.

Cue-based feeding also allows for more parent involvement, and promotes both breast and bottle feeding. Parent teaching can be done more efficiently during cue-based feeding, and parents have reported a sense of accomplishment when they truly understand how their infant learns to eat (Newland, L'Huillier, & Petrey, 2013).

Cue-based feeding protocols.

Neonatal studies conducted within the past decade have increasingly focused on feeding acquisition and feeding outcomes. A variety of effective, cue-based, feeding protocols from multiple disciplines have been produced: 1) nursing, 2) speech therapy, and 3) physical therapy. Three common premises were presented by studies promoting cue-based feeding protocols: 1) development occurs over time and involves active social interaction between caregiver and infant, 2) continuous assessment of the infant's stability and readiness is essential, and 3) intervention should be contingent upon assessment (Newland, L'Huillier, & Petrey, 2013; Premji, McNeil, & Scotland, 2004; Shaker, 2009).

Cue-based feeding is a feeding method, where, the infant directs how and when it will eat by displaying specific behavioral cues and eating reflexes. Behavioral cues, such as rooting, or sucking on fingers, are also known as approach cues, where the infant indicates that it is ready to receive feeding (Shaker, 2013). Als (1982) synactive theory of development has been widely referenced in cue-based feeding protocols, because caregivers must consider both the feeding environment and the infant's ability to feed, in order to determine whether or not feeding would be appropriate, safe or successful. While earlier feeding protocols focused more on the infant's developing mechanical function of feeding, or the relationship between co-morbidities and the onset of feeding cues, later protocols have incorporated these concepts with the importance of social interaction between caregiver and infant for feeding skill development. Regardless of the

origin or focus of the cue-based protocol, common goals among cue-based feeding protocols have emerged: 1) increase overall stability while supporting feeding skill development, and the safe consumption of nutrition, 2) support caregivers in competent and confident feeding of their infant, and 3) promote caregiver knowledge of the infant's feeding readiness (Shaker, 2012).

Feeding protocols evaluating the mechanics of oral feeding, and/or the physiological coordination of the suck-swallow-breathe reflex, have laid the groundwork for developmentally-based feeding programs. By examining these issues, the early feeding skills assessment (EFS) (Thoyre, Shaker, & Pridham, 2005) and the neonatal oral motor assessment scale (NOMAS) (Bingham, Ashikaga, & Abbasi, 2010) focused clinical attention on the emergence of feeding mechanics, airway protection, and the factors that facilitated the infant's ability to eat. Feeding safety was prioritized, and programs zeroed in on the appropriate age to initiate oral feedings based upon the timing of suck-swallow-breathe coordination. The oral feeding skills assessment (OFS) (Lau & Smith, 2011), and the supporting oral feeding in fragile infants (SOFFI) (Ross & Philbin, 2011), examined the infant's developmental age when feeding ability emerged and the relationship between the onset of developmental feeding cues and co-morbidities. These protocols looked more closely at the delay in feeding skill acquisition caused by prematurity-related disability and disease. Gestational age for the initiation of feeding was emphasized as clinicians believed that the infant's ability to acquire feeding skills was a product of aging.

The newest feeding protocols have emphasized the caregiver's role in feeding skill development. The cue-based feeding protocol from Baylor University (Newland, L'Huillier, & Petrey, 2013) incorporates the earlier priorities for feeding safety, with the findings from the Calgary Regional Neonatal Oral Feeding Protocol (RNOFP) (Premji, McNeil, & Scotland, 2004) to emphasize the importance of the caregiver's assessment of feeding cue development. Through the use of an interdisciplinary assessment tool caregivers would not only assess the neurologic, physiologic, and behavioral components, of feeding readiness (Pickler, 2004), but also, the quality of the subsequent feeding event (Newland, L'Huillier, & Petrey, 2013). By assessing the feeding readiness and feeding ability, caregivers would be able to safely, and effectively guide premature infants toward achieving feeding competence. Proper, consistent assessment of feeding readiness would assist caregivers in deciding when it is appropriate to offer oral feedings to a premature infant. Additionally, as was found in the RNOFP study, and furthered by the Baylor study, active assessment of feeding readiness cues, promotes active social interaction between the caregiver and the infant, and this relationship improved feeding acquisition (Newland, L'Huillier, & Petrey, 2013; Premji, McNeil, & Scotland, 2004).

Summary

Cue-based feeding is an individualized, developmentally appropriate feeding method, where, the infant directs how and when it will eat by displaying specific behavioral cues and eating reflexes. Neonatal clinicians have increasingly turned toward cue-based feeding models to provide premature infants with a safe, physiologically-based method for acquiring oral feeding competence. Cue-based feeding protocols have evolved from being focused on the physical mechanics of feeding, and airway protection, to incorporating behavioral assessment of feeding readiness. The involvement and ability of the caregiver is also gaining attention as an important factor in infant oral feeding acquisition. Cue-based feeding is being increasingly recognized as a

safe, developmentally supportive oral feeding method that facilitates, not hinders, oral feeding acquisition.

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