Assessment and Treatment of Feeding Disorders in Children

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Feeding Behavior

No human activity has greater biological and social significance than feeding.
Successful feeding is measured against social and cultural standards.

Feeding Behavior

Prevalence in Autism

Pediatric Feeding Disorders
Pediatric Feeding Disorders

**Typical**
- Accepts breast or bottle
- Starts baby food around 4 to 6 months of age
- Transitions to mashed table foods by 12 months of age

**Disordered**
- Has difficulty breast or bottle feeding
- Consistently rejects baby food
- Has difficulty transitioning to mashed table foods
## Pediatric Feeding Disorders

### Typical
- Picky eating emerges at 18 months of age
- Variety will reemerge with exposure
- Variety will be sufficient to provide adequate nutrition

### Disordered
- Reaction to non-preferred food is excessive
- Inflexible food preferences may change, but variety remains restricted
- Variety does not provide adequate nutrition

### Typical
- Preferences are influenced by peers
- Eating persists in different environmental conditions
- Will eat non-preferred food when hungry

### Disordered
- Insensitive to social cues around eating
- Eating is disrupted in different conditions
- Will not eat non-preferred food even when hungry
Pediatric Feeding Disorders

- Child has any one of the following:
  - Child has three consecutive months of weight loss
  - Child is diagnosed with dehydration or malnutrition, which results in emergency treatment
  - Child has nasogastric tube with no increase in the amount of calories from oral feeding for 3 consecutive months

Child should maintain growth along his or her own curve.

Growth should not decelerate.
Meal lengths over 30 minutes are the best predictor of a feeding disorder relative to any other target behavior.

Consider a comprehensive, interdisciplinary evaluation before starting treatment.
Pediatric Feeding Disorders

- Interdisciplinary team evaluation:
  - Medicine: Rule out physical causes of feeding problem
  - Nutrition: Evaluate adequacy of current intake
  - Social Work: Evaluate family stressors
  - Speech or Occupational Therapy: Evaluate oral-motor status and safety
  - Psychology: Assess contribution of environmental factors

Approximately 60% of children with feeding problems also have medical problems.
### Caloric Needs By Age (KCALS)

<table>
<thead>
<tr>
<th>AGE (YEARS)</th>
<th>1</th>
<th>2-3</th>
<th>4-8</th>
<th>9-13</th>
<th>14-18</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEMALE</td>
<td>900</td>
<td>1000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MALE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AGE (YEARS)</th>
<th>2-3</th>
<th>4-8</th>
<th>9-13</th>
<th>14-18</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEMALE</td>
<td>1200</td>
<td>1600</td>
<td>1800</td>
<td></td>
</tr>
<tr>
<td>MALE</td>
<td>1400</td>
<td>1800</td>
<td>2200</td>
<td></td>
</tr>
</tbody>
</table>

### Nutritional Requirements

<table>
<thead>
<tr>
<th>AGE (YEARS)</th>
<th>1</th>
<th>2-3</th>
<th>4-8</th>
<th>9-13</th>
<th>14-18</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAT (%KCAL)</td>
<td>30-40</td>
<td>30-35</td>
<td>25-35</td>
<td>25-35</td>
<td>25-35</td>
</tr>
<tr>
<td>DAIRY (C)</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>PROTEIN (OZ)</td>
<td>1.5</td>
<td>2</td>
<td>3F</td>
<td>4M</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>3F</td>
<td>1.5</td>
<td>1.5F</td>
<td>2M</td>
<td>2.5F</td>
</tr>
<tr>
<td>FRUITS (C)</td>
<td>1</td>
<td>1</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5F</td>
</tr>
<tr>
<td>VEGETABLES (C)</td>
<td>3/4</td>
<td>1</td>
<td>1F</td>
<td>1.5M</td>
<td>2F</td>
</tr>
<tr>
<td>GRAINS (OZ)</td>
<td>2</td>
<td>3</td>
<td>4F</td>
<td>5M</td>
<td>5F</td>
</tr>
<tr>
<td></td>
<td>5M</td>
<td></td>
<td>6F</td>
<td>7M</td>
<td></td>
</tr>
</tbody>
</table>
https://www.choosemyplate.gov/

https://www.choosemyplate.gov/MyPlate-Daily-Checklist-input
https://www.choosemyplate.gov/MyPlate-Daily-Checklist

<table>
<thead>
<tr>
<th>AGE GROUP</th>
<th>CALORIE LEVEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ages 2-3</td>
<td>1,000</td>
</tr>
<tr>
<td>Ages 4-8</td>
<td>1,200</td>
</tr>
<tr>
<td>Ages 9-13</td>
<td>1,600</td>
</tr>
<tr>
<td>Ages 14+</td>
<td>1,600</td>
</tr>
</tbody>
</table>

**FOLATE INTAKE**

- Initial Eval
- Admission
- Discharge
- Home Visits
- 6-month Follow-up

<table>
<thead>
<tr>
<th>TIME POINT</th>
<th>PERCENTAGE DAILY NEEDS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>
Pediatric Feeding Disorders

Approximately **40%** of children diagnosed with a feeding disorder will have an oral-motor skill deficit.

**Setting Goals**

- **Goals should be:**
  - Individualized
  - Observable
  - Measurable

- **Sample goals:**
  - Increase total oral intake to 50% of needs
  - Increase variety by 8 new foods
  - Increase acceptance of solids to 80%
  - Decrease inappropriate mealtime behavior to 1 per minute or less
Meal Structure

- Creates a predictable environment for the child
- Allows for systematic evaluation

Danny's Day - Treatment Schedule

9:00-9:45: Meal 1 (Breakfast)
9:45-10:30 Break
10:30-11:00: Meal 2 (Snack)
11:00-11:45 Break
11:45-12:30: Meal 3 (Lunch)
12:30-1:00 Break (may, free food)
1:00-3:30: Meal 4 (Snack 2)
3:30-4:00 Break
4:00-4:45: Meal 5 (Dinner)
Meal Structure

- Rubber-Coated Baby Spoons
- Maroon Spoons
- Nuk Brush

**Meal Structure**

- Identify foods
  - Identify food type
  - Specify foods by name, food group, brand, recipe
  - Identify food texture
  - Precisely describe how you make the texture
Hand Washing

Meal Structure

Solids
Meal Structure

Texture

Recipes

<table>
<thead>
<tr>
<th>Food Name</th>
<th>Brand</th>
<th>Canned or Frozen</th>
<th>Amount (g)</th>
<th>Amount &amp; Type of Liquid (oz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cut Green Beans</td>
<td>HyVee</td>
<td>Canned</td>
<td>226</td>
<td>None</td>
</tr>
</tbody>
</table>
Consult a dietitian if your child has poor weight gain or poor nutrition.

Consult a speech or occupational therapist if your child has swallowing difficulties.

Meal Structure

Specialty Products

5-bite sessions
Meal Structure

### Danny's Day-Treatment Schedule

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Meal</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00-9:45</td>
<td></td>
<td>Meal 1 (Breakfast)</td>
</tr>
<tr>
<td>9:45-10:30</td>
<td>Break</td>
<td></td>
</tr>
<tr>
<td>10:30-11:00</td>
<td></td>
<td>Meal 2 (Snack)</td>
</tr>
<tr>
<td>11:00-11:45</td>
<td>Break</td>
<td></td>
</tr>
<tr>
<td>11:45-12:30</td>
<td></td>
<td>Meal 3 (Lunch)</td>
</tr>
<tr>
<td>12:30-3:00</td>
<td>Break (nap, free feed)</td>
<td></td>
</tr>
<tr>
<td>3:00-3:30</td>
<td></td>
<td>Meal 4 (Snack 2)</td>
</tr>
<tr>
<td>3:30-4:00</td>
<td>Break</td>
<td></td>
</tr>
<tr>
<td>4:00-4:45</td>
<td></td>
<td>Meal 5 (Dinner)</td>
</tr>
</tbody>
</table>

- Flexible material
- Prevents occlusion of child’s face
- Facilitates transition to larger bolus
Meal Structure

Liquids

Bolus size

10 cc
6 cc
4 cc
2 cc
Meal Structure

- Adult chair
- Highchair
- Special Tomato Chair
- Toddler Chair
- Tumble Form
- Booster Seat

Seating

Cleaning Supplies
Meal Structure

Appropriate height for child and feeder
Data Collection

Child
- Bite presented
- Active acceptance
- Expel
- Mouth clean
- Pack
- Gag
- Cough
- Vomit
- Inappropriate mealtime behavior
- Negative vocalizations

Feeder
- Correct spoon presentation
- Correct praise
- Attention inappropriate mealtime behavior

Data Collection
- Concise, detailed definition of behavior
**Data Collection**

### Sample data sheet for a child who refuses food and engages in inappropriate behavior

<table>
<thead>
<tr>
<th>FOOD</th>
<th>TRIAL</th>
<th>Accept</th>
<th>Inapprop Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green beans</td>
<td>1</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Chicken</td>
<td>2</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Applesauce</td>
<td>3</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Potato</td>
<td>4</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

**Notes:**
- Child did not have inappropriate behavior during presentation of green beans.
- Child had inappropriate behavior during presentation of chicken.
- Child had inappropriate behavior during presentation of applesauce.
- Child had inappropriate behavior during presentation of potato.

### Sample data sheet for a child who does not swallow food consistently (holds food in mouth) and gags

<table>
<thead>
<tr>
<th>FOOD</th>
<th>TRIAL</th>
<th>Swallow</th>
<th>Gag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chips</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hamburger</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peas</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peach</td>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- Child did not swallow food consistently (holds food in mouth) and gags.

### Sample data sheet for a child who spits food out of his or her mouth and cries

<table>
<thead>
<tr>
<th>FOOD</th>
<th>TRIAL</th>
<th>Spit out</th>
<th>Cries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rice</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pears</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broccoli</td>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- Child spat food out of his or her mouth and cried.

### Data Collection

**Sample data for a child who refuses food and engages in inappropriate behavior.**

- Child accepted green beans.
- Child did not accept chicken.
- Child did not accept applesauce.

<table>
<thead>
<tr>
<th>FOOD</th>
<th>TRIAL</th>
<th>Accept</th>
<th>Inapprop Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green beans</td>
<td>1</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Chicken</td>
<td>2</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Applesauce</td>
<td>3</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Potato</td>
<td>4</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

**Notes:**
- Child accepted potato.

**Y = Yes**

**N = No**
## Functional Analysis

<table>
<thead>
<tr>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indirect assessment</td>
</tr>
<tr>
<td>Descriptive assessment</td>
</tr>
<tr>
<td>Functional analysis</td>
</tr>
<tr>
<td>Type</td>
</tr>
<tr>
<td>----------------------</td>
</tr>
<tr>
<td>Indirect assessment</td>
</tr>
<tr>
<td>Descriptive assessment</td>
</tr>
</tbody>
</table>
### Functional Analysis

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional analysis</td>
<td>Systematically manipulate environmental events</td>
<td>Identify conditions under which inappropriate behavior occurs</td>
<td>Time, resources, and expertise to implement and interpret</td>
</tr>
</tbody>
</table>

#### Condition

<table>
<thead>
<tr>
<th>Condition</th>
<th>Consequences for Inappropriate Mealtime Behavior</th>
<th>Bite Presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Escape</td>
<td>30 s of escape</td>
<td>Removed for 20 s</td>
</tr>
<tr>
<td>Attention</td>
<td>30 s of attention</td>
<td>Remained at midline</td>
</tr>
<tr>
<td>Tangible</td>
<td>30 s of access to tangibles</td>
<td>Remained at midline</td>
</tr>
<tr>
<td>Control</td>
<td>No differential consequences</td>
<td>Remained at midline</td>
</tr>
</tbody>
</table>

In this example, the child accepted 10%, 20%, and 10% of the bites, respectively, in each of the meals. Because acceptance of bites is low and predictable, you could start your treatment at the next meal.

**Meal 1**
- Green beans: 1 N
- Chicken: 2 N
- Applesauce: 3 N
- Potato: 4 N
- Green beans: 5 N
- Chicken: 6 N
- Applesauce: 7 Y
- Potato: 8 N
- Green beans: 9 N
- Chicken: 10 N

**Meal 2**
- Applesauce: 1 Y
- Potato: 2 N
- Chicken: 3 N
- Green beans: 4 N
- Applesauce: 5 N
- Potato: 6 N
- Chicken: 7 N
- Green beans: 8 N
- Applesauce: 9 Y
- Potato: 10 N

**Meal 3**
- Potato: 1 N
- Applesauce: 2 N
- Green beans: 3 N
- Chicken: 4 N
- Potato: 5 N
- Applesauce: 6 N
- Green beans: 7 N
- Chicken: 8 N
- Potato: 9 N
- Applesauce: 10 N

**TOTAL Accept**
- Meal 1: 1 N, 10%
- Meal 2: 2 N, 20%
- Meal 3: 1 N, 10%
Data Interpretation

In this example, the child accepted 80%, 20%, and 60% of the bites, respectively, in each of the meals. Because acceptance of bites is variable (unpredictable), you should wait to start treatment.

<table>
<thead>
<tr>
<th>FOOD</th>
<th>TRIAL</th>
<th>Accept</th>
<th>TRIAL</th>
<th>Accept</th>
<th>TRIAL</th>
<th>Accept</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green beans</td>
<td>1</td>
<td>Y</td>
<td>1</td>
<td>N</td>
<td>1</td>
<td>N</td>
</tr>
<tr>
<td>Chicken</td>
<td>2</td>
<td>N</td>
<td>2</td>
<td>Y</td>
<td>2</td>
<td>Y</td>
</tr>
<tr>
<td>Applesauce</td>
<td>3</td>
<td>Y</td>
<td>3</td>
<td>N</td>
<td>3</td>
<td>N</td>
</tr>
<tr>
<td>Potato</td>
<td>4</td>
<td>Y</td>
<td>4</td>
<td>N</td>
<td>4</td>
<td>N</td>
</tr>
<tr>
<td>Green beans</td>
<td>5</td>
<td>Y</td>
<td>5</td>
<td>N</td>
<td>5</td>
<td>N</td>
</tr>
<tr>
<td>Chicken</td>
<td>6</td>
<td>N</td>
<td>6</td>
<td>N</td>
<td>6</td>
<td>N</td>
</tr>
<tr>
<td>Applesauce</td>
<td>7</td>
<td>Y</td>
<td>7</td>
<td>N</td>
<td>7</td>
<td>N</td>
</tr>
<tr>
<td>Potato</td>
<td>8</td>
<td>Y</td>
<td>8</td>
<td>N</td>
<td>8</td>
<td>N</td>
</tr>
<tr>
<td>Green beans</td>
<td>9</td>
<td>Y</td>
<td>9</td>
<td>N</td>
<td>9</td>
<td>N</td>
</tr>
<tr>
<td>Chicken</td>
<td>10</td>
<td>Y</td>
<td>10</td>
<td>Y</td>
<td>10</td>
<td>Y</td>
</tr>
</tbody>
</table>

**Meal 1**
- Total Accept: 8
- %: 80%

**Meal 2**
- Total Accept: 2
- %: 20%

**Meal 3**
- Total Accept: 6
- %: 60%
Data Interpretation

Level
Stability
Trend

PERCENTAGE OF ACCEPTED BITES

Baseline

MEALS

Data Interpretation

Level
Stability
Trend

PERCENTAGE OF ACCEPTED BITES

Baseline

MEALS


- **Reinforcement**
  - High preference
  - Immediate
  - Restricted
Stimulus-Preference Assessment


http://europepmc.org/abstract/med/8827248
Fading-based Treatment

- Fading can be an effective way to increase consumption.
- There are certain ways to use fading so that it will work.

Fading-based Treatment

- **Fading** involves identifying something your child will do now (e.g., eats yogurt consistently).
- **Gradually** changing what your child does now or gradually changing the expectations of what you want your child to do.
- The **gradual** changes result in changes in what or how your child eats.

Antecedents

- vs.

vs.
**Syringe Fading**

**When to Use:** Child will swallow liquids or pureed foods from a syringe, but will not accept foods from a spoon.

![Deposit Syringe Images](5 cm, 4 cm, 3 cm, 2 cm, 1 cm)

![Deposit Spoon Images](Bottom, Top, In mouth, At lips, Next to)

Blending

When to Use: Child eats at least three foods reliably and has no concerns with weight.

Examples of Blends


*CIB = Carnation Instant Breakfast*

**Bite Fading**

*When to Use:* Child will eat a variety of foods, but only in small amounts.

<table>
<thead>
<tr>
<th>STEP</th>
<th># SPOONS OF FOOD TO PRESENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
</tr>
</tbody>
</table>
Liquids To Solids

When to Use: Child will drinks liquids from a cup, but will not eat solids from a spoon.
Solids To Liquids

**When to Use:** Child will eat pureed solids from a spoon, but will not drink liquids from a cup.
Additional Readings


Avoidance


Autism


Book Chapters and Reviews

Book Chapters and Reviews

Book Chapters and Reviews


Chaser

Chewing


Escape Extinction

Escape Extinction


Expulsion

FADING

- **Bite**

- **Blending**

- **Liquid to baby food**

- **Spoon distance**

- **Spoon to cup**

- **Syringe to cup and spoon**

---

Functional Analysis


High-probability Requests


Mouth Clean and Packing

Parent Training


Self-Feeding

Sensory Integration


Sequential Oral Sensory

Simultaneous Presentation


Texture and Consistency Manipulation

Utensil Manipulation