Definitions

- Feeding Disorder - refusal to eat certain food groups, textures, solids or liquids for a period of at least one month
- Dysphagia “Swallowing Disorder” - persistent difficulty with swallowing and moving food from the mouth to the stomach adequately
- Failure to Thrive - insufficient weight gain or inappropriate weight loss
Team Members

- Parents!
- Doctors (primary care, ENT, GI, Neurology, pulmonologist, etc.)
- Speech-Language Pathologists
- Occupational Therapists
- Physical Therapists
- Dietitian
- Nursing
- Lactation Consultants
- Case Workers
- Psychology
Typical Feeding Development

- **Newborn to 1 months**
  - 8-10 feedings per day on average
  - Typically take 1-4 ounces per feeding
  - Sucking is reflexive
  - Suckling pattern (in and out movement of the tongue)
  - Tongue thrust reflex present - tongue may protrude past lips
  - Coordinate suck-swallow-breath (s-s-b) pattern in short bursts
  - Gag reflex present from birth
  - Rooting reflex helps babe locate food source
  - Normal to lose some liquid anteriorly at times
  - Semi-reclined position most typical
Typical Feeding Development

• **2 to 4 months**
  • Typically 6-8 feedings per day
  • Increased volume per feeding - 4-7 ounces on average
  • Coordinate s-s-b pattern in longer sequences
  • Able to feed in a more upright position
  • At ~4 months sucking reflex is lost
    • Sucking becomes voluntary
  • Gag reflex diminishes however still present on back of tongue
  • Rooting reflex lost
  • Tongue thrust reflex lost (prepares babe to accept solids easier)
Typical Feeding Development

• **4 to 6 months**
  - World Health Organization recommends exclusive breastfeeding until 6 months
  - Typically feed 4-8 times per day
  - Introduction of first solids ~6 months
    - Need stability in supported sitting
  - Begin phasic bite
    - bite and release pattern controlled often revert to suckling
Typical Feeding Development

• 6 to 9 months
  • Thicker purees, mashed table foods, beginning cup drinking
  • More relaxed, coordinated tongue allows for less loss of solids
  • Munching pattern begins
  • Long, continuous sucks with cup drinking
    • Lots of anterior loss due to poor coordination
Typical Feeding Development

• **9 months to 1 year**
  • Begin independent feeding with finger foods
  • Formula or breastmilk via bottle (wean after 12 months typically) or cup
  • Mashed and puree foods continue, coarsely chopped table foods enter diet
  • 10 months: remove food from spoon with lips
  • Munching pattern typical however emerging rotary chew (adult like chewing)
  • Able to bite through items
  • Lateralize food left to right and use tongue to bring to center
Red Flags

• Newborn to 6 months
  • Coughing, choking
  • Gurgling or congestions with feedings
  • Watery eyes or look of distress with feeding
  • Difficulty coordinating suck-swallow-breath in a sequence
  • Frequent respiratory infections or pneumonia
  • Arching and refusals to feed
  • Quick transition between states with feeding - immediately falling asleep with feeding
  • Frequent spitting up
  • Prolonged feeding - typical feeding should be less than 30 minutes
  • Poor weight gain
Video poor feeding

Red Flags

• 6 months and older
  • Coughing, choking
  • Gagging or throwing up during or after feedings
  • Difficulty with acceptance of solids or new textures
  • Excessive loss of fluid or food
  • Stuffing mouth
  • Pocketing food for long periods of time
  • Frequent respiratory infections
  • Avoidance of textures
  • Difficulty with chewing
  • Poor weight gain
  • Social difficulties related to food (isolating or avoiding)
  • Prolonged feeding
  • Refusals
High Risk Conditions for Poor Feeding

- Respiratory
- Airway Anomalies
- Congenital Heart Defects
- Craniofacial Defects
- Gastrointestinal Difficulty/Defects
- Maternal/Perinatal
- Neurological
Nutritional Red Flags

• Not meeting age appropriate growth velocity or noted weight loss x 2 office visits (? 2 months)
• Delay of introduction of age appropriate solids d/t gagging, choking or refusal
• Cow’s milk protein allergy (bloody or mucus stools) or multiple food allergies
• Global delays surrounding feeding:
  • poor trunk or head control
  • weak or poor suck and swallow
  • low tone
Nutritional Red Flags

• Unable to meet energy/nutrient demands with oral intake
• Reflux like symptoms:
  • Extremely fussy and irritable surrounding feedings
  • Excessive emesis or spitting up
  • Arching back and turning away from bottle
  • Oral aversion
• Medically Complex Infants:
  • Syndrome/metabolic disorders
  • Cleft, cystic fibrosis, Congenital Heart Disease, Cerebral Palsy
  • Patients requiring enteral support
Referrals

- Early referral always best!
- All major Montana cities have feeding specialists/teams (some smaller communities may as well)
- Evaluation may be with OT or SLP depending on facility and difficulties
- Dietitians with pediatric experience are limited in the state
  - may need out of town referral
Evaluation

• Bedside swallow evaluation (BSE)
  • Completed in clinic or patient’s room
  • Visual observation of feeding
  • Determines treatment plan or need for further evaluation

• Videofluoroscopy Swallow Study (VFSS)
  • Completed with SLP and radiologist
  • Video X-ray of swallowing function
  • Able to identify if dysphagia present
  • Allows for further information treatment plan
  • Able to determine if thickening liquids necessary (DO NOT thicken without VFSS!)
Changes that may be considered

- Flow rate change for bottle feeding or pumping prior to breastfeeding to reduce flow
- Positioning changes
- Reflux Precautions
- Pacing
- Thickening
- No oral feedings/oral stimulation plan
Flow Rate Change

- Not all slow flow bottles are slow!
  - Significant variation in rate which the milk is delivered via nipple
  - Studies of flow rate recently began to appear in literature (2013 Jackman was first)
  - Britt Pados; Kelli Jackman studies
    - Used Medella breast pump to stimulate babies suck
    - Measured milk transferred in 1 minute time (averaged 3 to 50 trials)
    - Formulated flow rate based on average
Positioning Changes

- Increase or decrease in elevation
- Reflux precautions
Pacing

-Externally imposed pause breaks during feeding
-Go on cues of babe
-Assist babe in coordinating suck-swallow-breath pattern
-Do not remove bottle, tilt downward to stop flow
Thickened Liquids

• Last resort!
• Nectar and honey thick consistencies
• Unfortunately can not thicken breast milk 😞
• ONLY thicken after preformed on VFSS
  • Can increase risk for aspiration
• Standard of care for infants below 1 year is thickening with rice cereal
  • Needs to be preformed with each member of the team giving input including dietician, SLP and MD
  • Beech Nut anecdotally found to mix better with fewer clumps
National Dysphagia Diet: Thickened Liquid Levels

- Nectar-like
- Honey-like
- Pudding (spoon) thick

(McCullough, et al, 2003)
Nutritional Considerations when Thickening

• Standard Nutrient Distribution
  • Standard breast milk and formula concentrations = 18-20 kcal/ounce
  • Breast milk: 40% carbohydrate, 8% protein, 52% fat
  • Formula: 42% carbohydrate, 8% protein, 50% fat
  • Rice Cereal: 92% carbohydrate, 8% protein, 0% fat
  • Osmolality: BM = 290 mOsm; Formula = 310 mOsm
Nutritional Considerations when Thickening

• How adding rice cereal for thickening alters nutrients and calories
  • 19 kcal/oz Sim Advance mixed to **nectar thick consistency**
    • Changes calories to ~25 kcal/oz formula
    • Changes nutrients to 53% carb, 7% protein, 40% fat
    • Changes osmolality to 395 mOsm (<400 goal)
  • 19 kcal/oz Sim Advance mixed to **honey thick consistency**
    • Changes calories to ~32 kcal/oz formula
    • Changes nutrients to 58% carb, 6% protein 36% fat
    • Changes osmolality to 505 mOsm (<400 goal)
Nutritional Considerations when Thickening

• Increase in renal solute load = increase risk dehydration
  • Be aware of recipe and concentration – RD assistance
  • Increases constipation, cramping, fussiness can then lead to decrease in intake/volume

• Increases iron load
  • May or may not be a good thing
  • Consider adjusting vit/min supplementation

• Can specialized pre-thickened formulas be used for swallowing?
  • Similac for Spit-up vs Enfamil AR
  • NO!!!! 😞
Nutritional changes that may be considered

• Change Formula
  • Standard Infant – Enfamil, Similac
  • Lactose Free – Sim Sensitive,
  • Lactose Free partially broken down proteins- Gentlease, Total Comfort
  • Hydrolyzed Protein – Alimentum, Nutramigen, Pregestimil
  • Free AA-based – Elecare, Neocate, Alfamino
  • Others- Neosure, Enfacare, Spitup

• Change formula concentration
  • Standard concentration 19-20 kcal/oz
  • Increase from 22-30 kcal/oz
Nutritional changes that may be considered

- Change in Breast milk Fortification
  - Using powder formula or modular
  - Increase from 20-30 kcal/oz
  - Hind milk
- Change in Feeding Schedule
  - Small frequent feeds - Q 2 hr
  - Ensure babe wakes for night feeding
  - May offer bottle after Breast feeding
- Recommend initiation of solids/puree or addition of healthy fats to solids to maximize nutrients
Case Study #1

- 37 week male born at 1785 grams (~3 pounds, 14 ounces)
- Pregnancy complicated by Sub chorionic hemorrhage, poor fetal growth and asymmetrical IUGR
- Born via repeat C-section and transferred to mother baby
Case Study #1

- Day 2 of life noted to have poor feeding with breast and bottle, watery eyes, arching with feeds
- Bedside evaluation ordered
- Signs of aspiration including watery eyes, desats with feeding, arching lead to VFSS
- VFSS = silent aspiration with all consistencies, bottles, positions tried
- NICU admit
- Repeat VFSS 2 weeks later with same results
- G-tube placement prior to hospital discharge
- Home with oral stimulation plan and OP follow-up
Case Study #1

- Repeat VFSS 6 weeks post discharge
- Safe for small volumes of thin via ULTRA preemie nipple
- Signs of aspiration including throat clear, watery eyes
- Started with 20 cc thins 3x/day; 1x/day dry breast
- Follow-up every 2-3 weeks to ok increasing volumes
- Continued to work on breastfeeding
- By d/c from OP babe was taking breast or fortified bottle at all feeds; continued G-tube supplementing at night for growth
Case Study #2

• 30.6 week male born at 1499 grams (~3 pounds, 3 ounces)

• Delivered by emergent C-section due to decreased reactivity of Twin in utero

• Placed on CPAP due to respiratory difficulty immediately after birth and transported to NICU
Case Study #2

• Oral feeding initiated after CPAP wean; ~35 weeks gestational age (GA)

• Noted to have consistent oxygen desaturations both related and unrelated to oral feeding

• Per NICU protocol, feeding evaluation was conducted and infant was placed on a specialized feeding plan* with reflux precautions

• Unable to conduct VFSS due to prematurity, and infant’s GA under 37 weeks

• Tested for Beckwith-Weidemann Syndrome (BWS) in ~ week 4-5 of life after Twin’s BWS diagnosis was confirmed; infant’s Dx of BWS was also confirmed
Case Study #2

- VFSS conducted at 38 weeks GA given signs of instability and high risk of silent aspiration associated with BWS

- VFSS confirmed silent aspiration with thin and ½ thin-1/2 nectar thick consistencies, despite, bottles, positions tried

- Safe to orally feed in side-lying position, with nectar thick liquid and Dr. Brown level 2 nipple

- Repeat VFSS 3 weeks later in order to assess for advancement to thin liquids before hospital discharge; no functional changes noted

- Discharged from hospital on full oral feeding: Nectar thick liquid taken with Dr. Brown level 2 nipple
**Specialized Feeding Plan (VFSS)**

- Offer oral feeds using Nectar thick liquid with Dr. Brown level 2 nipple
  - For NTL: add 1 TBSP Beechnut Rice cereal to 2 oz formula

- Feed in side-lying position

- Avoid chin-cheek support as it may interfere with oral motor development and contribute to maladaptive feeding behaviors

- Stop feeding at first sign of aspiration, fatigue, distress

- Reflux precautions as able: Hold upright after feeding; elevate HOB, Right side-lying for first hour after feed, L side-lying for second hour
*Specialized Feeding Plan (BSE)*

- Offer no more than 20mL EBM via Dr. Brown preemie nipple
- Gavage remaining volume via NG
- Feed in side-lying position
  - Avoid chin-cheek support as it may interfere with oral motor development and contribute to maladaptive feeding behaviors
- Stop feeding at first sign of aspiration, fatigue, distress
- Reflux precautions as able: Hold upright after feeding; elevate HOB, Right side-lying for first hour after feed, L side-lying for second hour
Questions???