Nipple Feeding is a Developmental Skill: What to Expect from Premature and Newborn Babies During Bottle Feeding

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"A baby may show the ability to nipple feed but does not have the stamina to complete each feeding required to gain weight and discharge home (4). Babies born early should not be expected to perform and show the same energy as term babies (4,5)."

Premature babies come into the world with the suck reflex (1,2). However, the coordination of suck/swallow/breathe does not emerge until 32 - 34 weeks gestation and improves with each day of maturation (3). A baby may show the ability to nipple feed but does not have the stamina to complete each feeding required to gain weight and discharge home (4). Babies born early should not be expected to perform and show the same energy as term babies (4, 5).

"It is best practice to begin bottle feedings at 34 weeks gestation. At 34 weeks gestation, the premature baby can manage a suck pattern of 3-5 sucks in a burst with equal breaks (6). Each suck should have a suck/swallow/breathe at a 1:1:1 ratio, which shows us they have an effective suck rhythm (6)."

It is best practice to begin bottle feedings at 34 weeks gestation. At 34 weeks gestation, the premature baby can manage a suck pattern of 3-5 sucks in a burst with equal breaks (6). Each suck should have a suck/swallow/breathe at a 1:1:1 ratio, which shows us they have an effective suck rhythm (6). Rhythm is "a strong, regular, repeated pattern of movement" (7). When we take the definition of rhythm, a repeated pattern, and consider that a premature baby can handle 3-5 sucks in a burst, we can identify when the baby is showing less effort and interest. This information will guide the caregiver to provide supplemental feedings through gavage in order to support stamina and weight gain. It is important to provide a positive experience with nipple feeding, especially for a premature baby (8). Literature shows us that at 34 weeks of gestation, only 53% of brain cortisol volume is present, yet at this age, we are hoping for successful nipple feeding with energy and interest to take a full feed (9).

"If we go a step further and talk about expected sucks in a 2-minute time frame, a premature baby at 34 weeks should show a burst of suck/swallow/breathe approximately 30 times while using the rhythm of 3-5 sucks with equal breaks. What we encounter in the NICU is babies that struggle with maintaining a rhythm of 3-5 sucks in a burst. Our fragile premature babies are wired to suck and try to master the task sooner than they have the endurance to do so."

If we go a step further and talk about expected sucks in a 2-minute time frame, a premature baby at 34 weeks should show a burst of suck/swallow/breathe approximately 30 times while using the rhythm of 3-5 sucks with equal breaks. What we encounter in the NICU is babies that struggle with maintaining a rhythm of 3-5 sucks in a burst. Our fragile premature babies are wired to suck and try to master the task sooner than they have the endurance to do so. For example, a 34-week gestation baby is offered the bottle and is interested in feeding and initiates a suck pattern. The baby shows a burst of 10 sucks, then they tire out, and the next burst is four sucks, then two sucks, then a long break, then six sucks, and another prolonged break. The goal for a 34-week gestation baby is 3-5 sucks per burst (10). This leads us to treatment strategies for the baby and the need for regulation. The regulation allows the feeder to put the baby in a pattern that supports a positive nipple-feeding experience. Regulation is diagnostic-based and is used with younger infants (11).

The feeder provides a break between 3-5 sucks for the first minute of feeding and is re-introduced for one-minute intervals as needed to assist the baby with self-regulation (11). If at any point the baby demonstrates stress signs or fatigue signs, gavage feeding is recommended. Many researchers discuss that the disruption of coordinated functions when sucking may result in oral feeding difficulties and increase the risk of apnea, bradycardia, failure to

thrive, oxygen desaturation, or aspiration (4, 5). This shows the importance of knowing what to expect from a premature baby when the bottle is offered and focusing on the baby's interest and effort. If the baby does not show interest or effort and/or has a suck pattern that shows too much variability, then bottle feeding is not appropriate to continue when the baby shows fatigue. Babies communicate their abilities, and as caregivers, we need to respect their stress and fatigue signs (5, 12). A baby requires proper integration of physical and neurological functions, which are not in place when born prematurely (13). Providing a positive experience with nipple feeding and following the baby's cues will support the skill of feeding and lead to full oral feeds.

"What is the ultimate goal for a baby to show that they have mastered a mature suck pattern? A term baby can show a suck rhythm of 10, or more sucks in a burst (14). If you are feeding a baby and the baby can maintain a suck/swallow/breathe rhythm 10 - 30 or more times in a burst, take a break and then re-initiate a suck rhythm of 10 - 30 or more times in a burst, the baby is demonstrating a mature suck pattern (15). Along with having a mature suck pattern, the baby should also be in a calm state, be able to maintain physiologic flexion, and enjoy the experience of nipple feeding."

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Counting sucks in a burst gives the caregiver a unique perspective regarding expectations for each feed. As mentioned before, babies are wired to nipple feed. If we see appropriate effort, we notice fatigue and stress signs; the baby is communicating that they are still working on the endurance of nipple feeding (12,17,18).

"The premature baby shows interest and effort at breast and bottle but then becomes fatigued due to their prematurity. The caregiver needs to pay attention to the stress and fatigue signs and not encourage a baby beyond their endurance abilities (12,17). The suck is a reflex, and there are many ways to stimulate that reflex; however, when the baby communicates that they are fatigued and struggling, we need to pay close attention and provide the remainder of the feeding through gavage as we support a positive feeding experience (1, 3)."

From another perspective, if a baby is born at 37 weeks gestation and is demonstrating suck bursts of 5-7 sucks and sucks a total of 35 times in 2 minutes, the baby is demonstrating a pattern closer to what would be expected from a baby at 34 weeks gestation. In this case, the baby needs more time to build stamina, and when the baby shows signs of fatigue, it would be best to gavage the remainder of the feeding and support weight gain. We often expect a premature baby to show the developmental skills expected from a term baby, and the caregiver focuses on quantity rather than quality (19, 20, 21). The premature baby shows interest and effort at breast and bottle but then becomes fatigued due to their prematurity. The caregiver needs to pay attention to the stress and fatigue signs and not encourage a baby beyond their endurance abilities (12, 17). The suck is a reflex, and there are many ways to stimulate that reflex; however, when the baby communicates that they are fatigued and struggling, we need to pay close attention and provide the remainder of the feeding through gavage as we support a positive feeding experience (1, 3). Feeding is an innate behavior, a response to a stimulus, rather than a learned skill (22).

When a baby is breast or bottle-fed, having a positive experience is the goal. The baby should lead each feeding with close attention paid to the responses the baby has when attempting to lengthen their suck bursts and gain consistent rhythm (11, 17). The quality of feed with the baby showing interest and effort is more important than the intake during the feed (16).

Here is a review of suck patterns expected from a premature baby and a term baby.

Premature baby: the expected pattern is known as immature and is 3-5 sucks per burst with equal rest breaks (10, 11, 22).

Term baby: expected pattern is known as a mature pattern and is 10 or more sucks in a burst consistently (10, 11, 17).

What we usually get from the babies in the NICU is a variety of suck patterns with long bursts, short bursts, and transitional suck bursts of 5-10 sucks with varying breaks (10, 11).

"We need to look at this from a different angle and remember that the baby is not required to have the coordination to suck/swallow/breathe until their due date. Our primary focus should be exposing them to the activity and paying close attention to their response. A premature baby in the NICU will be discharged home sooner if we put them in charge of how much intake they can handle and never push them beyond their interest and effort. We should strive to match our expectations to the baby's effort that we observe and give the baby the gift of time to mature (5,13)."

Feeding is a developmental skill. The caregiver should provide a positive learning experience to build an appropriate foundation as the baby matures. We would never expect a term baby to start rolling over in the first month of life. We would not expect a 2-month-old to sit independently, a 4-month-old to pull to stand, or a 6-month-old to walk. The literature talks about babies staying in the NICU because they do not have the coordination to suck/swallow/breathe (23). We need to look at this from a different angle and remember that the baby is not required to have the coordination to suck/swallow/breathe until their due date. Our primary focus should be exposing them to the activity and paying close attention to their response. A premature baby in the NICU will be discharged home sooner if we put them in charge of how much intake they can handle and never push them beyond their interest and effort. We should strive to match our expectations to the baby's effort that we observe and give the baby the gift of time to mature (5, 13).

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