

Neonatal Nursing Education Brief: Developmentally Supportive Feeding in the NICU

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Oral feeding skills are a major developmental milestone and can be challenging for infants requiring NICU care. Preterm infants are at increased risk for feeding difficulties. Developmentally supportive feeding practices can promote normal brain growth and improve feeding skills.

NICU, preterm infants, oral feeding skills, bottle feeding, feeding position

Developmentally Supportive Feeding in the NICU

Purpose and Goal: CNEP #2100

- Learn about the challenges of developing feeding skills
- Learn about strategies nurses can use to support feeding

None of the planners, faculty or content specialists has any conflict of interest or will be presenting any off-label product use. This presentation has no commercial support or sponsorship, nor is it co-sponsored.

Requirements for successful completion:

- Successfully complete the post-test
- Complete the evaluation form

Date

- March 2019 – March 2021

Learning Objectives

- Describe the development of feeding behaviors
- Describe the effects of negative feeding experiences
- Describe 2 strategies for supporting successful feeding

Introduction

- The ability to orally feed is a major milestone
- Oral feeds are also a prerequisite for NICU discharge
- A variety of factors can affect an infants' ability to feed
 - Gestational age
 - Infant positioning
 - Feeding readiness
 - Oral-motor immaturity
- Side-lying feeds are one factor that can be useful
 - In providing positive feeding experiences
 - In supporting development of feeding skills

The Development of Oral-Motor Feeding Skills

- NICU infants are at risk for feeding immaturity
 - Especially premature infants
 - Especially recovering infants
- Oral-motor and neurological immaturity
 - Interfere with the ability to feed
 - Contribute to feeding difficulties
- Successful oral feeding depends on
 - The coordination of:

- Sucking
 - Swallowing
 - Breathing
- Coordination is non-linear
- All three develop at different times
- All three mature at different times
- Oral feeding behavior emerges from:
 - Non-linear dynamic interactions
 - Coordination of multiple systems
 - Oral-motor system
 - Neurological system
 - Cardiorespiratory system
 - Gastrointestinal system
 - Self-regulation occurs between systems
 - Continuously within systems
 - Continuously between systems
- Self-regulation creates successful feeding coordination
 - Efficient sucking
 - Enough milk intake
 - Physiologic stability
 - Prevention of aspiration
 - Minimal disruption of breathing
 - Adequate intake for growth
- As oral feeding skills develop
 - Feeding difficulties can emerge
 - Inability to integrate breathing
 - Dysfunctional suck-swallow sequences
 - Poor fluid management
 - Increased risk of aspiration
 - Physiologic instability
 - Bradycardia
 - Oxygen desaturation
 - Early cessation of feeding
 - Fatigue
 - Behavioral distress
- Repeated stressful feeding experiences
 - Can alter sensory-motor pathways
 - Can alter developing brain pathways

- Can lead to long-term maladaptive behaviors
- Supportive development of oral feeding skills
 - Is an important area of NICU care

Behavioral State and Oral-Motor Immaturity

- The ability to achieve full oral feeds is challenging
 - Especially for preterm infants
 - Especially for recovering infants
- The challenges include the ability to maintain
 - Physiologic stability
 - Behavioral state stability
 - High feeding efficiency
- Oral feeding success is defined as the ability
 - To consume full volume feedings
 - While maintaining physiologic stability
- There are numerous factors that affect feeding success
- Factors that affect feeding success include
 - Maturation
 - Pre-feeding cues
 - Alert behavioral state
 - Ability to self-regulate
 - Physiologic stability
- Studies have shown alert states improve feeding
 - Unsuccessful feeds are associated with sleep states
 - Drowsy
 - Quiet sleep
 - Active sleep
 - Deep sleep
 - Sleep-wake transition
 - Non-alert waking activity
 - Successful feeds are associated with alert states

- Quiet alert
- Active alert
- Forced oral feeds without alertness should be avoided

Sensorimotor Interventions for Supportive Feeding

- Oral feeding is a complex and dynamic process
- Sensorimotor interventions may optimize feeding skills
- Sensory input should be developmentally appropriate
- Developmentally appropriate sensory input includes:
 - Oral input
 - Stroking lips
 - Stroking gums
 - Stroking cheeks
 - Stroking tongue
 - Tactile input
 - Stroking trunk
 - Stroking limbs
 - Kinesthetic input
 - Limb movement
 - Range of motion
 - Auditory input
 - Sound
 - Olfactory input
 - Smell
- Input can be categorized as:
 - Unimodal = one sensory input
 - Multimodal = 2 or more sensory inputs
- Research shows unimodal input can improve feeding
 - Especially input other than oral input
- The goal is to mimic in utero experiences
 - In utero experiences support development
 - NICU experiences negatively impact development

- Specific interactions that are beneficial:
 - Non-nutritive sucking
 - Pacifier use
 - Swallow exercises
 - Pacifier use
 - With <0.2 ml milk
 - Oral stimulation
 - Stroking exercise
 - Lips, cheeks, gums, tongue
 - Tactile stimulation
 - Infant massage
 - Auditory stimulation
 - Lullabies
 - Maternal voice
 - Olfactory stimulation
 - Mother's milk

Optimal Positioning for Supportive Feeding

- Optimal positioning during feeding has potential
 - To improve breathing
 - To support feeding skills
- A semi-elevated supine position has been commonly used
 - This position reduces work of breathing
 - By facilitating lung expansion
 - Through head and trunk elevation
 - It also enhances the ability to:
 - Provide head-neck alignment
 - Provide visual access to infant
 - This position may interfere with the upper airway
 - It may allow the soft palate to fall back
 - It may allow the tongue to fall back
 - Leading to ineffective breathing
 - Gravity may increase milk transit time

- It may decrease milk bolus control
 - Leading to dysfunctional swallowing
 - Leading to an increased risk of aspiration
- A semi-elevated side-lying position is currently recommended
 - This position mimics breastfeeding positioning
 - This is a natural position
 - It can support breastfeeding skills
 - It is consistent between breast and bottle feeds
 - It avoids the disadvantages of supine positioning
 - The bottle is held at a lowered angle
 - It requires less antigravity movement
 - There is decreased milk transit time
 - Leading to less risk of a milk bolus
 - Leading to safer supportive swallowing
 - It improves coordination of breathing and swallowing
 - Leading to less disruption of breathing
 - This position also reduces work of breathing
 - Leading to promotion of upper airway patency
 - Leading to less stress and improved energy
 - Additionally, this position has been shown to:
 - Lead to sustained energy
 - Lead to sustained attention
 - Maintain physiologic stability
 - Lead to controlled oral-motor function

Physiologic Stability in Feeding Positioning

- Four studies have compared feeding positions
- All four studies compared two positions
 - Elevated supine positioning
 - Elevated side-lying positioning
- All four studies evaluated two areas
 - Physiologic stability
 - Feeding performance
- Physiologic stability

- Heart rate patterns
 - Heart rate patterns were less variable
 - Bradycardia was less frequent
 - In elevated side-lying position
- Oxygen saturations
 - Oxygen saturations were less variable
 - Saturations remained higher
 - In elevated side-lying position
- Respiratory characteristics
 - Respiratory patterns were less variable
 - Apneic events were less variable
 - In elevated side-lying position
 - Fewer apneic events
 - Briefer apneic events
- Feeding performance
 - Infants fed in elevated side-lying positioning
 - Had longer feeding times
 - Had more feeding endurance
 - Showed increased engagement
 - Consumed increased volumes of milk

Summary

- Feeding immaturity is common in the NICU
- The development of safe feeding experiences
 - Supports brain growth and skills
 - Protects infants from adverse effects
- Elevated side-lying positioning during feeds
 - Supports physiologic stability
 - Helps regulate the flow of milk
 - Mimics breastfeeding positioning
- Feeding challenges can lead to:

- Prolonged hospitalization
- Increased health care costs
- Supportive feeding practices
 - Can support normal development
 - Can support developing feeding skills
 - Can avoid prolonged feeding challenges
 - Can avoid prolonged NICU hospitalization

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