PEDIATRIC FEEDING DISORDERS

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Learning Objectives

- Recognize developmental tasks of infants and young children as they pertain to acquisition of feeding skills and behaviors.
- Identify infants/young children at risk for the development of feeding disorder
- Recognize parent/child feeding behaviors that suggest feeding problems.
- Demonstrate history taking and counseling skills intended to prevent or treat pediatric feeding disorder.
Definition: Pediatric Feeding Disorder

- Problems in a broad range of eating activities that may or may not be accompanied by difficulty with swallowing food and liquid.

Common Feeding Disorders

<table>
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<tr>
<th>Adipsia</th>
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<td>Dysphagia</td>
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<td>Food refusal</td>
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Pediatric feeding disorders. Manikam R; Perman JA
Prevalence of Feeding Disorders

• In the pre-school years feeding related concerns are among the most common issues presented to the pediatrician by parents

• Mild-moderate feeding disorders
  - 25-35% of children with normal development
  - 33-80% of children with developmental disabilities

• Severe feeding disorder
  - 3-10% of children with normal development
  - 26-90% of children with physical disabilities
  - 10-49% of children with medical illnesses and/or prematurity
Clinical consequences of Feeding Disorders

- Growth failure (FTT, PD)
- Susceptibility to acute/chronic illnesses
- Personal or familial distress
- Over-nutrition

- Social or developmental risk
- Cognitive impairment
- Significant nutritional deficiencies
- Death

Untreated pediatric feeding disorders can lead to life-long eating problems that affect physical and psychological health and difficulty with relationships.
Etiologies of Feeding Disorders

**Multi-factorial**

- Medical
- Nutritional
- Behavioral/Psychological
- Environmental

All children are at risk of developing behavioral problems regardless of initial underlying causes of feeding disorders; behavioral/psychological associated feeding disorders can persist even after the underlying organic problems resolved.
Etiologies: Medical

- **Structural abnormalities**
  - Anatomical defects of the palate, tongue, jaw, and esophagus

- **Neurological problems**
  - CNS associated or musculoskeletal disorders

- **Metabolic dysfunction**
  - Conditions interfering the development/maintenance of normal feeding patterns

- **Digestive disorders**
  - Insult or dysfunction of the digestive system
  - Medications affecting appetite and GI function

- **Cardiorespiratory problems**
  - Conditions compromising the cardiovascular and respiratory systems and complicating the coordination of Suck Swallow Breath during feeding


Structural Abnormalities

- **Naso-pharyngeal obstruction**
  - Disruption in nipple feeding at breast or bottle
- **Open mouth posture**
  - Nasal breathing or hypotonia
- **Cleft palate**
  - Food and liquid entering the naso-pharynx
- **Tonsil and adenoid hypertrophy**
  - Partial airway obstruction with mouth breathing and snoring
  - Food may get caught in tonsils
- **Mandibular hypoplasia (micronathia)**
  - Retracted tongue
- **Asymmetric facial features**
  - May be indicative of stroke or other neurological insult
Neuromuscular & Developmental Disorders

- Hypotonia
  - Poor postural control for feeding
  - Weak oral structures

- Muscular spasticity
  - Poor hand coordination
  - Poor range of motion
  - Dystonia

- Oromotor dysfunction

- Dysphagia

- Sensory processing disorder
  - Hypersensitivity increases postural tone and reflexes
  - Hyposensitivity can affect swallowing, diminish taste and smell acuity
  - Contributes to oral motor disorders
  - Interferes with feeding skill development and motivation
  - Common in Autism Spectrum Disorders

- Lack of communication
Common digestive disorders associated with feeding difficulties

- Dysphagia
- Aspiration
- Constipation
- Celiac disease
- Motility disorders
- Hirschsprung disease
- Short bowel syndrome
- Food allergy intolerance
- Gastroesophageal reflux

Pediatric feeding disorders.
Manikam R; Perman JA

Other Digestive disorders associated with feeding difficulties

• Silent GER
  - Food refusal, limited food intake due to pain, discomfort without spitting up or vomiting

• Eosinophilic Esophagitis
  - Consider if medical/dietary treatment of GER or food allergy is not effective—diagnosed by endoscopy
  - Can result in food impaction and dysphagia
Definition: Dysphagia
Problems in one or more phases of the swallow

1) Initial phase- voluntary control
   a. The mouth receives solids and liquids
   b. Lips & jaw closes to seal the mouth.
   c. Saliva is produced in response to senses (sight, smell, taste, texture) of solids/liquids.

2) Oral phase- voluntary control
   a. Bolus formation
   b. Food bolus transfer posteriorly ending with initiation of the pharyngeal swallow

3) Pharyngeal phase
   a. Initiation of the swallow under voluntary control
   b. Transfer of bolus into the esophagus

4) Esophageal Phase
   a. From opening of the upper esophageal sphincter through the lower esophageal sphincter under involuntary control
Dysphagia

Swallowing requires the coordination of 25 muscles and 5 cranial nerves. Any one or more of these stages in the swallowing process can become impaired and result in dysphagia.
## Causes and mechanisms of feeding difficulties by anatomic location

<table>
<thead>
<tr>
<th>Organ system</th>
<th>GI/organic disorder</th>
<th>Mechanism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mouth</td>
<td>Malocclusion</td>
<td>Pain, high effort to chew</td>
</tr>
<tr>
<td>Pharynx</td>
<td>Aspiration</td>
<td>Pain, choking, gagging</td>
</tr>
<tr>
<td>Esophagus</td>
<td>Reflux</td>
<td>Pain, burning sensation</td>
</tr>
<tr>
<td>Stomach</td>
<td>Motility disorder</td>
<td>Reduced appetite, discomfort</td>
</tr>
<tr>
<td>Colon</td>
<td>Constipation</td>
<td>Pain, reduced appetite, discomfort</td>
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</table>

GI, gastrointestinal.

*Pediatric feeding disorders.*
Manikam R, Perman JA

Prematurity & Illness

- Oral aversion caused by
  - Invasive oral procedures
  - Lack of internal hunger/satiety cue
  - Lack of exposure to oral intake especially during the critical period of feeding skill development (6-12 months of age)
  - Delayed re-introduction of oral feeding
  - Medical complications
  - Nausea, vomiting

- Late term premies
  Underappreciated feeding problems due to initial competence in feeding and lack of medical complications
Etiology: Nutritional

- **Inadequate or excessive consumption of nutrients**
  - Inappropriate types/textures
  - Inappropriate liquid/solid ratio
  - Poor exposure to food variety
  - Use of supplements

- **Developmentally inappropriate diet**
  - Feeding skill deficits

- **Unstructured meal**
  - Feeding/eating habits interfering hunger/satiety cue (appetite)
  - Grazing
Etiology:
Behavioral/Psychological

- Negative feeding behavior shaped and maintained by internal/external reinforcement
  - Selective food refusal
  - Gagging, choking, emesis
  - Rumination

- Emotionally based difficulties
  - Phobia
  - Conditioned emotional reactions
  - Depression
  - Temperament

- Psychosocial difficulties
  - Poor environmental stimulation
  - Dysfunctional feeder-child interaction
Etiology: Environmental

- **Caregiver competence**
  - Parent mental illness
  - Parent knowledge deficits
  - Maladaptive nutrition beliefs
  - Non-nurturing parenting

- **Systemic constraints**
  - Poverty
  - Family stressors
  - Multiple feeders

- **Problematic interaction/management**
  - Limit setting difficulties
  - Cue insensitivity
  - Distracting or unsupportive feeding environment
A biological-psychological-social model of feeding disorders

- Gastroesophageal reflux → Esophagitis
- Food avoidance → Fighting, crying, gagging, vomiting, spitting, turning head, tantruming, pushing food away, throwing food
- Parental responses → Inappropriate textures, food selectivity, escape from meals, forced feeding

Pediatric feeding disorders. Manikam R; Perman JA
Feeding Disorder in Healthy Children

- Children with no clear physiological precursor or developmental delay are not immune to feeding disorder.
- Feeding issues may continue in children whose organic issues are resolved.
- Behavioral issues arise due to disrupted family functioning and maladaptive patterns of reinforcement.
Potentially problematic feeding practices

- lack of structure conducive to eating with unrestrained access to food or irregular mealtimes
- exposure to developmentally inappropriate textures, and/or parental modeling of inappropriate eating habits
- learned behaviors whose function is to escape unpleasant feeding experiences and/or gain attention from caregivers
Inadvertent reinforcement of problem behaviors

- Positive reinforcement
  - caregiver attention for inappropriate behavior
  - “stop playing and eat”, “you need to eat”, “you won’t get dessert if you don’t eat your dinner”

- Negative reinforcement
  - removing food and/or ending meals due to problem behaviors may inadvertently shape and strengthen problem behaviors.

- Behaviors tend to become more frequent or intense

- May lead to greater efforts by caregivers to manage problem behaviors.
Possible functions of maladaptive feeding behaviors

<table>
<thead>
<tr>
<th>Functions</th>
<th>Behaviors</th>
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<tbody>
<tr>
<td>Avoidance</td>
<td>Refuse to be seated in the high chair to elude food aversion</td>
</tr>
<tr>
<td>Escape</td>
<td>Expel food presented to eliminate taste or texture aversion</td>
</tr>
<tr>
<td>Attention</td>
<td>Display inappropriate behaviors for the sympathy it gets (e.g., emesis)</td>
</tr>
<tr>
<td>Reinforcement</td>
<td>Increase inappropriate behaviors for the satisfaction derived (e.g., rumination)</td>
</tr>
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Healthy Children Need Intervention Too

• Critical developmental experiences are circumvented or severely disrupted
• Without direct intervention, this pattern is likely to increase in frequency and severity over time
Identification of Feeding Disorders
History Taking & Rationale

• How long does it take to feed the child?
  - Prolonged feeding duration is a primary marker for feeding problems (>25-30 min on a regular basis)

• Is the child totally dependent upon other for feeding?
  - Children who are not feeding independently but should be typically present with significant neuro-motor disability

• Does the child refuse food?
  - Can indicate physiological problems, oral sensori-motor deficits, or disordered parent-child interaction
  - Refusal may manifest as clamping the mouth shut, turning head away, hitting the spoon or feeders arm, spitting food out, gagging and vomiting purposefully.

• Are mealtimes stressful?
  - Forced feeding may result when parents are frustrated
History Taking & Rationale

• Has the child slowed or stopped gaining weight?
  - Steady and appropriate weight gain is critical for growth and brain development particularly in the 1st 2 years of life.

• Are there signs of respiratory distress?
  - Development of congestion as a meal progresses and a gurgly or raspy voice quality may indicate aspiration

• Does the child vomit regularly? When?
  - Vomiting tends to be a negative experience

• Does the child become irritable or lethargic during mealtimes?
  - Irritability may signal GI discomfort, airway problems or behavioral issues
  - Lethargy or sleepiness may result from fatigue, sedating medications or seizure activity.
History

- Medical History
- Family Medical History
- Psychosocial History
  - Caregiver depression
  - Family functioning/stressors
- Diet History
  - Feeding history especially during sensitive periods of feeding skill development
  - Dietary intake
    - Quantification of caloric liquid intake
    - Food texture and variety
    - Meal/snack frequency and timing
    - Self feeding
Intervention for Behavioral Aspects of Feeding Disorders

• Differential reinforcement (DRA)
  - Positive reinforcement contingent upon appropriate eating behaviors (staying at table, taking bites/sips, tasting/eating novel foods…
  - Ignoring inappropriate response such as chatting, playing, not taking bites

• Escape extinction (EE) procedures
  - Targets food avoidance behaviors
  - Eg. Present food on spoon and patiently wait for child to accept it followed by positive reinforcement
  - Ignore pocketing or expelling of food and give positive reinforcement for swallowing food.
Pediatrician Intervention for Feeding Disorder in Healthy Children

• Structured mealtimes
  - 3 meals, 1-2 snacks
  - 20-30 minutes maximum duration

• Limit caloric beverages
  - 16 oz milk or substitute - Couple oz. at each meal
  - ≤ 6 oz juice - serve only at mealtimes
  - Water only for thirst between meals/snacks

• Provide variety
  - Variety of food groups
  - Variety of food within groups
  - Small amounts of preferred food with novel food

• Differential Reinforcement & Escape Extinction

• Non-stressful, non-threatening mealtime environment and family meals without force feeding

• Child should have appropriate seating at family meals
**Intervention Cont’d**

- **Meal characteristics**
  
  To provide sufficient calories and nutrients through well-balanced food selection and developmentally appropriate foods for optimal growth and development

1) Developmentally-appropriate menu
   - Types of foods
   - Portion of foods

2) Repeated exposure of new foods and textures
   - Type of foods
   - Texture of foods
<table>
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<tr>
<th>Age (mos)</th>
<th>Oral Motor Skill</th>
<th>Self-feeding Skills</th>
<th>Texture Transition</th>
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</table>
| Birth     | • Reflexively turns head toward breast or bottle when mouth or cheek is touched  
          | • Automatically sucks when something is placed in the mouth | • Spontaneously initiates latching and extraction of milk when presented with breast or bottle |                      |
| 1-2       | • Suckling is stronger  
          | • Infant moves tongue forward and back in the mouth |                  |
| 2-4       | • Corner of lips are more engaged in sucking  
          | • Infant initiates better head control  
          | • Mouth opens in anticipation of nipple  
          | • Tongue protrudes (tongue thrust) | • Reaches for objects including food and utensils while being fed |
| 4-6       | • Sucking becomes more voluntary  
          | • Better trunk control  
          | • Early munching pattern emerges (pre-chewing)  
          | • Moves tongue outward voluntarily  
          | • Puckers and smack lips together | • Breast/bottle recognition  
          | • Puts hands on bottle or breast | Introduction of complimentary feeding-Thin puree initially  
<pre><code>      | | *(Courtesy of Nancy Calamusa, MA, CCC/SLP)* |
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<tr>
<td>6-8</td>
<td>• Lips can close around the spoon</td>
<td>• Sits without support</td>
<td>• Continues with solid food variety</td>
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<tr>
<td></td>
<td>• Chewing begins (vertical movements)</td>
<td>• Holds bottle/breast</td>
<td>• + progression</td>
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<tr>
<td></td>
<td>• Tongue begins to move side to side</td>
<td>• Plays with spoon</td>
<td>• Soft, small finger foods</td>
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<tr>
<td></td>
<td>• Munching pattern continues</td>
<td>• Initiates bringing food to mouth</td>
<td>• Offer fluids from cup</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Begins to sip from cup</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Can hold and release objects</td>
<td></td>
</tr>
<tr>
<td>8-10</td>
<td>• Biting emerges</td>
<td>• Begin to finger feed</td>
<td>• Increase texture from strained to lumpy</td>
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<tr>
<td></td>
<td>• Independent tongue movements</td>
<td>• Can hold bottle</td>
<td>• Begin finely chopped or mashed table food</td>
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<tr>
<td></td>
<td>• Can move from center of tongue to sides</td>
<td>• Sips from cup</td>
<td>• Fluids from a cup</td>
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<tr>
<td></td>
<td>• Can close lips</td>
<td></td>
<td></td>
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<tr>
<td>10-12</td>
<td>• Rotary chewing emerges</td>
<td>• Begins to hold cup</td>
<td>• Begin small finger foods</td>
</tr>
<tr>
<td></td>
<td>• Lips close when swallowing</td>
<td>• Finger feeds holding food with pincer grasp</td>
<td>• Chopped table foods (soft, munchable)</td>
</tr>
<tr>
<td></td>
<td>• Can lick food from lower lip</td>
<td>• Begins to bite food with central incisors</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Better lip and tongue control</td>
<td>• Begins self feeding</td>
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| 12-15       | • Can take consecutive sips  
               • Mature rotary chewing develops | • Drinks from a cup at all meals  
               • Spoon handling improves | • Continue to advance textures  
               • Initiate weaning from bottle  
               • All liquids from cup |
| 18-36       | • Oral movements are developed for all feeding functions | • Maturation of skills continues | • Masters regular table food textures  
               • All liquids via cup  
               • Avoid food items that are a choking risk |
| 36+         | • All primary oral skills needed for adulthood are achieved | | |
Intervention Cont’d

Feeding schedule
To establish appropriate internal cue of hunger and satiety (appetite) through systematic control of feeding patterns.

1) Frequency of feeding
   Structured meal plan
   Modified feeding schedule if needed.

2) Duration of feeding
   Short VS Long mealtime
Intervention Cont’d

Setting characteristics

To create optimal physical settings in order to make feeding pleasant, safe and effective for appropriate intake.

1) Environment of feeding
   - Stimulus control (Decreased distraction)

2) Feeding position & body support
   - Secure, well-balanced posture

3) Activities before & after feeding
   - Less excitement premeal
   - Postmeal activities as a positive reinforcement
Intervention Cont’d

Interactions

To improve parental response to child’s hunger & satiety cue and to establish parental skill in appropriately responding to desired/undesired behaviors.

1) Reciprocity in feeder-child interactions
   Accurately interpret child’s signs
   Accurately respond to each sign

2) Contingency of interactions
   Modified attitudes depending on child’s eating behavior
Intervention Therapy: Decision making

- Is feeding intervention medically necessary?
- Is the child ready to transition?
- Are the caregivers receptive to interdisciplinary intervention?
- Are resources available for intervention to have a reasonable chance of success?
Intervention for Moderate to Severe Feeding Disorders-Referral

Interdisciplinary Feeding Team: Members

- OT, SLP
- Behavioral psychologist
- Dietitian
- Pediatrician
- Nursing
- SW
- PT
Interdisciplinary Feeding Team: Management

- Inpatient VS Outpatient
- Meal characteristics
- Feeding schedule
- Setting characteristics
- Interactions
Intervention Therapy: Components

- Nutrition support (tube feeding)
  - Adequate intake of energy & nutrients
- Normalization of hunger/satiety cycles
  - Adjustment of timing and amount GT feeding
- Normalization of oral-tactile*
  - Desensitizing oral sensitivity
- Behavioral management
  - Reinforcers and rewards
Intervention Therapy: Components

- Adaptive feeding devices
- Thickened beverages and texture modification
- Empirical trial of acid suppression
  - Consideration for silent reflux
- Prevention of constipation
Intervention: Outcome Measures

- Weight gain
- Solid and liquid intake
- Use of tube feeding
- Type of oral diet (variety and texture)
- Feeding-related behaviors
- Family’s stress
Case Study

You are meeting a 16 month old caucasian male who has transferred to your practice. He presents with chief complaint of feeding difficulty and poor weight gain.

• Discuss appropriate history taking to investigate this problem
What is your assessment of this patient's feeding
What feeding problems have you identified:

- Consider the following

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What is your Diagnosis
What are your next steps?

What is your rationale for your recommendations?
Feeding Therapy Evaluations

• Poor oral motor strength
• Poor lateralization of the tongue
• Developmentally inappropriate chewing pattern—munching
• Oral defensiveness
• No evidence of aspiration
• Feeding therapy recommended
  - Decrease oral defensiveness
  - Strengthen oral motor structures
  - Improve coordination of oral motor skills
  - Normalize feeding behavior and decrease family stress.
References

6. [www.dysphagiaonline.com](http://www.dysphagiaonline.com) accessed on 11/27/03.
7. [www.gerd.com](http://www.gerd.com) accessed on 11/27/03.


