Nourishment concerns

Failure to thrive
Diarrhea
Constipation
Obesity

Failure to thrive

• Definition
  – rate of weight gain <2 SD during an interval of 2 mo or longer if <6 mo of age or during an interval of 3 mo or longer if >6 mo of age
  – weight for length for age is <5%ile

• Need to accept that these criteria are not ideal for either specificity or sensitivity

Failure to thrive

• Infants < 3 yo who are judged to gain inadequately in wt or wt & length
• term applies to growth failure that results from inadequate energy intake without underlying disease or abnormality

Failure to Thrive Risk Factors

• Decrease in weight velocity
• Downward crossing of at least two growth channels on a standard growth chart—commonly concurrent with decrease in length and OFC velocity
• Estimated ideal body weight for height age 90% or lower
• Any one or combination of factors describes a child at risk for FTT & should be evaluated

Failure to Thrive Risk Factors

• Non-organic risk factors
  – sickly, difficult child
  – isolated, overwhelmed mother
  – emotionally distant or unavailable father
  – disordered feeding situation resulting in inadequate energy intake or retention
  – impoverished or problematic nonfeeding interaction
  – social environment or loss, stress, or poverty

Failure to Thrive Risk Factors

• Organic risk factors
  – congenital anomalies
  – postnatal medical illnesses
  – major illness
  – organ system failure
Possible causes of poor growth

• Genetic
• Poor nourishment
• Poor parent-child interaction
• Poor feeding skills/oral motor problems

Nutrition ‘risk’ parameters in children

• Medical
• Physical/motor
• Environmental
• Food intake

Medical ‘risk’ issues

• Syndrome and disease entities which:
  – increase or modify nutrient/energy needs
  – interaction of medications and nutrients
  – constipation
  – diarrhea

Motor ‘risk’ issues

• Oral motor dysfunction when eating
• making the transition from tube to oral feeds
• lack of self-feeding
• athetosis, increased energy requirements
• accepts only a limited range of textures

Environmental ‘risk’ issues

Parents are:
• anxious/concerned about what & how the child eats
• set up a daily buffet of snacks
• not bonded with child
• overly fastidious about self-feeding
• infantilize the child
• have unrealistic expectations about self-feeding
• don’t know what the child eats
• try to force feed
• don’t recognize cues of hunger or satiation
• reinforce not eating

Food intake ‘risk’ issues

• large appetite -eats too much
• picky, finicky appetite -eats very little
• dependence on a single or a few foods
  – juice, noodles, some fruit
  – kool-aid, French fries
  – apples, chicken
• consumption of large volume of liquid
  – 64 oz apple juice
• excessive intake of sweet foods or crunchy, salty foods
Assessing depressed appetite—truly depressed vs transient phenomena of toddlers

• What is total nutrient intake?
• Is rate of growth typical despite apparent lack of appetite?
• Is child reinforced for not eating rather than eating?
• How do parents react when child refuses to eat?
• I positive reinforcement for eating used appropriately?
• Is child tired at meals?
• Is the child offered too many snacks?
• Is the child overwhelmed by the demands on eating?
• Is the child overwhelmed by the foods?

Failure-to-thrive in Seattle

• Total admits: 1100
  – Admits w FTT: 50
• Total NB admits: 336
  – NB admits w FTT: 5
• Total non-NB admits: 764
  – Non-NB w FTT: 45

Classification:
– 1. Inadequate pro/energy intake
– 2. Maternal-infant problems above nourishment
– 3. Organic causes of various etiology

Incidence by Type

<table>
<thead>
<tr>
<th>Type</th>
<th>NB FTT</th>
<th>NNb FTT</th>
<th>Total</th>
<th>%</th>
<th>TOTAL</th>
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<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>13</td>
<td>15</td>
<td>30</td>
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<tr>
<td>2</td>
<td>2</td>
<td>14</td>
<td>16</td>
<td>32</td>
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<td>3</td>
<td>1</td>
<td>18</td>
<td>19</td>
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<tr>
<td>Total</td>
<td>5</td>
<td>45</td>
<td>50</td>
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Differentiation of organic from non-organic FTT

• 3 groups of infants, 6-16 mo
  – N=8, non-organic FTT
  – N=10, organic FTT
  – N=7, normally grown, hosp. For medical reasons

Method:
– 1-7 point scale of approach withdrawal to monitor brief social interactions

Results
– Non-organic FTT children prefer distant social interactions and inanimate objects
– Organic FTT children & medically ill contrast groups consistently responded to close personal interactions

FTT: SES, intake & mother-child interaction

• Criteria:
  – >2500 gm
  – >36 wks gest
  – no birth complications
  – No organic cause for growth retardation
  – maternal ht >5’1”

• N=30 children, 12-59 mo old
• Study group: <3rd%ile for ht
• Contrast group: 25%ile for ht

• Contrast families had better living conditions
• Contrast had subtle nutrient advantage
• Mother-child interaction using HOME
### FTT: SES, intake & mother-child interaction

<table>
<thead>
<tr>
<th>Study</th>
<th>Contrast</th>
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<tr>
<td>Overall</td>
<td>70%</td>
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<tr>
<td>Development &amp; vocal stim</td>
<td>74%</td>
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<td>Emotional climate</td>
<td>55%</td>
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### Biochemical tests in FTT evaluation
- Complete blood count (CBC)
- Urinalysis (UA)
- Urine culture
- Blood urea nitrogen, creatinine
- Free erythrocyte protoporphrin (FEP)
- Stool pH, reducing substances, occult blood, ova, and parasites
- Albumin, prealbumin, transferrin
- Alkaline phosphate
- Sweat chloride

### Management of FTT

### Common causes of acute diarrhea
- Infection
  - bacterial - salmonella, etc
  - Parasitic - giardia
  - viral - rotavirus is causative agent for >50% of hospitalizations of infants with diarrhea
  - medication reaction - antibiotics
- Food intolerance or overfeeding
- Nonspecific diarrhea of infancy-childhood equivalent of irritable bowel syndrome
- Poisoning - iron, insecticides

### Common causes of chronic diarrhea
- CHO intolerance (lactase deficiency)
- Food/formula intolerance or improper formula preparation
- Nonspecific diarrhea of infancy
- Parasitic infections
- Celiac disease
- Cystic fibrosis
- Immune deficiencies
- Inflammatory bowel disease
- Short gut syndrome
- Constipation with encopresis
- Pseudomembranous colitis related to antibiotic use

### Chronic non-specific diarrhea: excessive fluid intake
- N=105 toddlers
- N=85, no evidence of malabsorption
- Criteria: diarrhea for >3 weeks, normal growth, no enteric pathogens
- Non-protein fluid intake = 196 ±32 ml/kg/day
- E.g. 2 yo child at 12 kg = 2250+ ml fluid/day
Chronic non-specific diarrhea: excessive fluid intake

- Treatment: limit juice to 90ml/kg/day with no other change in diet
- e.g. 2 yo child at 12 kg = 1000+ ml fluid/day
- FU at 2 wks & 8 wks
  - ↓ stool frequency from ~10/day to ~3/day
  - ↑ consistency of stools
- Hypothesis: intake of fluid exceeded absorption capacity of intestine

Chronic diarrhea if childhood and use of elimination diets

- N=4, age 3-18 mo
- suspected milk protein sensitivity
- used milk substitute which became primary nutritional source
- Developed protein-energy malnutrition in 6 weeks to 18 mo
  - hypoproteinemia
  - edema
  - hepatic abnormalities

Chronic diarrhea if childhood and use of elimination diets

- Differential diagnosis for chronic recurrent diarrhea

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<td>Post-infective diarrhoea</td>
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<td>22</td>
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<tr>
<td>Milk allergy</td>
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<td>6</td>
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<tr>
<td>Primary motor neurone deficiency</td>
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<td>5</td>
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<td>Other deficiencies</td>
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<td>6</td>
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Chronic diarrhea if childhood and use of elimination diets

Energy source & distribution of milk substitute

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<tr>
<th>Nutrient</th>
<th>Source</th>
<th>% of total energy</th>
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<tr>
<td>Fat</td>
<td>Soybean oil</td>
<td>22%</td>
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<td>Polyunsat</td>
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<td>47%</td>
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<td>Other</td>
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<td>CHO</td>
<td>Corn syrup</td>
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<tr>
<td>Protein</td>
<td>Soy protein</td>
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Chronic diarrhea if childhood and use of elimination diets

Diagnosis and management of constipation
For long-term growth and wellness of young children:

Reasonable

– intake of nutrients - protein, energy, calcium, iron, fiber
– quantity of food
– quality of food
– social environment
– interpersonal interaction
– consider how children ‘see’ food