Picky Eaters: Nutritional Needs in Childhood

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Objectives

- To recognize the characteristics of picky eaters in childhood
- To review common nutritional deficits in children who have picky eating habits
- To provide anticipatory guidance for dietary energy, calcium, and vitamin D in children with picky eating habits
Case

- 4-1/2 y old female referred for poor weight gain
- Height and weight <5th %ile, BMI 5th %ile
- H/O Prematurity, gestational age 7-1/2 mo
- Eats chicken and beef, no eggs; likes fruit; does not like vegetables, only eats corn; does not drink milk, eats yogurt twice weekly
- No multivitamin supplement
- Swallows liquids and solids without choking
- No nausea or vomiting
- Bowel movement daily, soft stool, no blood
- No allergies
- No family history of GI disorders
Case

- Physical exam: small petite child, slender body; abdominal exam benign
- Screening labs CBC, CRP, Chem 20, lipase, TTG/IgA, TSH, urinalysis, stool elastase, calprotectin normal
- Impression: constitutionally small, former premature child, with picky eating habits
- Plan: Restart formula and multivitamin supplementation, monitor weight gain and linear growth, consider appetite stimulant medication
Definition of Picky Eater

- No recognized definition
- Common terms
  - Refusal to eat familiar foods
  - Selective eating
  - Refusal to eat novel foods (neophobia)
  - Sensory food aversion
  - Faddy or fussy eating
Epidemiology

- Picky eating common problem during childhood
- Prevalence 18% (range 13-22% from 3 – 11 y of age) [Jacobi 2008, Mascola 2010]
- Rates stable over 2 y period during early childhood [Dubois 2007]
- No gender, ethnicity, household differences [Carruth 2014, Mascola 2010]
- Two-thirds of children recover within 3 y [Cano 2015, Mascola 2010]
Associations with Picky Eating

- Low birth weight, prematurity (missed window of opportunity) [Stern 2006, Cero 2002]
- Breastfeeding < 6 months (lack of exposure to maternal foods) [Galloway 2003]
- Dysfunctional family dynamics (parent-child relationship, child’s temperament) [Kintner 1981]
Characteristics of Picky Eaters

- Eat limited variety of foods
- Eat limited amount of food
- Reject certain textures or flavors
- Unwilling to try new foods
- Strong likes/dislikes in food preferences

[Mascola 2010]
Characteristics of Parents

- Frequent struggles over food
- Focus of struggle on type rather than amount of food
- Argue about child’s poor eating habits
- More likely to comment negatively about child’s poor eating habits
- More likely to prepare separate meals from family meals
- More likely to offer rewards or bribes to encourage eating

[Mascola 2010]
Long-term Health Consequences

- Lower weight in early childhood [Dubois 2007]
- Lower dietary energy (fat) intake [Dubois 2007]
- Increased risk for anorexia nervosa, but not dieting or binge eating, in adolescence [Marchi 1990, Jacobi 2008]
- More likely to exhibit problem behaviors (tantrums, withdrawal, anxiety, somatic complaints, depression, aggressive or oppositional-defiant behaviors) [Jacobi 2008]
Nutrient Patterns of Picky Eaters

- No clear evidence that nutrient intakes differ between picky/nonpicky eaters [Caruth 2000, 2004]

- Reported food group differences
  - Lower vegetable and fruit intake [Dovey 2008, Cooke 2004, Jacobi 2004, Van der Horst 2016]
  - Lower meat, egg, fish intake [Cooke 2003, Dubois 2007, Van der Horst 2016]
  - Inconsistent sweets, sugar intake [Calloway 2005]
  - Unknown milk and dairy product consumption

- Reported food texture differences
  - Refuse mushy foods [Boquin 2014]
  - Refuse tough (chew) foods [Russell 2013]
  - Refuse raw foods [Nederkoorn 2015]
Normal Development

- At beginning of complementary feeding, exposure to variety of foods important for acceptance of new foods  [Remy 2013]

- At beginning of complementary feeding, repeated exposure (maximum 10 times) enhances acceptance of vegetables  [Remy 2013]
  - Flavor additive less effective
  - Learning effect persists

- At age 2 y, children reject foods initially accepted; place higher importance on physical properties of food (color, texture)  [Williams, 2013]
Normal Development

- At age 2-3 y, children choose animal products, starchy foods; avoid vegetables [Nicklaus 2005]
- At age 3 y, total daily energy intake increases, but variety of foods remains limited [Nicklaus 2005]
- By age 4 y, acquisition of food repertoire influenced by previous food exposure and food choice behaviors [Nicklaus 2005]
- Thereafter, food variety seeking behaviors track into early adult life [Nicklaus 2005]
Evaluation of Picky Eater

- Identify red flags suggestive of organic disease that may require referral to a specialist
- In absence of worrisome signs or symptoms, “normal” growth curves may allay parental and physician concerns
Red Flags

- Chewing or swallowing dysfunction (dysphagia)
- Coughing, choking, gagging when drinking liquids or eating solids
- Recurrent aspiration pneumonia
- Feeding interrupted by crying (suggests pain)
- Vomiting and/or diarrhea
- Atopic conditions (eczema)
- Developmental problems (prematurity, congenital anomalies, autism)
Red Flags - Growth Charts

- Measurements more than 2 SD below mean (<5\textsuperscript{th} %ile)
- Measurements that decrease more than two major percentile lines
- Children growing slightly under 5\textsuperscript{th} %ile and have short parents may be normal
- Calculate mid-parent height
  - Boys: \[ \text{Height}_{\text{Mom}} (\text{cm}) + 13 \] + \text{Height}_{\text{Dad}} (\text{cm}) / 2
  - Girls: \[ \text{Height}_{\text{Dad}} (\text{cm}) - 13 \] + \text{Height}_{\text{Mom}} (\text{cm}) / 2
  - Determine child’s projected height at 18 y based on current height-for-age %ile
  - Normal: Mid-parent height – projected height at 18 y ≤ 8.5 cm
Differential Diagnosis

- Intake (dietary)
  - Anorexia
  - Chew/swallow dysfunction

- Internal (metabolic)
  - Hepatic
  - Endocrine
  - Renal

- Output (GI loss)
  - Malabsorption
  - Inflammatory
  - Infectious
  - Allergy
Nutritional Strategy

- Confirm organic disease unlikely
- Assess common nutritional deficits
  - Energy
    - Inadequate amount of food consumed
  - Calcium, Vitamin D
    - Minimal milk and dairy product consumption
    - Limited sunlight exposure
Energy Metabolism

Energy balance = Energy intake (kcal/d) – Energy expenditure (kcal/d)

\[ \downarrow \]

Maintain body composition

Basal metabolic rate 60%
Physical activity 30%
Energy cost of growth 4%

<table>
<thead>
<tr>
<th>Age (y)</th>
<th>Basal Metabolic Rate (kcal/d)</th>
<th>Physical Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Girls</td>
<td>Boys</td>
</tr>
<tr>
<td>2 – 3</td>
<td>1000</td>
<td>1050</td>
</tr>
<tr>
<td>4 – 8</td>
<td>1200</td>
<td>1300</td>
</tr>
<tr>
<td>9 – 13</td>
<td>1350</td>
<td>1700</td>
</tr>
</tbody>
</table>
Catch-up Growth

Energy cost of catch-up growth (kcal/d) =

Ideal body weight (kg) \* Dietary reference intake (kcal/d)

Actual body weight (kg)

OR

Rule of thumb = 120% - 150% DRI for age for energy (kcal/d)
# MyPlate Serving Size

<table>
<thead>
<tr>
<th>Age (y)</th>
<th>Veggie (c/d)</th>
<th>Fruit (c/d)</th>
<th>Grain (oz/d)</th>
<th>Protein (oz/d)</th>
<th>Milk (c/d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 – 3</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>4 – 8</td>
<td>1½</td>
<td>1½</td>
<td>5</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>9 – 13</td>
<td>2</td>
<td>1½</td>
<td>5</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>

*Grain (1 oz) = 1 slice bread, ½ c oatmeal, 1 pancake, ½ c rice, macaroni

*Protein (1 oz) = 1 oz meat, fish poultry, 1 egg, 1 Tbsp peanut butter, ¼ c cooked beans
Calcium

- Calcium required for bone formation
- DRI-for-age for Ca
  - <4 y = 700 mg/d
  - 4-8 y = 1000 mg/d
  - 9-18 y = 1300 mg/d
  - >18 y = 1000 mg/d
- Milk, dairy products good Ca source
  - 8 oz milk = 300 mg
  - 1 c ↓ fat, plain yogurt = 415 mg
  - 1 oz American cheese = 175 mg
- Ca supplement
  - 200 mg elemental Ca per tablet

[DRI 2011]
Vitamin D

- Vitamin D deficiency in 14% of American children [Saintonge 2009]
- Vitamin D promotes Ca absorption
- Risk factors for deficiency
  - Inherently dark skin, ↓sun exposure, anticonvulsant use
- Sunlight, milk, MVI vitamin D sources
- DRI-for-age for Vitamin D
  - 1-70 y = 600 IU/d [DRI 2011]
- AAP recommends four 8-oz glasses of milk daily (vitamin D = 400 IU/d)
- If 25-hydroxyvitamin D <20 ng/mL, supplement (1000-2000 IU/d x 3 mo) [Harel 2013]
Children with smaller body size may have lower food requirements

Children have a physiological decrease in appetite between 1-5 y of age

Although children have variable intakes at meals, their total daily energy intake remains fairly constant

As children develop a sense of autonomy, they prefer self-feeding and become selective in food choices

If pressured to eat, children may resist

[Leung 1994; Birch 1991; Cerro 2002; Sarter 1995]
Final Comments

- Excessive intake of beverages and sweet may reduce a child’s appetite for food and lead to failure to thrive.
- Food refusal may be an attention seeking device because of difficulty in the parent-child relationship.
- Refusal to eat may result from inappropriate feeding techniques that include scolding or punishing.
- Family and peer group modeling are effective means to encourage children to eat.
- Insistence on table manners inappropriate for age may interfere with the child’s eating.

[Sarter 1995; Cerro 2002; Skuse 1993; Sarter 1990]
Anticipatory Guidance

- Parents should choose nutritious food of appropriate texture and taste for child’s age, provide structured meals and snacks, but allow child to decide how much and what to eat.

- Parents initially may provide small portions of each food (1 Tbsp/y of age) and serve more based on child’s appetite.

- Snacks work best mid-way between meals and should not include excessive sweetened beverages.

- Children should not be coerced to eat or punished for not eating.
Anticipatory Guidance

- Table time should be limited to 20-30 min/meal; food should be offered again only at the next planned meal or snack.
- Distractions such as toys or television should not be permitted at the table during mealtimes.
- Parents should only insist on table manners appropriate for the child’s age and stage of development.
- Eating with the family should provide a pleasurable social experience and the opportunity to learn by imitation.
Anticipatory Guidance

- Despite variable intakes at meals, total daily energy intake remains fairly constant to support basal metabolic rates, physical activity, and growth in the constitutionally small child.
- Milk and dairy products should be a mainstay of daily food choices to assure adequacy of dietary calcium and vitamin D intakes.
- Multivitamin and mineral supplements may be used if the quality of the diet is questionable.
- Nutritional supplements may be used to support catch-up growth if growth deficits prevail.
- Appetite stimulants may be considered when eating behaviors fall outside the norm.
References


- Leung AKC, et al. The ‘picky eater’: the toddler or preschooler who does not eat. Paediatr Child Health 2012;17:455-7
