

Improving Feeding Outcomes in Premature Infants

The effects of integrating nfant[®] Control Flow Nipples and objective feeding skill assessments into cue-based feeding protocols.



POPULATION

Low and very low birthweight infants born <30 weeks gestational age

PROBLEM

Feeding challenges remain one of the most persistent barriers to NICU discharge.

QUALITY IMPROVEMENT STUDY

A recent clinical study followed very low-birth weight infants through their entire NICU stay using nfant Control Flow Nipples and objective sucking assessments as part of their cue-based feeding progression protocol.

OUTCOMES

- · Reduced feeding-related length of stay by 8 days on average
- No observed readmissions, modified barium swallow studies or G-Tube placements for weight gain
- · No required outpatient feeding services
- Expansion of feeding protocol to include late and moderate preterm infants < 34 week gestational age at birth

Introduction

The American Academy of Pediatrics states that one criterion for hospital discharge of preterm infants is the ability to complete oral feedings safely. The transition from tube to oral feeding is especially challenging for infants born less than 30 weeks post menstrual age (PMA). The current gold standard for determining readiness to begin and advance nipple feedings is via visual assessment. However, sole reliance on visual cues to determine the status of fragile infants during feeding can be problematic as cues can be missed or misinterpreted.

For this reason, a matched case series study was conducted to determine whether an additional assessment using nfant®'s technology platform prior to initiating oral feeding could improve feeding outcomes. This included nfant® Control Flow Nipples (which provide controlled flow rates) and the biofeedback and analytics capabilities of nfant®'s smart bottle—each of which may help facilitate the neonate's transition to independent oral feeding.



How nfant's Technology Works

Every time an infant feeds, a complex sequence of muscle movements occurs, requiring coordination between the tongue, lips, jaw, and hard/soft palate. Proper suck-swallow-breathe patterns depend on both tongue strength and neuromuscular control. The nfant[®] Thrive Bottle objectively measures measures the resulting nipple movements in real-time.

Inside the bottle, a cantilever mechanism responds to the baby's sucking motion, triggering movement that is detected by the Bottle Sensor at the base of the bottle. The sensor wirelessly transmits feeding data to the nfant[®] Thrive Tracker App, which translates the movements into key clinical metrics, including peak amplitude, duration, and frequency—giving caregivers a quantifiable and longitudinal view of the baby's feeding ability throughout their entire development progression.

For clinical care teams and pediatricians, these insights provide a clearer picture of an infant's feeding skill development and potential challenges and offer actionable information, such as:

- Active feeding time: Is the baby actively feeding, or just nonnutritively sucking? Was the infant truly ready to feed? Are they fatiguing?
- Suck smoothness: Has the baby established a consistent suck-swallow-breathe rhythm, or is there evidence of discoordination?
- Suck burst patterns: Is the nipple flow rate appropriate for the baby's feeding ability? Could positioning or nipple flow rate adjustments adjustments improve efficiency?



Study Methods

For the experimental group (N=23), an original algorithm was used to assess infants' suck patterns and advance nipple flow rates based on the metrics gathered using the using nfant bottle feeding technology. This along with visual assessment and cue-based feeding plans of care were used by health care providers. Parents were consented prior to initiation of oral feedings.

For the control group (N=40), only the visual assessment and cue-based feeding plans of care were used.

All infants started their feeding program by practicing nonnutritive sucking with the nfant No Flow Nipples as early as 28 weeks GA. At 33 weeks or greater postmenstrual age, infants were allowed to advance to the nutritive nfant Control Flow nipple determined to be best suitable for their feeding ability based on simple criteria that was repeated 2–3 times per week:

- **1. Standard visual observation –** The infant exhibited autonomic stability and minimal disengagement cues for a set period of time.
- 2. Added objective data Exhibited an organized suck pattern as determined by objective biofeedback using nfant's smart bottle and mobile app.

The feeding related outcomes of interest included feeding related length of stay, time to transition to full oral feedings, number of modified barium swallow studies conducted, need for gastrostomy tube placement, hospital readmission for failure to thrive and recommendation for feeding therapy post discharge.

SMART SESSIONS 2-3X PER WEEK



Feeding Progression Protocol



*Initiation may be delayed until neonate is off positive pressure ventilation and tolerates gentle stimulation, if necessary.

Conclusion

The feeding progression protocol improved all the feeding metrics of interest compared to the standard of care of cue-based feeding using visual assessment alone.

This study highlights the value of integrating objective, data-driven tools with clinical expertise to personalize feeding strategies for vulnerable preterm infants throughout the entirety of their progression to independent oral feeding and discharge home. Leveraging quantitative metrics to guide nipple flow rate selection allows clinicians to make more informed decisions—helping to reduce practice variability, feeding-related complications, potentially shorten NICU stays, and support long-term feeding success.



The combination of nfant®'s Control Flow Nipples and objective feeding metrics equips NICUs to transition from, traditional experience-based care to proactive, individualized feeding management.

Partnering with You to Advance Infant Feeding Care

nfant has collaborated with researchers, speech-language pathologists, physicians, and clinicians for more than a decade to advance the science of effective infant feeding. To explore the clinical evidence informing these materials, please refer to our <u>published studies</u>. If you are interested in learning more about our latest clinical studies, or how Thrive's quantitative data can support your practice, we would be happy to walk you through our products and answer any questions you may have. Email us at **pros@nfant.com** to connect.

References & Publications From This Study

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