

Collaborating to Ensure Success When Feeding the Preterm Infant

Occupational Therapist

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In Partnership with:

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THE HOSPITAL FOR
SICK CHILDREN

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About SickKids Hospital



143
YEARS OLD

16,800
ADMISSIONS

6.26 DAYS
LENGTH OF STAY (LOS)

**AFFILIATED WITH
UNIVERSITY OF TORONTO**



**ONE OF THE TOP
CHILDREN'S HOSPITALS
IN THE WORLD AND ONE
OF CANADA'S MOST
RESEARCH-INTENSIVE
HOSPITALS**

310,000
OUTPATIENT
VISITS
80,500
EMERGENCY ROOM VISITS

294
AVERAGE NUMBER OF
BEDS OCCUPIED DAILY

12,500
SURGERIES

~\$1
BILLION

TOTAL BUDGET

~\$148
MILLION
ANNUAL FUNDRAISING

10,800+
PEOPLE

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Objectives

At the end of the session the participant will be able to:

- Describe infant sucking and coordination of suck/swallow/breathe
- Identify common situations in the NICU that impact oral feeding
- Generate strategies to address these situations in the clinical setting and prevent escalation



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Sucking

Normal Non-Nutritive Suck – used when not feeding

- Tongue cupped around nipple
- Moves in extension-elevation-retraction pattern
- Rate is 2 sucks per second – jaw excursions are shorter

Immature Nutritive Sucking Pattern – used when feeding

- Tongue cupped around nipple (lips not active until ~ 3 months of age)
- Rate is 1 suck per second – wide jaw excursions
- Seen between 30-34 weeks
- Short bursts of 3-5 sucks followed by pauses to breathe

Normal Nutritive Suck - used when feeding

- Tongue cupped around nipple (lips not active until ~ 3 months of age)
- Rate is 1 suck per second – wide jaw excursions
- Long bursts of 10-30 sucks with breathing integrated into suck/swallow cycle
- Brief pauses between burst

Palmer (2002), Journal of Human Lactation

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Development of feeding

- 26-27 weeks - Gag reflex evident
- 28 weeks - Disorganized non-nutritive sucking pattern.
- 30-32 weeks - Use lips and tongues more actively and can manage to swallow drops of breast milk. Some babies can attach to the breast. Most babies will lick drops of expressed milk on the nipple.
- 32-34 weeks - Rooting and attachment. Nutritive sucking begins usually have poor coordination of SSB. Some babies maybe ready to take a full breast feed.
- 34-36 weeks - Strong rooting and mature suck, swallow and breathing patterns developing. Some babies may achieve full breast feeding.
- 37 weeks - Healthy infants are able to sustain their nutrition totally at the breast

Nyqvist, K. H., Sjoden, P.-O. and Ewald, U. (1999). Early Human Development

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Traditional Feeding Model

- Oral feeding started at a set gestation (34 weeks)
- One oral feed per day/per shift
- Progression when baby successfully completed one full oral feeding
- Often progress to alternate bottle feeds regardless of infant cues
- Schedule decided by RN prior to feeding time
- Lead to limited practice of oral motor skills

Breton & Steinwender (2007), *Newborn and Infant Nursing Reviews*



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Advancement of oral feeding

- Traditional practice is a gradual increase of feedings (breast or bottle) by a specific number per day
- Assumptions are that oral feeding:
 - is stressful for infant
 - requires more energy consumption
 - results in poorer weight gain and fatigue

*******Not supported by evidence*******

Simpson et al., (2002), Pediatrics,
Kirk et al., (2007), Journal of Perinatology

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Transitioning to oral feeding in NICU

- No definite corrected age
- Baby wakens/alerts around feeding time
- Baby shows signs of feeding readiness or hunger ie. rooting, sucking on hands, soother
- Baby licks/sucks on nipple when offered

Jones (2012), Neonatal Network
Shaker (2013), Neonatal Network



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Advancement of oral feeding

- Infant should be fed when showing readiness cues at feeding time
- Assess at each feeding time once the infant is 30-32 weeks or begins showing cues
- Stimulation of feeding readiness by encouraging non-nutritive sucking prior to feeding time
- Feed following baby's cues
- Stop oral feeding when the infant is showing disengagement cues or there is an adverse event (coughing, bradycardia, significant oxygen desaturation)
- Repeated adverse events may indicate more serious problem -collaborate with feeding therapist



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Infant Driven Feeding® Scale - Readiness

Ludwig and Waitzma 2007

Score

Description

1

Alert or fussy prior to care. Rooting and/or hands to mouth behavior. Good tone.

2

Alert once handled. Some rooting or takes pacifier. Adequate tone

3

Briefly alert with care. No hunger behaviors (ie. Rooting, sucking). Adequate tone

4

Sleeping throughout care. No hunger cues. No change in tone

5

Significant HR,RR,O2, or WOB outside of baseline

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Infant issues affecting oral feeding

- Neurologic development
 - Postural tone, muscle development, oral motor skills
 - May benefit from an assessment by a therapist
- Underlying conditions
- Chronic lung disease, necrotizing enterocolitis, post hemorrhagic hydrocephalus
- Aerobic demands of feeding
 - Breathing frequency and depth
 - Respiratory fatigue
- Adaptations used to maintain stability and cope with demands of feeding
 - Transitional sucking pattern, switching to NNS, falling “asleep”

Shaker (2017), Seminars in Speech and Language



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Impact of NICU on oral feeding

- Environment
 - Noise
 - Loud noises are startling
 - Constant background noises

 - Light
 - Usually bright lighting
 - Baby may keep eyes closed

 - Different caregivers
 - Different styles of feeding
 - Inconsistent for infant – decreased trust



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– Decreased parental presence/involvement

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Strategies to improve infant feeding and prevent escalation of issues

- Environment
- Flow rate
- Positioning
- Co-regulated pacing
- Rest periods
- Reading and respecting infant cues



Environment

- Feed in a quiet, dimly lit area
- Minimize noise
- No rocking if in rocking chair
- Only one input at a time ie. Only look but don't talk or only talk but don't look
- Holding close to body or bundling provides sense of security and motor stability
- Allow baby to suck on a soother or your finger before starting the bottle feed



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Flow rate

- A manageable flow rate:
 - Preterm and sick infants often have difficulty coordinating SSB
 - Allows infant time for frequent and deep breaths
 - Avoids need for “urgent” breath
 - It is not the work of sucking that makes feeding difficult – **it is trying to breathe**
 - Flow rate negatively correlates with feeding efficiency - feed more with slow flow nipple

Shaker (2017), Seminars in Speech and Language

Matthews (1991), Journal of Pediatrics

- Encourage breast feeding: (get support from lactation consultant)
 - More able to control flow by slowing sucking rate and reducing sucking pressure
 - Less intake than bottle fed infants
 - Better oxygenation, temperature control, heart rate stability than bottle feeding
 - Better coordination of suck/swallow/breathe

Nyqvist (2013), Journal of Human Lactation

Furman and Minich (2004), Journal of Perinatology



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- Use a slow flowing nipple:
 - Tightening collar of nipple decreases air exchange and therefore decreases flow rate, loosening collar increases flow rate
 - Hold bottle horizontally so liquid does not drip when infant is not sucking
 - Keep nipple full of liquid – minimizes air exchange
 - Do NOT provide cheek and/or jaw support - Preterm infants generally have strong suction and can extract an adequate bolus from the nipple; cheek or jaw support improves suction and therefore flow rate
 - Do not twist nipple, move jaw up and down etc. if infant pauses

Ross and Fuhrman (2015), Dysphagia
Shaker (2017), Seminars in Speech and Language



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Positioning

- Bundle or position with arms towards midline and chin tucked
- Ensure legs are not pushed into abdomen
- Side lying or elevated side lying
 - similar to breastfeeding
 - easier to maintain alignment of head and trunk
 - In semi upright or in crook of arm head more likely to fall into hyperextension
 - allows milk to pool in cheek pocket
 - bolus flow less affected by gravity
 - improved oxygenation and endurance

Glass & Wolfe (1992) , Feeding and Swallowing Disorders in Infancy
Shaker (2017), Seminars in Speech and Language



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SIDELYING BOTTLE FEEDING

Most recommended position



Key Points:

- Keep nipple full
- Make sure baby's hips are extended (to minimize pressure on stomach)



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Co-regulated Pacing

External Pacing

- External pacing interrupts liquid flow during feeding to allow infant to breathe
 - Prevents infant from taking “urgent breath”
 - Supports more frequent and deeper breaths
 - Experience less adverse events
- Tip or remove nipple when infant shows:
 - signs of stress/disorganization:
 - facial expressions, eye behaviors, disorganized tongue movements
 - changes in work of breathing, bolus control,
 - Loss of liquid from front of mouth, apnea
 - need to breathe
 - Sucking burst is too long, panicked look, pulling away

Shaker (2017), Seminars in Speech and Language

Marcus & Breton (2013), Infant and Child Feeding and Swallowing

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Provide Rest Periods

- Periodic brief pauses of 30-60 seconds during feeding is see increase in work of breathing, anterior loss of bolus, drowsiness
 - Preserves respiratory reserves and endurance
 - Allows infant to take breaths and improve oxygenation
 - Preserves infant's energy

Shaker (2017), Seminars in Speech and Language

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Respecting Infant's Cues

Disengagement or Distress Cues:

- Significant changes in heart rate
 - Bradycardia - poor coordination of SSB/aspiration
 - Tachycardia – increased work of feeding
- Significant changes in respiratory effort (grunting, indrawing, apnea, tachypnea)
- Signs of aspiration
- Pulling away from nipple
- Head turning
- Grimacing
- Not resuming sucking after break
- Looks panicked

Shaker (2013), Neonatal Network

Ludwig and Waitzman, (2007), Newborn and Infant Nursing Reviews
Alberta Health Services (2016)

Marcus & Breton (2013), Infant and Child Feeding and Swallowing

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TOGETHER WE CAN
REACH THE GOAL OF
HELPING THE BABY
BECOME A GOOD
FEEDER NOT JUST TO
HAVE A FULL ORAL
FEED !



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Questions



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Thank you

- USAID for their financial support of this conference
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