

Premature Infant Feeding Issues: What do WIC RD's Need to Know?

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A word about the Presenters

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- Neonatal Dietitian at Childrens Hospital of Los Angeles for the past 5 years.
- Certified Specialist in Pediatric Nutrition.
- Former WIC dietitian.
- Mother of 3... Zachary (2), Alexandra (5) and Christian (8).
- French-Canadian, moved to California in 1994.

Judy Parkinson, MA, OTR/L, CLE

- Occupational Therapist working in the NICU for the past 11 years at CHLA
- Certified Lactation Educator
- Advance Practice Certification, Feeding & Swallowing
- Mother of 3...Andrew (3), Brian (6) and Jack (8)

Medical Factors Predisposing the Preemie to Long-term Feeding Issues

- Neurological disturbances
(ex. apnea, IVH, seizure, hydrocephalus)
- Chronic lung disease, bronchopulmonary dysplasia
- Cleft lip/palate: resulting in GER
- Medical instability: unable to advance enteral feeds
- Long intubation: unable to initiate oral feeds
- Negative oral experiences resulting in oral aversion
(i.e., intubation, ventilator, feeding tube)
- Gastrointestinal Dx, Cardiac Dx



Parental Factors Predisposing the Preemie to Long-term Feeding Issues

- ❑ Intense anxiety about feedings and growth
- ❑ Parents distrust their parental instincts regarding their baby's needs
- ❑ Parents perception that their baby needs to be “well fed” for catch-up growth

Some Common Feeding Problems

- ❑ Breastfeeding issues
- ❑ Formula intolerance/allergy
- ❑ Early introduction of solids
- ❑ Frequent vomiting, gastroesophageal reflux
- ❑ Risk for or Hx of aspiration while feeding
- ❑ Trouble breathing while eating
- ❑ Poor appetite due to fatigue/poor endurance
- ❑ Refusal to eat or difficult to feed
- ❑ Overfeeding
- ❑ Constipation/ colic

How can you help parents solve these issues?



Role of the WIC RD

- Listen/reassure about what is normal in preemies, deflect parental culpability
- Explain why and how progress in feedings may be different when compared to a full term healthy infant
- Monitor growth and need for aggressive interventions
- Offer practical techniques to improve nutrition outcomes and solve feeding problems
- Review recommended feeding schedule for preemies, including use of water, juice, enriched formula, etc.
- Know when issues are beyond expertise and refer

Developmental Milestones for Feeding

- ❑ Reflexive sucking – premature infant will have immature sucking pattern/bursts
- ❑ Full term newborn has irregular suck-swallow-breathe patterns until 41 wks GA
- ❑ Adaptive reflexes of infant: rooting and suck-swallow
- ❑ Protective reflexes: gag and cough
- ❑ Sucking becomes voluntary at 4 mo corrected age

Assessing Premature Sucking Skills at 0-6 Months

- ❑ State control: organizes his state, motor and physiologic systems with support (swaddling, containment)
- ❑ Roots eagerly, non-nutritive sucking elicited in all states
- ❑ Awakens, stirs or fussy prior to feeding
- ❑ Mouthing; hand-to-mouth behaviors
- ❑ Coordinates suck-swallow-breathe (1:1:1)
- ❑ Strength and endurance
- ❑ Efficiency

Red Flags for Swallowing Problems

- ❑ Coughing during or soon after feeding
- ❑ Slow feeding
- ❑ Increased chest congestion
- ❑ Wet voice during and/or after feeding
- ❑ Multiple swallows on single mouthful
- ❑ Extra effort while sucking/swallowing
- ❑ Fatigue, SOB, color changes
- ❑ Temperature rise 30 min to 1 hr after feeding
- ❑ Obvious choking or gagging
- ❑ Audible swallow or “gulping” sounds
- ❑ Eye tearing during feeding
- ❑ Food or liquids coming from trach

Preparing Environment/Infant for Feeding

- ❑ Modify visual stimulation
- ❑ Modify noise levels
- ❑ Temperature control
- ❑ Feeder should be relaxed during feeding



Arousal Techniques for “Sleepy” Baby

- ❑ Apply with variability, not rhythmical
- ❑ Unpredictable movement
- ❑ Auditory stimulation
- ❑ Tactile stimulation (tickling feet, cool wash cloth)
- ❑ Cooler temperatures

Calming the Irritable Baby

- Use containment and rhythm
- Stimulus: only provide one at a time
- Tactile: firm pressure, swaddling, cover head, roll beneath feet, flexion, massage
- Vestibular: rhythmical, standing, vertical bouncing, rocking
- Auditory: decreased input, no talking or white noise, rhythmical, repetitive music
- Visual: dim lights, avert eyes

Positioning for Optimal Feeding

- Emphasize flexion, midline orientation and neutral alignment of head and neck
- Shoulders should be symmetric with arms and forward flexed toward the midline
- Hips flexed at 45-90 degrees



Frequent Vomiting of Feeds

- ❑ Upright for at least 30 minutes after each feeding
- ❑ May sleep in car seat if bad GERD
- ❑ Shorter more frequent feedings helps
- ❑ Frequent burping
- ❑ If breastfeeding and large milk supply, may need to feed only 1 breast at time (see “overfeeding” – this is RARE with hospitalized preemie!!!)

Breastfeeding: Even Greater Advantages for the Preterm

- Helps tolerance of early feedings, ↓ risk for NEC
- Immunological factors ↓ risks of infections
- Enhances retinal maturation and visual acuity
- 0-3wk postpartum, preterm BM is higher in protein, vit.A, Na & Zc to better meet preterm nutrition needs
- Long term: developmental and cognitive benefits
- Mother feels she is doing something to help her baby

Supporting Establishment of Milk Supply

First 6 wks is crucial time for establishing supply:

- Bring baby to breast OR use a HOSPITAL GRADE pump to express breast milk a MINIMUM of 8-12 x in 24 hr, at least once/night
- If pumping, use dual, electrical hospital grade pump
- Pump both sides simultaneously for minimum 15 min.

Preemie's Success at Breast Is Dependent on WIC's Help!



WIC needs to provide mothers of hospitalized infants with a hospital grade pump immediately!



Encouraging Milk Supply When Hospitalized

- ❑ Pump at bedside or look at picture of her baby
- ❑ “Borrow” linen infant slept in and place on the pillow at night
- ❑ Encourage skin-skin, Kangaroo Care
- ❑ Next step is non-nutritive “suckling” at the breast
- ❑ Mom must be proactive in asking hospital staff to allow her to provide Kangaroo Care as soon as baby is stable



Transition to Home

- ❏ Mom may have never had a chance to breastfeed her baby until after hospital discharge
- ❏ Observe breastfeeding session or refer to lactation consultant to ensure mom/baby are doing well
- ❏ If still providing fortified pumped BM, slowly transition to breastfeeding & supplementation of fortified (24 kcal/oz) enriched formula 2-3X/d.
- ❏ Feed on demand, but wake infant if > 4hr

Red flags for breastfeeding issues

- ❑ Maternal stress (any mom of preemie!)
- ❑ Single mom, new mom, teenage mom, h/o BF difficulty
- ❑ Meds (ie: sudafed, benadryl) → decr. milk supply
- ❑ Hx breast surgery
- ❑ Flat/inverted nipples
- ❑ Engorgement/breast tenderness
- ❑ Sore, red, cracked, bleeding or blistered nipples
- ❑ **REFER TO LACTATION CONSULTATION!**

Do I have enough milk?

- Amount expressed may be unrelated to actual supply
- Supply is dependent upon frequent and effective sucking
- Let down/milk ejection reflex
- Audible swallows
- Infant satiety
- What comes in must come out → count diapers
- IF SUSPECT DIFFICULTY, REFER TO LACTATION CONSULTANT**



Latch-on Basics

- ❑ Use “C” – NOT SCISSORS hold
- ❑ Large and small breasted mothers
- ❑ Deep, asymmetrical latch
- ❑ “Nipple sandwich”
- ❑ Lips flanged
- ❑ Tongue cupped
- ❑ Nipples round and extended after infant detaches
- ❑ Little to no nipple soreness if latch-on correct



Sore Nipples with Good Latch?

- ❑ Inspect infant's mouth for thrush
- ❑ Is it a "burning" pain on nipples?
- ❑ Are nipples red/cracked?
- ❑ Any shooting pain in ducts?
- ❑ Any hard, red spots?
- ❑ Any chills, fever, general malaise?



Inadequate Intake Due to Fatigue/Poor Endurance

- ❑ Common with congenital heart disease, CLD, BPD
- ❑ Regulate flow: Begin with faster flowing nipple
Watch for ability to coordinate swallowing
- ❑ May require supplemental O₂ during bottle feeds
- ❑ Provide adequate rest breaks
- ❑ Insure protected sleep times b/w feedings
- ❑ Shorter more frequent feeds
- ❑ Notify PMD – may need to increase calories/decrease volume
- ❑ Refer to OT/Regional Center

Fatigue/Poor Endurance on Breast

- ❑ Studies show infants usually have better HR, RR and O₂ saturation while on breast
- ❑ Monitor mother's milk supply/let down time
- ❑ Mom may need to pump to achieve let down; place baby on breast at time of let down to minimize work of feeding
- ❑ Arousal techniques/adequate rest breaks as above
- ❑ One full breast is better than two half breasts!

Moderate to Severe GERD

- ❑ Signs – arching, extension with posturing and crying soon after initiation of feeds
- ❑ Coughing, choking, vomiting or color changes during or after feeds
- ❑ Pulling off breast and screaming during feeding (usually about 5 minutes into breast feeding)
- ❑ Refer to pediatrician/pediatric GI for management – if moderate to severe most likely requires medication
- ❑ Positioning and little movement during/after feeding
- ❑ Breast fed baby can feed in “upright/prone” position
- ❑ **IMPORTANT NOT TO IGNORE** – can disrupt feeding and be a risk for aspiration/apnea!!

Difficult/Refusing to Feed

- ❑ R/O GERD vs. feeding aversion
- ❑ Common in infants with prolonged hospitalization
- ❑ Signs: gagging, crying when touching outside of face, and/or when nipple or spoon presented
- ❑ Facial grimacing, turning away from bottle/food
- ❑ Difficulty tolerating intra-oral stimulation
- ❑ Refer to Regional Center OT for de-sensitization program!



Etiology of Feeding Aversion

- ❑ Unpleasant oral-tactile experiences (ie: ETT tube, suctioning, NGT/OGT during prolonged NICU stay)
- ❑ Delayed introduction of oral feedings
- ❑ Disruption of normal non-nutritive sucking patterns
- ❑ Immaturity or illness
- ❑ Hypersensitivity versus true aversion



Techniques for Oral-Tactile Hypersensitivity

- ❑ Provide pleasant oral experiences (play around mouth, infant's own hand to mouth, etc)
- ❑ Reduce aversive oral-facial stimulation
- ❑ Ensure appropriate trunk, head, neck and hip support
- ❑ Control environment
- ❑ Develop schedule
- ❑ Grade touch
 - Firm pressure: arms, head, face, mouth, gum massage
 - Type stimulation: smooth → soft → unusual → finally prickly
- ❑ Grade Food
 - Hard crunchy, liquid, soft solids, chunky, purees
- ❑ Refer to therapy!

Difficulty with Breathing During Feeding

- ❑ Difficulty coordinating suck-swallow-breathe rhythm
- ❑ Long sucking bursts followed by prolonged rest periods with fast and shallow breathing
- ❑ Inefficient and can be dangerous

ACTION:

- ❑ Provide external pacing
- ❑ Decrease rate of flow: thicker liquid or slower flow nipple

Food Allergy

Food hypersensitivity (allergy):
immunological reaction from
ingestion of a food or additives

Possible Reactions

- Cutaneous: rash, eczema
- Gastrointestinal: colic, bloody stool, diarrhea
- Respiratory: Asthma, runny nose



What to Recommend with Food Allergy in Preterms?

- ❑ **Breastfeeding:** restrict cow's milk, egg, wheat, fish, peanut and tree nuts. If unsuccessful, try hypoallergenic formula.
- ❑ **Formula:** hypoallergenic formula (Nutramigen, Alimentum or Pregestimil)
- ❑ **Soy formula:** not recommended if <1800g; can be tried in term/near term infant; if allergic response, suggest a hypoallergenic formula

Food Intolerance

Food intolerance : non-immunological reaction from ingestion of food or additives (often milk)

Possible Reactions:

Vomiting, colic, diarrhea

Recommendations:

- ❑ Breastfeeding assessment/ adjustments
- ❑ Maternal dairy restriction if breastfeeding
- ❑ Hypoallergenic formula for premature infant; soy formula can be tried in term/near term infants.

	Allergy	Intolerance
Reaction time	Immediate (within 45 minutes)	Intermediate (45 minutes to 20 hours)
Trigger	Trace amounts of protein	Moderate to large amounts of protein
Symptoms	Hives, swelling, rashes, coughing, wheezing, shock, bloody stools	Gastrointestinal - vomiting, diarrhea, colic
Skin-prick test	Positive	Negative
IgE levels	Elevated	Normal
Later effects	Persists for several years; possibly into adulthood	Goes away after infancy
Intervention	BF: maternal restriction of cow's milk, eggs, fish, peanut and tree nuts Formula: Hypoallergenic if born < 1800g/ Soy may work in FT infants, but also common allergen	BF: BF assessment, maternal restriction of dairy Formula: hypoallergenic if born <1800g Soy formula if term/near term

The fun world of infant bowels...



Stool Assessment

Breastfeeding	Formula	Inadequate output 0-6wks	2ndry Lactose Overload
<p>0-6wks</p> <p>Small, frequent, at least one larger 1x/d</p> <p>Yellow, unformed</p> <p>Watery</p> <p>6wks-solids</p> <p>Less frequent stools ~1Qd, can go up to 1 Q3-10d.</p>	<p>Milk based w/ iron: Green, less frequent than BF</p> <p>Hypoallergenic: Frequency similar to BM, green watery stools</p> <p>Soy: hard/firm, green</p> <p>Fe suppl.: may be black</p>	<p>BM: yellow-green</p> <p>No watery component</p> <p>Infrequent/small</p> <p>Larger stools are days apart</p>	<p>Yellow-green</p> <p>Watery</p> <p>Frequent small</p> <p>Frequent copious</p> <p>Explosive</p> <p>Acidic smell</p> <p>Peri-anal burn</p> <p>Unsettled infant</p> <p>Colic symptoms</p>
<p>Urine is colorless to light yellow</p>	<p>Urine is colorless to light yellow</p>	<p>Urine is mid-dark yellow</p>	<p>Urine is colorless to light yellow</p>

Introduction of Solids



Motor Skills for Early Feeding

- Head and trunk control
- Sits with minimal support
- Overall tone: at risk for abnormal tone – hypo versus hypertonic, extraneous reflexes interfere w/feeding
- Position to overcome motor issues



When to Feed Solids?

- 4 - 6 mo. CORRECTED age
- Developmentally ready
- Early introduction ↑ risk for eczema; no nutritional benefits
- Family Hx of allergies: wait until 6 mo.
- Delay in feeding skills may be r/t to prolong hospitalization/VLBW
- Anatomical or neurological abnormalities: poor suck-swallow coordination, GER, gag reflex, etc, (feeding clinic)
- Cardiac or respiratory compromise: difficulty breathing, ↓ endurance (kcal-dense food, ex. cereal mix w/ cal-dense HM of formula), small freq feeds, monitor growth, avoid salty food
- Oral aversion is not uncommon (feeding clinic)

What to Feed the Preterm

Increased risk for Zinc and Iron deficiencies, esp. if mostly BF and/or born ELBW, and not on supplements:

- ❑ Single grain infant cereal, enriched with Iron and Zinc
- ❑ Meat also provides Zinc/Iron
- ❑ Fruits/vegetables high in vit. C improves Iron absorption
- ❑ Wait ≥ 3 d before introduce a new food; add new food group Q 3 - 4wks
- ❑ No fruit juice before 6 mo. corrected age; limit to 4 - 6 oz/d
- ❑ “Neither breastfed nor formula-fed infants require extra water, even in hot climate, dry climate and even when febrile” *Pediatric Nutrition Handbook, 5th ed., AAP, p.111*

A Word about Overfeeding

- ❑ Feeding dynamic between parents and infants is often disturbed with premature birth
- ❑ Parents learn to rely on “cc taken” and “daily wt gained” as reinforcement for adequate nutrition
- ❑ When infant transitions to ad lib feeds and comes home, parents are anxious about intake
- ❑ Most preterms often d/c with wt deficit, tendency is to overfeed/force-feed to help with “catch-up”.

Risks of Overfeeding

- ❑ Not attending to the infant's hunger, satiety or emotional cues, sets the stage for maladaptive feeding behavior.
- ❑ Excessive intake leads to excessive fat deposition.
- ❑ Good catch-up growth occurs over several months to years; not weeks.
- ❑ Excessive wt gain is associated with ↑ morbidity and mortality later in life.



Referral Sources

- Regional Center (by zip code) provides OT and PT evaluation and treatment IN HOME
- Any infant/child with developmental delay or feeding issues due to prematurity or illness qualify
- Access regional center on-line
<http://www.dds.ca.gov/rc/RCLookup.cfm>
- Family needs to call Regional Center to start the process

Case Study for Beatrice

Beatrice's 1st WIC Visit:

Birthdate: Dec. 10, 2005

Gestational Age: 28 wks

BW: 805 g (28.8 oz. **or** 1# 13 oz.)

Mom reports:

Blood in stools when infant started on BM ~ 3 wk;

Part of her intestine resected, on IV for ~ 2 mo;

Difficulty breathing; D/C ventilator 3 mo. after birth;

Head bleed when very little; on seizure medication;

Takes Poly-vi-sol and iron supplement qd

Beatrice's 2nd WIC Visit:

- ❑ BF ~ 2-3x/d; gives formula for other feeds; eats 6x/d
- ❑ Discharged on NeoSure 24; mom switched to soy formula ~ 3 wks ago due to colic
- ❑ Frequent vomiting after feedings
- ❑ Pulls off breast after 5 min. feeding, crying & arching
- ❑ Gets tired ~ 1/2 way thru feeds, breathing faster with weaker suck
- ❑ Mom adds rice cereal to formula to help growth
- ❑ Baby seems to strain during BM; mom stopped the iron supplement last wk
- ❑ Wants to start fruits for fiber
- ❑ Gained ~ 12g/d last mo; 3rd % ile wt/age
- ❑ Mom complains of sore nipples, considering weaning off BF

Questions

1. What is Beatrice's adjusted age?
2. Is growth adequate?
3. Is the feeding regimen optimal? Explain.
4. What will you say about vomiting, cereal in the bottle, colic, or sleepiness during feeds?
5. What will say about iron and constipation or giving fruits?
6. What will you tell mom about sore nipples and weaning from breast?
7. When should you see Beatrice again?