

Changing Feeding Documentation to Reflect Infant-Driven Feeding Practice

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Nipple feeding is a complex task for most preterm or high-risk infants. It requires a skilled and observant caregiver to assist the infant in a pleasurable feeding experience that maximizes intake and minimizes stress. This article presents the traditional progression, method, and documentation routinely used in nurseries, as well as an infant-driven approach to feeding that is beginning to surface in nurseries. The article will review the goals for successful nipple feeding and present the Infant-Driven Feeding Scales to be used as an assessment, a guide for intervention, and a means for documentation of nipple feedings. The scale encompasses infant feeding readiness and quality of nipping, as well as caregiver techniques. The article includes parent use of the scale, as well as a case review using the Infant-Driven Feeding Scales.

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Recent neonatal literature has given more insight into infant feeding abilities, such as suck-swallow-breathe patterns, feeding readiness, and individual behavioral cues.¹⁻³ Current feeding practice and documentation must reflect this literature. Nipple feeding is a complex, highly coordinated sensorimotor experience for the preterm infant. Caregivers, especially nurses and parents, need to communicate about specific skills the infant has or has not gained while transitioning to oral feeding.⁴ Succinct, appropriate documentation of the transition to oral feeding is an integral part of this communication.

Facilitating a successful transition to oral feeding is a key factor in preparing an infant for discharge from the neonatal intensive care unit (NICU). Historically, practice and documentation of oral feeding in the NICU was couched in the framework of a medical model. It followed the pattern of documentation for all other types of feeding, citing the route, the amount “given,” and time required for the full volume to be completed. Although this was effective in determining input and number of full nipple feeds, it contributed little to the overall picture of how the infant was progressing with this complicated developmental task—a task that is often the last hurdle required for discharge.⁵ There was rarely, if ever,

language provided for the infant's interest or “readiness” to feed, the quality or maturity of their skills, or the type of caregiver intervention provided. Regardless of whether this documentation is handwritten or computerized, it is beneficial when working with infants to be able to describe the infants' response as well as details regarding caregiver intervention in a concise, uniform, and objective manner. The purpose of this article is to present feeding scales that can be used in the special care nursery (SCN) or NICU for this means.

Traditional Feeding Practice

Feeding practice stems from a traditional medical model where a successful nipple feeding is characterized by volume intake or an empty bottle, regardless of infant behaviors or caregiver manipulation of the bottle during feeding. Feeding is typically volume and time driven, meaning progress is defined by increased volume taken by the infant; and the primary source for determining readiness is the time on the clock, not the overall state of the infant. This traditional model frequently involves the physician ordering nipple feedings at intervals such as once a shift or every other feeding, based primarily on an infant's weight and gestational age. In this framework, preterm infants may be encouraged to orally feed before they are physiologically or behaviorally ready.⁶ This may lead to increased stress on the infant and slow the progression to successful feedings.⁶ Neonatal nurses have tremendous observation skills regarding feeding readiness from an autonomic stability and behavioral standpoint. In the past, too often these skills were overshadowed by pressure to “get” the infant to eat, theoretically facilitating transition to discharge. In addition, nurses are not typically

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taught the complex processes the premature or medically fragile infant must execute to nipple feed successfully. Nurses are educated thoroughly on the extensive medical needs of the high-risk infant, whereas oral feeding appears benign in comparison. Documentation of feeding in this traditional practice reflects the limited focus on the infant's overall skill, maturity, and progress.

Traditional Feeding Documentation

In the SCN or NICU, oral feeding is often documented in a narrative that is seldom read by others and that varies from nurse to nurse. Another common way of documenting feeding is by classifying the feeding as “poor,” “fair,” or “good.” Unfortunately, these means of documenting feeding are subjective and therefore often misinterpreted and unuseful. When this jargon is used, it is difficult to know how the nurse fed the infant vs how the infant feeds. Little clarification is made between what sucking behaviors an infant demonstrated during the nipping attempt and what techniques the caregiver used to feed the infant. In a similar manner, there is rarely assessment and documentation of behaviors the infant exhibited to show interest or lack of interest in nipple feeding before each nipping attempt or when initiating oral feeding overall. Because of the subjective nature and generality of this type of assessment and documentation, any other member of the NICU staff attempting to discern the infant's feeding progress is left focusing on the volume only, further reinforcing a volume-driven practice. It is imperative that an infant take in the volume and calories necessary for adequate growth and development. However the way with which caregivers assess, support, and document oral feeding practice must reflect individual infant progress in order to support long-term feeding success.

Infant-Driven Feeding Practice

Nursing research demonstrates that feeding preterm infants is a skilled nursing task that involves clinical decision making as to how and when to feed the infant.⁷ Therefore, in contrast to traditional feeding practice, many nurseries are now incorporating care practices that require the bedside nurse to identify infant feeding readiness signs to establish when an infant is ready to attempt nipple feedings. This practice lends itself to a cue-based feeding approach that is infant driven vs physician driven. When this type of feeding approach is used, a successful feeding is no longer that of an empty bottle and/or what the caregiver did to achieve the task. A successful feeding in an infant-driven model of care includes the achievement of four goals: the feeding is safe, functional, nurturing, and individually and, developmentally appropriate. These goals will be reviewed briefly to illustrate the necessity of changing feeding practice and documentation.

Goals for Successful Infant-Driven Feeding

Safety is the primary feeding goal. Care should be given to minimize tracheal aspiration with feeds. Bedside nurses must

use caution when providing excessive nipple manipulation when an infant is nipping, as this could increase the risk of infant aspiration and feeding-induced apnea by causing a flow of liquid when the infant needs to breathe. There is a trend in the NICU and SCN to use fewer preterm infant nipples and more standard or even slow-flow nipples to prevent the high flow rates that can compromise safety. The use of any nonstandard nipple in the NICU or SCN must be a thoughtful decision based on clear rationale. The second goal for a successful feeding in an infant-driven model of practice is that feedings are functional. A functional feeding occurs when an adequate amount of formula or expressed breast milk is taken in for proper growth, without undue stress on the infant's subsystems. These subsystems include the state, motoric, and autonomic subsystems. Therefore, an infant who begins to show listless behavior, toneless posture, or color changes during a bottlefeed should have the rest of the feed gaviged instead of being force fed the remainder by twisting and pumping the nipple. This infant is showing undue stress on his subsystems, thereby potentially setting him up for safety issues as well as to be unsuccessful at his next nipple feeding. The infant-driven model where oral feeding is stopped if these behaviors occur is in sharp contrast to the traditional method of feeding that encourages the caregiver to do whatever technique is needed to empty the bottle. The third goal for successful feedings is that feedings should be nurturing. Feeding, like most activities between a caregiver and an infant, should be a relationship-based event, not just a task. Feeding should be pleasant, not aversive. If the infant is screaming, arching his or her back, pulling his or her head backward and thrashing it side to side with attempts to nipple feed, then an alternative means of feeding (ie, gavage) is needed. The fourth goal for achieving a successful feeding under an infant-driven feeding model is that feedings are individually and developmentally appropriate. The swallow reflex is completely functional by 34 weeks' postconceptual age (PCA).⁸ Therefore, the anticipated developmental milestone for nipple feeding is around 34 weeks' PCA.⁸ However individual infants can nipple at 33 weeks PCA and some not until more than 35 weeks' PCA, as factors such as swallow-breathe coordination may still be immature or limited. Infants communicate their individual developmental maturation through their behavior (alertness, awareness of hunger, and robustness), tone, reflexes (rooting, sucking, gag), and movement (balance of flexion and extension). These individual, developmental behaviors should be used to initiate and progress infant feeding.

The Infant-Driven Feeding Scales presupposes autonomic stability at baseline and a PCA of 33 weeks or greater. Parameters such as a minimum PCA or definition of autonomic stability can be included in a policy for the scale. Successful implementation of the scales includes systematic education in the complex nature of feeding premature or high-risk infants. Fortunately, with the latest trend toward more family-centered and developmentally appropriate care in neonatal nurseries, there has been a shift in feeding practices and education. Nurses must view feeding as skilled care and acquire evidence-based knowledge of transitioning high-risk infants from gavage to oral feeding.⁹

Table 1. Infant-Driven Feeding Scales

Score	Description
A. Feeding readiness scale	
1	Drowsy, alert, or fussy before care Rooting and/or bringing of hands to mouth/taking of pacifier Good tone (presupposes autonomic stability)
2	Drowsy or alert once handled Some rooting or taking of pacifier Adequate tone
3	Briefly alert with care No hunger behaviors No change in tone
4	Sleeps throughout care No hunger cues No change in tone
5	Needs increased oxygen with care Apnea and/or bradycardia with care Tachypnea greater than baseline with care
B. Quality of nipple scale	
1	Nipples with a strong coordinated suck throughout feed
2	Nipples with a strong coordinated suck initially but fatigues with progression
3	Nipples with consistent suck but has difficulty coordinating swallow, some loss of liquid or difficulty in pacing Benefits from external pacing
4	Nipples with a weak/inconsistent suck, Little to no rhythm, may require some rest breaks
5	Unable to coordinate suck-swallow-breathe pattern despite pacing, may result in frequent or significant A/Bs or large amounts of liquid loss and/or tachypnea significantly greater than baseline with feeding
C. Caregiver technique scale	
A	External pacing
B	Modified sidelying
C	Chin support
D	Cheek support
E	Oral stimulation
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Infant-Driven Documentation

In an effort to simplify documentation, while making it more objective and appropriate to new developmentally appropriate feeding practices, we propose the use of the Infant-driven Feeding Scales. The Infant-Driven Feeding Scales is composed of three scales meant to be used together to capture the infant's readiness to nipple feed, the infant's feeding abilities, as well as the techniques used by the caregiver feeding the infant. Steps

are underway to provide reliability and validity for these scales. The scales, used in conjunction with standard documentation of nipping time/duration, nipping quantity, and nipple type, give the health care team a much clearer picture of the infant's feeding abilities and, overall stability, and progress toward discharge. Each of the scales will be described along with their clinical use in neonatal nurseries.

Both the Feeding readiness and Quality of nipple scales are five-point scales with 1 being the most optimal and mature infant response and 5 being the least. It is impossible to describe every infant with any scale. Therefore, variances should be documented accordingly. A legend can be printed on the documentation form or provided on the computerized text that correlates with the appropriate score on the scale (Table 1). This allows the bedside caregiver to provide the documentation about the infant feeding by using only a number from 1 to 5 that is quickly interpreted by other health care team members as the corresponding statement of infant behavior. Once the scale is used for a short time in the neonatal nursery, the bedside nurse can easily give report to the oncoming nurse by quickly stating the number related to the feeding scales. The caregiver technique scale is done in letters to differentiate it from infant responses and caregiver intervention. Therefore, instead of 1 to 5, the letters A to E are used to correspond to the caregiver technique.

Implementation of the Infant-Driven Feeding Scales requires education beyond the scales themselves. The scales will significantly aid in assessment and documentation but must be used in conjunction with a change in feeding culture toward an infant-driven model of feeding.

Description of Feeding Readiness Scale (Table 1A)

To score a 1 for readiness, an infant must be in an alert state or at least in a drowsy state before nursing care. This type of behavior is typically demonstrated by a more mature infant. The infant roots, actively brings hands to mouth, or actively takes a pacifier. The infant exhibits good tone for age. A score of 2 for readiness indicates that an infant achieves this drowsy or alert state once they are gently handled for routine care. This may still afford a flexible schedule of every 3 to 4 hours. Premature infants do not routinely arouse independently for feeding, but many will become alert quite easily with gentle handling and then show signs of hunger. This score also indicates that the infant is rooting or takes the pacifier if offered. The infant's tone is adequate for feeding. Only infants scoring a 1 or 2 on the readiness scale should then be nipple fed.

A score of 3 for readiness reflects an infant who may be briefly alert with care but shows no hunger behaviors such as rooting, bringing of hands to mouth, or taking the pacifier. Also, there is no change in tone with this briefly alert state. The infant receives a score of 4 if he or she sleeps throughout care and demonstrates no hunger cues and no change in muscle tone. A score of 5 indicates that an infant is demonstrating some medical instability, that is, needing increased oxygen with care, having apnea and/or bradycardia with care, or is tachypneic

greater than the baseline with care. This score of 5 both in readiness and quality of nipping is an indication of autonomic instability of some kind. An infant who consistently scores a 5 for readiness may need observation for a change in overall medical status.

It was important to the developers of this scale to document not only when an infant showed readiness behaviors but also when they did not. This assists the staff in transitioning to cue-based feeding. It allows the nursing staff to have language to indicate their conscious decision to gavage feed the infant as well. This eliminates any questions by the medical staff and/or the parents as to why the nurse chose not to nipple feed the infant. It also gives the nurse credit for her assessment not only if she determined that the infant was to feed but also if the infant was not ready. Those decisions are believed to be of equal importance. This may also aid parents in determining a trend in times of day for their infant, so they may attempt to plan breastfeeding or other care interactions accordingly. Parents begin to develop a language from this documentation as well, which assists them in identifying signs of readiness.

The Feeding readiness scale may be used not only with each individual feeding assessment but as part of the overall evaluation to initiate oral feedings. It may be used by the nursing staff, in conjunction with a cue-based feeding practice, to assess and document infants' individual behavior as they show signs of maturity, stability, and interest in feeding. Ideally, beginning the readiness scale for stable infants around 33 weeks' PCA would allow the staff to begin documenting the infants' signs of readiness; and once they reach a level of maturity, stability, and interest that is consistent with readiness criteria, then nipple feedings may be initiated. This may begin with physician orders to 'initiate cue-based feeds.' The bedside nurse would then assess the infant for readiness prior to each feeding using the Infant-Driven Feeding Scales. Consistent documentation using the same objective criteria aids in communication between all disciplines. This documentation must be accessible to all staff.

Description of Quality of Nipping Scale (Table 1B)

Traditionally, a successful nipple feeding is one in which the predetermined quantity is taken quickly. Little attention has been given to how much the infant participated in that feeding, but instead attention has been focused on the caregiver doing what needed to be done to empty the bottle. The Quality of nipping scale encourages the staff to observe the infant's feeding behaviors, document those behaviors by using one number from 1 to 5, as well as to assess which caregiver techniques may be needed based on the infant's quality of nipping.

To score a 1 for nipping quality, an infant must demonstrate a strong coordinated suck throughout the duration of the feeding experience. A score of 2 indicates that an infant nipples with a strong coordinated suck but, like many premature or high-risk infants, fatigues with progression. This does not indicate whether the infant did or did not take a volume but describes the infant's progression toward fatigue by the end of the feeding

experience, not necessarily the end of the bottle. A score of 3 for quality reflects an infant with a consistent suck but has difficulty coordinating the swallow, may have notable loss of fluid, or difficulty in self-pacing. This infant may benefit from external pacing for breathing or for flow rate/swallow coordination. An infant receives a quality score of 4 if he or she nipples with a weak or inconsistent suck, has little to no rhythm, or requires some rest breaks during the feeding. This infant may still lack the maturation or organization for efficient nipping. A score of 5 indicates that an infant is unable, despite pacing, to coordinate suck/swallow/breathe, which may result in significant apnea or bradycardia, and may have large amounts of fluid loss and/or tachypnea significantly greater than baseline when nipping. This feeding would likely be stopped by the caregiver because of infant instability. The infant may be reassessed for readiness overall; or this may, if this score continues on subsequent attempts, be an indication of sickness, unsafe swallowing, or significant overfatigue. Again, a score of 5 is a red flag for instability and is usually not present during a typical progression to full nipple feeding. An infant who consistently scores a 4 or 5 for feeding readiness and/or quality of nipping may benefit from a referral to the unit's feeding specialist whether that is a feeding team, an occupational or physical therapist, or a speech language pathologist.

Description of Caregiver Techniques Scale (Table 1C)

Documenting caregiver techniques used to aid in feeding is beneficial for subsequent staff members and provides consistency for the infant. Not all traditional methods of caregiver techniques are appropriate for facilitating normal oral motor function. Appropriate caregiver techniques that are included in the Caregiver technique scale are listed below.

External pacing is needed when an infant cannot independently coordinate a suck-swallow-breathe pattern. External pacing is a technique in which the caregiver, upon noting that the infant needs to take a breath or is overwhelmed by volume, may tip the bottle (not the infant) downward, allowing fluid to flow back into the bottle while leaving the nipple in the infant's mouth. In the absence of flow from the nipple, the infant will take breaths and/or have time to swallow without accumulating additional liquid in the oral cavity. This is called *external pacing* because it relies on the caregiver to carefully observe the infant and impose this break for breathing or swallowing, which would typically be internally driven in a more mature or medically stable infant. Pacing may be provided as needed. The infant may need to be paced based on cues such as raising eyebrows, eyes widening, head pulling backward, or an abrupt/rapid change in muscle tone. Raising of the eyebrows is one of the first signs that an infant needs the caregiver to tilt the nipple down for pacing. Some infants can only tolerate three to five sucks without stopping to breathe, whereas others can go five to seven sucks; but there is no standard number of sucks per burst before pacing. External pacing should be individualized for the

infant, based on cues and coordination. Many babies only need to be paced at the beginning of the feeding, and then they develop a rhythm and can finish without intervention.

Attempts are made to first pace the infant without removing the nipple, as removal can be disorganizing to the infant. If attempts to pace the infant in this manner are unsuccessful, then removal of the nipple may be necessary. However, if pulling the nipple out of the mouth versus just tipping it down is consistently needed to pace, the caregiver should question the infant's overall readiness or quality of nipple feeding.

Modified sidelying is generally the preferred position for feeding premature infants, and mimics the breastfeeding position. This is a sidelying position with a slightly upright tilt, the head still being higher than the feet. This position allows the infant more control of the bolus/liquid and decreases the infant's risk of choking. This position is especially helpful with any infant with tracheal malacia, laryngeal malacia, micrognathia, or a posterior tongue placement.

Chin support is to help stabilize the lower jaw and prevent release of the nipple with each suck (which creates a smacking sound) or to help bring the tongue/chin forward for a better stripping of the nipple. In providing chin support, the caregiver's finger is under the bony part of the chin and provides a gentle but firm pressure forward/outward vs a finger on the soft part with pressure upward. Chin support is frequently overused in nurseries as a feeding technique. This support, like others, should only be provided when the quality of nipping pattern indicates a need for it.

Cheek support is used to decrease intraoral space for better intraoral suction/pressure. Cheek support can be provided either unilaterally (begin with this first and add as needed) or bilaterally, and is provided by a supportive finger along the area of the cheek where the gums line up. Cheek support is often provided only on the lower/bottom side when the infant is in a modified sidelying position. (Gravity pulls the bottom/lower cheek and lip downward, causing poor lip seal.) Once again, cheek support should only be provided on an "as needed" basis. Caregivers should not get in the habit of routinely using chin and cheek support together to feed infants without first assessing the need for each.

Oral stimulation exercises usually consist of the caregiver using a gloved finger dipped in formula/milk. (The pacifier usually cannot be used for oral stimulation.) The caregiver may help diminish the bite reflex by providing firm but gentle pressure with the padded side of the finger on the infant's gums (where the teeth will be), first on the bottom sides and then on the top sides. This is done very slowly. This may be followed by a gentle pressure on the roof of the mouth to facilitate a sucking pattern.

Parent Education

For parents, feeding their son or daughter is one of their first parenting experiences that can impact their future relationship with their infant. Feeding success can foster parent-infant attachment and the parents' confidence in their role as a parent. Unfortunately, feeding a premature or high-risk infant does not

come naturally. Staff of the NICU or SCN must provide parents with realistic expectations, guidance, instruction, and demonstration of how to feed their infant. The Infant-Driven Feeding Scales can assist with this process.

The Feeding readiness scale is helpful for parents in the NICU or SCN so they can identify what cues their infants typically exhibit at feeding time. This will be beneficial for the parents after the infant has been discharged and is on demand feeds. The quality of nipping scale helps parents understand that although their infant may be nipping most of their feeding, there is a certain quality that must be achieved as well before discharge. Finally, the Caregiver technique scale can be used as an indicator for the staff to identify which techniques an infant typically needs, so that parents can be taught to use them successfully when needed and consistency is maintained for the infant.

Infant-Driven Feeding Scales and Breastfeeding

A mother's milk is the optimal form of nutrition for all infants.¹⁰ Although many mothers in the NICU or SCN pump and provide their milk to their infant, their ultimate goal is usually to direct breastfeed. Nonetheless, many infants must become adept in nipple feeding from a bottle when their mother is not available in the nursery and/or when discharge is close and tube feeding has been discontinued. The Infant-driven Feeding Scales can be used not only during this transition of nipple/bottlefeeding but also with direct breastfeeding attempts. For example, a mother can identify when her infant is ready to feed based on the feeding readiness scale, and she can communicate to the staff how well the infant fed using the quality of nipping scale. Likewise, because sidelying is the natural position for direct breastfeeding, the caregiver technique scale may be used to document this or other techniques used when nursing such as pacing.

Infant-Driven Feeding and Documentation: Putting it to Practice

Brandi was the infant daughter of Bob and Julia Smith. She was born at 32 + 2 weeks' gestational age. Brandi was a well

Table 2. Sample Infant-Driven Feeding Scales for Brandi

PCA (weeks)	33 + 3	34 + 4
Feeding readiness	2	1
Quality of nipping	3	1
Caregiver technique	A/B	B
Quantity and method (mls)	n = 24 G = 9	n = 45
Time (minutes)	15	20
n, nipple; G, gavage.		

preterm infant who was admitted to the NICU. Once she reached 33 weeks, her bedside nurses began completing the feeding readiness scale (Table 1A). For the first 2 days, Brandi received scores of 3 and 4 (did not become alert for feeds, no hunger behaviors) for five of the eight feedings. Each day the nurse would provide this information during patient care rounds. Brandi was gavage fed 35 mls each feeding using her nasogastric tube. Once Brandi reached 33 + 3 weeks, Brandi began receiving feeding readiness scores of 1 or 2 for five of the eight feedings. The order was then written to initiate cue-based feeds. The next time Brandi received a 2 (came to alert state once awakened, sucked on pacifier, and had good tone) on her feeding readiness scale, her nurse attempted to nipple feed Brandi. Brandi sucked with a consistent suck but had difficulty coordinating swallows. Brandi nipped 24 mls and then became sleepy, uninterested, and stopped sucking despite efforts to burp and rearouse. Brandi was then gaviged the remaining 9 mls. Brandi's nurse documented a nipping quality score of 3 using the Quality of Nipple Scale (Table 1B). Her bedside nurse who was feeding her provided a sidelying position and external pacing to help Brandi with her coordination with swallowing. Therefore, the bedside nurse documented an A and B on the Caregiver technique scale (Table 1C). Brandi's nurse also documented the amount of time (15 minutes) it took Brandi to nipple. Within 8 days, when she was 34 + 4 days old, Brandi was receiving a score of 1 or 2 on both the feeding readiness scale and quality of nipping scale. Her volume each feeding had increased to 45 mls, which she generally nipped within 20 minutes. Table 2 exemplifies using the Infant-Driven Feeding Scales in bedside nursing documentation. She continued to require sidelying positioning during feeding but no longer required external pacing. Brandi was then ready to progress to ad lib

and on-demand feedings. She was well on her way to discharge from the NICU.

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