A Summary of Treatments for Children with Autism and Feeding Disorders

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Feeding Behavior
No human activity has greater biological and social significance than feeding.
Successful feeding is measured against a set of social and cultural standards. 

Feeding Behavior

Achievement of adequate physical growth.

Achievement of feeding milestones.

PEDIATRIC FEEDING DISORDERS

- Identified when a child fails to consume a sufficient variety or quantity of food to maintain nutritional status
FEEDING PROBLEMS AND AUTISM

- Approximately 30% to 80% of children
- Untreated feeding problems associated with poor physical growth and learning and behavior problems

Typical vs. Disordered Feeding

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

**Disordered**
- Insensitive to social cues around eating
- Eating is disrupted in different environmental conditions
- Will not eat less preferred food even when hungry
Child should maintain growth along his or her own curve.

Growth should not decelerate.

Pediatric Feeding Disorders

- Child evidences any one of the following characteristics
  - Child experiences three consecutive months of weight loss
  - Child is diagnosed with dehydration or malnutrition, which results in emergency treatment
  - Child has NG-tube with no increase in the percentage of calories obtained via oral feeding for 3 consecutive months
Pediatric Feeding Disorders

- Parent reports any one of the following:
  - Chronic lengthy meals
  - Unusual or inappropriate mealtime conditions
  - Failure to advance texture
  - Over dependence on a single source of nutrition
  - High levels of inappropriate mealtime behavior
  - High levels of caregiver stress during meals

- Symptoms of dehydration:
  - Low or no urine output
  - Urine appears dark yellow and/or is strong smelling
  - Dry mucous membranes
  - Sunken eyes
  - Markedly sunken fontanelle
  - Lethargy
  - Vomiting and/or diarrhea
Medical Conditions

Children with Autism do not have a higher prevalence of GI problems.
Interdisciplinary Approach

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

INTERDISCIPLINARY APPROACH

- Consider an interdisciplinary evaluation prior to initiation of treatment
- Practice within your scope of competence
Setting Goals for Treatment

- 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
FEEDING GOALS: Jenny Smith  
Date: 4-26-07

Increase Total Intake by Mouth  
| Admission: 0% | Current: 25% | Discharge: 100% |

Increase Acceptance of 8 novel foods  
| Admission: 0% | Current: 50% | Discharge: 80-100% |

Decrease Inappropriate Mealtime Behavior  
| Admission: 15.6 per minute | Current: 5.2 per minute | Discharge: at or below 1 per minute |

Decrease Tube Feeding  
| Admission: 100% | Current: 50% | Discharge: 0% |

Measurable goals are set for each patient

Assessment

- Why is it important to structure meals?  
  - Create a predictable environment for the child  
  - Ensure the expectations of the meal are clear to the child  
  - Allows for systematic changes when implementing treatment components
How do we structure the meal?

- **Identify foods that will be presented**
  - Identify food type
  - Specify foods by name, food group, brand, recipe
  - Identify food texture
  - Precisely describe how texture is achieved

![Image of products]

[http://abbottnutrition.com/Products/polycose](http://abbottnutrition.com/Products/polycose)
Eating and Drinking Utensils

Plastic Coated Baby Spoons
Maroon Spoons
Nuk Brush

Nosey/Cut out cups

How do we structure the meal?

**Liquids**

<table>
<thead>
<tr>
<th>AGE</th>
<th>UTENSIL TYPE</th>
<th>BOLUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth to 8 months</td>
<td>Bottle</td>
<td>59 cc</td>
</tr>
<tr>
<td>8 months to 4 years</td>
<td>Pink cut-out cup</td>
<td>2 cc</td>
</tr>
<tr>
<td>4 to 8 years</td>
<td>Blue cut-out cup</td>
<td>4 cc</td>
</tr>
<tr>
<td>8 to 12 years</td>
<td>Regular cup</td>
<td>6-8 cc</td>
</tr>
</tbody>
</table>
How do we structure the meal?

### Solids

<table>
<thead>
<tr>
<th>AGE</th>
<th>UTENSIL TYPE</th>
<th>BOLUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 to 8 months</td>
<td>Coated baby spoon</td>
<td>¼ level spoon</td>
</tr>
<tr>
<td>9 to 12 months</td>
<td>Coated baby spoon</td>
<td>½ level spoon</td>
</tr>
<tr>
<td>13 to 18 months</td>
<td>Coated baby spoon</td>
<td>Level spoon</td>
</tr>
<tr>
<td>19 months to 6 years</td>
<td>Small maroon spoon</td>
<td>Level spoon</td>
</tr>
<tr>
<td>7 years+</td>
<td>Large maroon spoon</td>
<td>Level spoon</td>
</tr>
</tbody>
</table>

How do we structure the meal?

- **Length of meal**
  - Time based (e.g., 5 min, 15 min)
  - Bite or drink based (e.g., 1 bite, 5 bites)
  - Set the child up for success
  - What is feasible for follow through?
## GRAM INTAKE

*Please record food weights in the order that they are presented during each session*

Pre 1 = Weight of food item prior to additives
Pre 2 = Weight of food item with additives (e.g., polycose, butter, thick-it)

<table>
<thead>
<tr>
<th>Date</th>
<th>food</th>
<th>pre 1</th>
<th>pre 2</th>
<th>post</th>
<th>diff</th>
<th>spill</th>
<th>intake</th>
<th>emesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>12/7/2007</td>
<td>Carnation Instant Brk</td>
<td>210 g</td>
<td>177 g</td>
<td>33 g</td>
<td>1 g</td>
<td>32 g</td>
<td>0 g</td>
<td></td>
</tr>
<tr>
<td></td>
<td>breakfast with whole milk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/7/2007</td>
<td>pureed peas</td>
<td>30 g</td>
<td>28 g</td>
<td>2 g</td>
<td>0 g</td>
<td>2 g</td>
<td>0 g</td>
<td></td>
</tr>
<tr>
<td></td>
<td>am snack</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>pureed pancakes</td>
<td>30 g</td>
<td>26 g</td>
<td>4 g</td>
<td>0 g</td>
<td>4 g</td>
<td>0 g</td>
<td></td>
</tr>
<tr>
<td></td>
<td>pureed hotdog</td>
<td>30 g</td>
<td>22 g</td>
<td>8 g</td>
<td>2 g</td>
<td>6 g</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>pureed peaches</td>
<td>30 g</td>
<td>25 g</td>
<td>5 g</td>
<td>0 g</td>
<td>5 g</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/7/2007</td>
<td>Carnation Instant Brk</td>
<td>210 g</td>
<td>160 g</td>
<td>50 g</td>
<td>3 g</td>
<td>47 g</td>
<td>13 g</td>
<td></td>
</tr>
<tr>
<td></td>
<td>lunch with whole milk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Data Based

- Direct observation
- Operationally defined behavior
- Measure behavior over time
- Assess progress toward goals
Feeding behavior is quantified and measured precisely

Operationally Defining Behavior

- Clear, concise detailed definition of a measure
- Used to remove ambiguity and ensure all data collectors measure the same behavior
Operationally Defining Behavior

**Child**
- Bite Presented
- 5-s Acceptance
- Bite Taken After 5 s
- Expel
- Mouth Clean
- Pack
- Gag
- Cough
- Vomit
- Inappropriate Behavior
- Negative Vocalizations

**Feeder**
- Incorrect Escape
- Spoon at lips
- Incorrect Positive Reinforcement
- Incorrect Praise
FUNCTIONAL ANALYSIS OF
PEDIATRIC FEEDING DISORDERS


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<tr>
<th>Condition</th>
<th>Consequence for Inappropriate Behavior</th>
<th>Bite Presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESCAPE</td>
<td>30 s of escape</td>
<td>remove for 20 s</td>
</tr>
<tr>
<td>ATTENTION</td>
<td>30 s of attention</td>
<td>remains at midline</td>
</tr>
<tr>
<td>TANGIBLE</td>
<td>30 s of access tangible</td>
<td>remains at midline</td>
</tr>
<tr>
<td>CONTROL</td>
<td>no differential consequence</td>
<td>remains at midline</td>
</tr>
</tbody>
</table>
**Escape Condition**
Feeder delivers 30 s of *escape* following inappropriate behavior.

**Attention Condition**
Feeder delivers 30 s of *attention* following inappropriate behavior.
Control Condition
Feeder provides continuous access to toys and attention. No differential consequence following inappropriate behavior.

Functional Analysis - Control

FUNCTIONAL ANALYSIS OF
PEDIATRIC FEEDING DISORDERS

- 67% of participants displayed high levels of inappropriate mealtime behavior in one or more test conditions.
- 90% of participants whose functional analyses were differentiated displayed sensitivity to negative reinforcement.
- 80% of participants whose functional analyses were differentiated displayed sensitivity to multiple reinforcing contingencies.
The findings suggest that:

- Negative reinforcement plays a primary role in the maintenance of feeding problems.
- Children with feeding problems may be sensitive to other reinforcement contingencies.

GENERAL TREATMENT PROGRESSION

**Functional Analysis**

**Function-Based Treatment**
- Chaser
- Chin prompt
- Facilitation/Redistribution
- Fading Texture

- Expulsion/Packing
- No Change

- Avoidance Fading Momentum

- Effective Treatment
- Parent Training
STUDIES ON ESCAPE EXTINCTION

Escape extinction (EE) may be a necessary component of treatment.


EE or EE+Sr+/Sr−

- **Nonremoval of the spoon** – feeder keeps spoon or cup at child’s lips and deposits bite or drink at first opportunity
- **Differential reinforcement of alternative behavior (DRA)** – feeder delivers a preferred item or activity following appropriate behavior (e.g., mouth clean)
- **Noncontingent reinforcement (NCR)** – throughout the meal (a) feeder interacts with child, (b) feeder interacts with child and preferred items or activities are available, or (c) preferred items or activities are available
- **Differential negative reinforcement of alternative behavior (DNRA)** – feeder delays presentation of bite following appropriate behavior (e.g., mouth clean)
Studies on the Effects of Reinforcement

Reinforcement of the First Behavior in the Chain (Acceptance) vs Reinforcement of the Terminal Behavior in the Chain (Mouth Clean)

Sr+ Acceptance  Sr+ Swallowing (Mouth Clean)

Does it make a difference?

Studies on the Effects of Reinforcement

What Are the Effects of Differential Positive Reinforcement with and without Escape Extinction?

Differential Sr+  Escape Extinction

Does it make a difference?

### Condition | Consequence for Inappropriate Behavior | Bite Presentation | Consequence for Mouth Clean
---|---|---|---
ESC | 20 s of escape | removed for 20 s | brief praise
DRA + ESC | 20 s of escape | removed for 20 s | access to Sr+
EE | no differential consequence | remained at child’s lips | brief praise
DRA + EE | no differential consequence | remained at child’s lips | access to Sr+


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### Studies on the Effects of Reinforcement

What Are the Effects of Noncontingent Positive Reinforcement with and without Escape Extinction?

**Noncontingent Sr+**

**Escape Extinction**

Does it make a difference?
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<tr>
<td>ESC</td>
<td>20 s of escape</td>
<td>removed for 20 s</td>
<td>brief praise</td>
</tr>
<tr>
<td>NCR + ESC</td>
<td>20 s of escape</td>
<td>removed for 20 s</td>
<td>access to Sr+ throughout</td>
</tr>
<tr>
<td>EE</td>
<td>no differential consequence</td>
<td>remained at child’s lips</td>
<td>brief praise</td>
</tr>
<tr>
<td>NCR + EE</td>
<td>no differential consequence</td>
<td>remained at child’s lips</td>
<td>access to Sr+ throughout</td>
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**Effects of Function-Based Treatment**

What Are the Effects of Function-Based Treatment for Children Whose Inappropriate Mealtime Behavior is Maintained by Multiple Reinforcers?

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</tr>
</thead>
<tbody>
<tr>
<td>ATTN + ESC</td>
<td>20 s of attention plus escape</td>
<td>removed for 20 s</td>
</tr>
<tr>
<td>EE + ATTN</td>
<td>20 s of attention</td>
<td>remained at child’s lips</td>
</tr>
<tr>
<td>AE + ESC</td>
<td>20 s of escape</td>
<td>removed for 20 s</td>
</tr>
<tr>
<td>EE + AE</td>
<td>no differential consequence</td>
<td>remained at child’s lips</td>
</tr>
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Effects of Function-Based Treatment

What Are the Effects of Function-Based Treatment for Children Whose Inappropriate Mealtime Behavior is Maintained by Multiple Reinforcers?

- Acceptance and Mouth Clean Increased With Escape Extinction but Not Attention Extinction
- Inappropriate Behavior Maintained at Low Levels with Escape Extinction in the Absence of Attention Extinction
- Levels of Acceptance and Mouth Clean Were Higher and More Stable with Escape AND Attention Extinction
- Important to Treat Both Functions when Inappropriate Mealtime Behavior is Multiply Maintained

Comparison of Function-Based and Sensory-Based Treatments

How Effective is Function- versus Sensory-Based Treatment?


**COMPARISON OF FUNCTION- VS SENSORY-BASED TREATMENTS**

- Sensory integration-based treatment produced no change in behavior.
- Escape extinction was associated with increased acceptance and decreased inappropriate behavior.

FADING

- **Blending**

- **Spoon distance**

- **Spoon to cup**

- **Syringe to cup and spoon**

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*CIB = Carnation Instant Breakfast


SWALLOW FACILITATION AND RE-DISTRIBUTION

NUK WITH FACILITATION

Solids Nuk
(facilitation)

FLIPPED SPOON

Flip Spoon

**CHIN PROMPT**

Chin Prompt

Liquids

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**Chaser**

- **Chaser** – feeder presents a solid or liquid that the child swallows reliably following depositing a solid or liquid the child does not swallow reliably


AVOIDANCE


**AVOIDANCE**

**Avoidance Solids**

1 : 1 : 5
SUMMARY

- EE or EE+Sr+/Sr- was an effective treatment for 43% of the interventions.
- Although EE may be a necessary treatment, it may not be sufficient for many children with severe feeding problems.
SUMMARY

- We used other procedures in addition to EE for 53% of the interventions.

LIMITATIONS

- All of the procedures were effective some of the time; however, it is not clear which procedures should be used in which order when EE is not sufficient.