

An Integrative Review of Oral Motor Interventions Aimed at Enhancing Oral Feeding Skills in Preterm Infants

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DESCRIPTION

Oral feeding is a necessary function that is notably impacted by immaturity and altered brain development in preterm infants. Very preterm infants (those born before 32 weeks of gestation) typically progress from being unable to consume any milk by mouth to taking full oral feeds during their stay in the Neonatal Intensive Care Unit (NICU). Achieving the ability to feed orally is often one of the last milestones to be met before discharge from the NICU, making it a critical component of the infant's readiness for release. For preterm infants, the development of oral feeding skills is not only affected by physiological immaturity but also by the absence of the typical early oral sensory-motor experiences that full-term infants undergo before birth.

In full-term infants, prolonged in utero experiences, such as sucking and swallowing amniotic fluid, play a key role in the development and coordination of the neurological, cardiorespiratory and gastrointestinal systems. These experiences allow for the early maturation of essential feeding skills. By contrast, preterm infants often lack these experiences, as their early development is interrupted due to premature birth. As a result, preterm infants require specialized care to support their oral feeding development, including medical interventions that address their immature body systems.

One key aspect of oral feeding development is the coordination of sucking, swallowing and breathing. This coordination begins in the intrauterine period but typically does not fully mature until 32 weeks-34 weeks of gestation. Preterm infants, however, often begin oral feeding during the obligatory reflexive phase of development, when sucking is largely automatic and not yet integrated with the complex act of swallowing and breathing. During this early phase, the infant's ability to coordinate suck, swallow, and breathe can be inadequate, leading to significant challenges during feeding.

There are numerous inherent risks for preterm infants during this early feeding phase. Due to their immature muscle tone, limited state regulation and underdeveloped suck-swallow-breathe coordination, preterm infants are particularly vulnerable

during oral feeding. Infants in this stage are unable to stop a feeding if they become stressed, which can lead to oxygen desaturation, bradycardic events (slowing of the heart rate) and a lack of coordination between sucking and breathing. This disordered feeding pattern increases the risk of aspiration, where fluids or milk enter the lungs, potentially causing respiratory complications.

To mitigate these risks, early oral feeding in preterm infants requires a responsive approach. Caregivers or feeding professionals need to carefully monitor and adjust the feeding pace, imposing breaks between sucks and swallows to allow the infant to breathe. This method, known as responsive feeding, is essential for ensuring the infant's safety and comfort during feeding sessions. Research has shown that having familial caregivers as feeders, rather than medical staff, can further improve feeding outcomes. In addition to the medical benefits of responsive feeding, this practice strengthens the emotional bond between the caregiver and the infant, reduces feeding-related stress and enhances the overall feeding experience.

As preterm infants grow and approach their term-equivalent age (the age they would have been if born at full term), their developmental capacities improve. The central nervous system matures over time, leading to better regulation of states such as wakefulness, feeding and sleep. Preterm infants begin to experience longer periods of arousal, which enable them to be awake for longer stretches and engage more actively in feeding. As their neurological systems mature, reflexes such as rooting and sucking become more pronounced. Over time, these reflexes evolve into more coordinated actions, resulting in improved suck-swallow-breathe synchrony, which is important for successful oral feeding.

The development of feeding skills is also influenced by the infant's Postmenstrual Age (PMA), which is the infant's age calculated from the first day of the last menstrual period, taking into account both gestational age and postnatal age. As PMA increases, the feeding abilities of preterm infants become more sophisticated. At full-term age, most preterm infants can engage in feeding as a social activity, interacting with their caregivers through eye contact and other social cues while feeding.

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However, despite the progress made toward full oral feeding, preterm infants may continue to experience challenges with feeding even at term equivalent age.

Studies have shown that preterm infants at term equivalent age, when compared to healthy full-term infants, still demonstrate several feeding difficulties. These may include poorer arousal and alertness, inadequate tongue positioning, less coordinated suck-swallow-breathe patterns and difficulty maintaining an appropriate feeding pace. In addition, preterm infants may display more signs of aspiration (milk entering the airway), difficulty regulating breathing and an inability to complete a full feeding session. Furthermore, tone abnormalities and discoordination between the tongue and jaw during sucking may be observed, as well as a lack of positive engagement with the feeder or signs of discomfort during feeding.

Given these ongoing challenges, it is clear that while preterm infants may achieve full oral feeding by the time they are ready for discharge, the rehabilitation of feeding skills continues to be

a critical focus of care. The maturation of oral motor skills, along with targeted interventions, is essential in ensuring that preterm infants are able to feed efficiently and safely, even after leaving the NICU.

CONCLUSION

In conclusion, while preterm infants demonstrate significant progress in oral feeding skills as they approach their term-equivalent age, challenges remain even at discharge. A variety of interventions, particularly those targeting oral motor development, are used in clinical practice to help preterm infants achieve full oral feeding. However, more research is needed to determine the most effective interventions to support the maturation of feeding skills and ensure the safety and well-being of preterm infants during this critical developmental phase. This lack of a systematic review leaves a gap in our understanding of which interventions are most beneficial for improving oral feeding skills in preterm infants.