Feeding Problems in Autism: Evidence-Based Approaches to Intervention

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The Marcus Autism Center
Specific Goals and Learning Objectives

• 1) Define and discuss the prevalence of feeding disorders in ASD.
• 2) Develop an understanding of the medical and behavioral factors that contribute to the development and maintenance of feeding disturbances in children with ASD.
• 3) Identify appropriate interventions for feeding disorders in ASD based on the severity of the presenting problem. This includes parent consultation/education, nutritional guidance, behavioral therapy, medical interventions, and intensive inpatient services.
Autism Spectrum Disorders

• Neurodevelopmental disorder(s) of unknown genetic origin where symptoms unfold over the first few years of life:
  – Impairments in socialization
  – Impairments in communication
  – Development of restricted interests, repetitive & perseverative behaviors, and need for sameness
Case Example

- K.S.
  - 4 year old male
  - Autistic Disorder
  - Preferred (Self fed): Doritos, Vanilla wafers
  - Non-preferred (caregivers presented): pureed foods, Pediasure, liquids
- Feeding involved
  - 3 adults to complete
  - Special highchair designed by grandfather to restrain child
  - Syringe for depositing liquids
- No growth concerns (BMI WNL)
Feeding Disorders Program

Multi-Disciplinary Program

Core Disciplines:
• Behavioral Psychology
• Oral-motor
• Nutrition

Increased Research and Clinical Collaboration:
• Emory GI - Dr. McElhanon
Target Population

Chronic food refusal: Volume and/or Variety

Severe problem behavior during meals
- Crying
- Disruptions
- Elopement
- Aggression
Ledford & Gast (2006)

- Time span: 1994 to 2004
- 7 descriptive studies identified
- N = 381 children with ASD
- Findings:
  - All identified maladaptive feeding behaviors related to ASD
  - Estimates ranged from 46% and 89% of children with ASD displaying significant feeding problems
  - Often no identifiable organic precursor
Inclusion criteria:
1. Published between 1980 and 2011
2. Focused on pediatric population (birth to 18 years)
3. Involved a comparison group
4. Evaluated feeding and/or nutrition in ASD a standardized, replicable manner
5. Presented data either descriptively (e.g., frequency, percentages) or statistically (e.g., t scores)

Exclusion criteria:
1. Studies with known sampling bias (e.g., chart reviews from feeding programs)
2. Studies focusing on dietary manipulation (e.g., GFCF)
Table 4  Effect sizes, 95% confidence limits and within-group tests for heterogeneity for studies included in the meta-analysis for feeding behavior problems by comparison groups

<table>
<thead>
<tr>
<th>ASD versus subgroup</th>
<th>Number of contributing studies</th>
<th>Random effects model</th>
<th>Within-groups</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SMD (SE)</td>
<td>OR</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All groups</td>
<td>15</td>
<td>0.89 (0.08)</td>
<td>5.11</td>
</tr>
<tr>
<td>TD</td>
<td>13</td>
<td>0.94 (0.11)</td>
<td>5.49</td>
</tr>
<tr>
<td>SB</td>
<td>3</td>
<td>0.98 (0.22)</td>
<td>5.89</td>
</tr>
<tr>
<td>DD</td>
<td>2</td>
<td>0.67 (0.19)</td>
<td>3.36</td>
</tr>
</tbody>
</table>

TD typically developing, DD other developmental delay, SB siblings
Table 5 Effect sizes, 95% confidence limits and within-group tests for heterogeneity for studies included in the meta-analysis for nutritional data

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Number of contributing studies</th>
<th>Random effects model</th>
<th>95% confidence limits</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SMD (SE)</td>
<td>OR</td>
<td>LCL</td>
</tr>
<tr>
<td>Calcium</td>
<td>8</td>
<td>-0.65 (0.29)</td>
<td>0.31</td>
<td>0.11</td>
</tr>
<tr>
<td>Carbohydrates</td>
<td>7</td>
<td>-0.02 (0.07)</td>
<td>0.97</td>
<td>0.76</td>
</tr>
<tr>
<td>Energy</td>
<td>6</td>
<td>0 (0.06)</td>
<td>0.99</td>
<td>0.80</td>
</tr>
<tr>
<td>Fiber</td>
<td>6</td>
<td>0.09 (0.12)</td>
<td>1.18</td>
<td>0.77</td>
</tr>
<tr>
<td>Iron</td>
<td>7</td>
<td>0.17 (0.20)</td>
<td>1.35</td>
<td>0.66</td>
</tr>
<tr>
<td>Protein</td>
<td>7</td>
<td>-0.58 (0.25)</td>
<td>0.35</td>
<td>0.14</td>
</tr>
<tr>
<td>Total fat</td>
<td>6</td>
<td>0.03 (0.06)</td>
<td>1.05</td>
<td>0.84</td>
</tr>
<tr>
<td>Vitamin A</td>
<td>6</td>
<td>-0.51 (0.35)</td>
<td>0.39</td>
<td>0.11</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>7</td>
<td>-0.13 (0.19)</td>
<td>0.98</td>
<td>0.52</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>6</td>
<td>-0.07 (0.19)</td>
<td>0.88</td>
<td>0.45</td>
</tr>
<tr>
<td>Vitamin E</td>
<td>5</td>
<td>0.05 (0.17)</td>
<td>1.10</td>
<td>0.61</td>
</tr>
<tr>
<td>Zinc</td>
<td>6</td>
<td>-0.03 (0.09)</td>
<td>0.95</td>
<td>0.69</td>
</tr>
<tr>
<td>Study</td>
<td>ASD</td>
<td>TD</td>
<td>Summary of Findings</td>
<td></td>
</tr>
<tr>
<td>-------------------------------</td>
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<td>-----------------------------------------------------------------------------------------------------------------------------------------------------</td>
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<tr>
<td>Bandini et al. (2010)</td>
<td>n = 53</td>
<td>n = 53</td>
<td>ASD group refused more <em>vegetables</em>, both in absolute amount (11 +/- 6 vs 6 +/- 5; p &lt;.0001) and as a percentage of foods offered (63% +/-31% vs 33%+/- 27%; p &lt;.0001).</td>
<td></td>
</tr>
<tr>
<td>Emond et al. (2010)</td>
<td>n = 79</td>
<td>n = 12,901</td>
<td>ASD group consumed fewer <em>vegetables</em>, salads, and <em>fresh fruit</em> but also consumed fewer sweets and fizzy drinks.</td>
<td></td>
</tr>
<tr>
<td>Johnson et al. (2008)</td>
<td>n = 19</td>
<td>n = 20</td>
<td>ASD group consumed significantly fewer <em>vegetables</em> (p &lt; .001).</td>
<td></td>
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<tr>
<td>Luckens &amp; Linsheid (2008)</td>
<td>n = 68</td>
<td>n = 40</td>
<td>ASD group had significantly higher scores on a scale assessing limited dietary variety (p &lt; .01), which was negatively associated with servings of <em>meats</em> (p &lt; .01), <em>fruits</em> (p &lt; .05), and <em>vegetables</em> (p &lt; .01).</td>
<td></td>
</tr>
<tr>
<td>Martins et al. (2008)</td>
<td>n = 41</td>
<td>n = 41</td>
<td>ASD group displayed significantly more food avoidance behaviors (p &lt; .01), with <em>vegetables</em> followed by <em>fruits</em> the most commonly avoided food types.</td>
<td></td>
</tr>
<tr>
<td>Schmitt et al. (2008)</td>
<td>n = 20</td>
<td>n = 18</td>
<td>Significantly more children with ASD choose food based on texture (70% vs. 11%; p &lt; .05), with favorite foods in ASD including <em>pizza, pasta, and cookies/candy</em>. All children in the ASD avoided mushy foods.</td>
<td></td>
</tr>
</tbody>
</table>
• 380 calories
• 2 grams of saturated fat
• 10 grams of dietary fiber
• Key micronutrients:
  Vitamin A
  Thiamin
  Riboflavin
  Niacin
  Vitamin B_{12}
  Vitamin C
  Vitamin D
  Vitamin E
  Folate
  Calcium
  Iron
  Magnesium
  Zinc

VS

• 720 calories
• 8 grams of saturated fat
• 4 grams of dietary fiber
• Key micronutrients:
  Thiamin
  Riboflavin
  Niacin
  Vitamin C
  Calcium
  Iron
  Magnesium

• No quantities of:
  Vitamin A
  Vitamin B_{12}
  Vitamin D
  Vitamin E
  Folate
  Zinc
Medical Impact

In general, no issues with gross anthropometric parameters in ASD
Long term medical sequela

Hediger et al. (2008)

Does high consumption of fats and snacks?

Egan, Dreyer, Odar, Beckwith, & Garrison, 2013

Cardiovascular disease and cancer
Quality of Life

- Increased parental stress regarding health and development
- Required to prepare multiple menus for each meal
- Disrupted family meals & further limitations in social interactions
- Reduced opportunities to eat at restaurants or social occasions
Etiology

• Behavioral Rigidity: Ahearn et al. (2001) - atypical feeding may represent an additional manifestation of this core diagnostic feature in ASD.
• Evidence:
  – Nadon, Feldman, Dunn, & Gisel (2011)
    • Not eating the same foods across settings (e.g., daycare; home)
    • Less likely to tolerate the introduction of new foods on their plate
  – Provost, Crowe, Osbourn, McClain, & Skipper (2010)
    • More likely to have difficulty eating outside the home (e.g., schools, restaurants)
Pediatric Feeding Disorders: A Quantitative Synthesis of Treatment Outcomes

William G. Sharp · David L. Jaques · Jane F. Morton · Caitlin V. Herzinger

Abstract  A systematic review of the literature regarding treatment of pediatric feeding disorders was conducted. Articles in peer-reviewed scientific journals (1970–2010) evaluating treatment of severe food refusal or selectivity were identified. Studies demonstrating strict experimental control were selected and analyzed. Forty-eight single-case research studies reporting outcomes for 96 participants were included in the review. Most children presented with complex medical and developmental concerns and were treated at multidisciplinary feeding disorders programs. All studies involved behavioral intervention; no well-controlled studies evaluating feeding interventions by other theoretical perspectives or clinical disciplines met inclusion criteria. Results indicated that behavioral intervention was associated with significant improvements in feeding behavior. Clinical and research implications are discussed, including movement toward the identification of key behavioral antecedents and consequences that promote appropriate mealtime performance, as well as the need to better document outcomes beyond behavioral improvements, such as changes in anthropometric parameters, generalization of treatment gains to caregivers, and improvements in nutritional status.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (in months)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$M = 48.06; SD = 30.47$; range 10–168</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>62</td>
<td>64.6</td>
</tr>
<tr>
<td>Female</td>
<td>34</td>
<td>35.4</td>
</tr>
<tr>
<td>Total</td>
<td>96</td>
<td></td>
</tr>
<tr>
<td>Feeding concerns</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feeding tube</td>
<td>43</td>
<td>44.8</td>
</tr>
<tr>
<td>Food selectivity</td>
<td>30</td>
<td>31.3</td>
</tr>
<tr>
<td>Bottle/liquid dependence</td>
<td>15</td>
<td>15.6</td>
</tr>
<tr>
<td>Poor oral intake</td>
<td>8</td>
<td>8.3</td>
</tr>
<tr>
<td>Developmental issues</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reported</td>
<td>63</td>
<td>65.6</td>
</tr>
<tr>
<td>Not reported</td>
<td>23</td>
<td>23.9</td>
</tr>
<tr>
<td>“Typically developing”</td>
<td>10</td>
<td>10.5</td>
</tr>
<tr>
<td>Breakdown of developmental issues$^a$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Developmental delay</td>
<td>29</td>
<td>31.2</td>
</tr>
<tr>
<td>Autism spectrum disorder</td>
<td>22</td>
<td>23.7</td>
</tr>
<tr>
<td>Mental retardation</td>
<td>20</td>
<td>21.5</td>
</tr>
<tr>
<td>Speech/language delay</td>
<td>9</td>
<td>9.7</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>4.3</td>
</tr>
<tr>
<td>Medical issues</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reported</td>
<td>65</td>
<td>67.7</td>
</tr>
<tr>
<td>Not reported</td>
<td>31</td>
<td>32.3</td>
</tr>
<tr>
<td>Breakdown of medical issues$^a$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Failure to thrive</td>
<td>25</td>
<td>26.0</td>
</tr>
<tr>
<td>Gastroesophageal reflux</td>
<td>21</td>
<td>22.8</td>
</tr>
<tr>
<td>Gastrointestinal problems</td>
<td>14</td>
<td>15.2</td>
</tr>
<tr>
<td>Anatomical abnormalities</td>
<td>10</td>
<td>10.9</td>
</tr>
<tr>
<td>Genetic disorder</td>
<td>10</td>
<td>10.9</td>
</tr>
<tr>
<td>Pulmonary disorder/dysfunction</td>
<td>7</td>
<td>7.6</td>
</tr>
<tr>
<td>CNS disorder/malformation</td>
<td>6</td>
<td>6.5</td>
</tr>
<tr>
<td>Prematurity</td>
<td>4</td>
<td>4.3</td>
</tr>
<tr>
<td>Food allergies</td>
<td>3</td>
<td>3.3</td>
</tr>
<tr>
<td>Cardiac impairment</td>
<td>2</td>
<td>2.2</td>
</tr>
<tr>
<td>Other</td>
<td>11</td>
<td>12.0</td>
</tr>
</tbody>
</table>
Etiology: Organic

- The **available evidence** suggests that the type and prevalence of gastrointestinal signs, symptoms, and conditions reported in ASD are **similar** to that observed in the **general population**, with the possible exception of feeding problems, chronic constipation and encopresis as a consequence of constipation (see Buie et al., 2010 for a review).
Etiology: Learning Process

• Regardless of what factors contribute to the emergence of restrictive patterns of intake in ASD, food selectivity often is maintained by a cycle of negative reinforcement, with learning occurring on both sides of the child/parent dyad.
Learning Process: Parent-Child Dyad

- Child displays refusal behaviors in response to a bite presentation.
- Parent removes the feeding demand.
- Refusal behaviors are reinforced.
Learning Process: Parent-Child Dyad

Child displays refusal behaviors in response to a bite presentation.

Parent removes the feeding demand.

Food removal is reinforced.

Child stops crying, screaming, aggression etc.

Refusal behaviors are reinforced.
“The Arms Race”
Topography and Prevalence

• Up to 95% of children with ASD might experience some type of feeding problem (Lockner et al., 2008)

• Food selectivity: only eating a narrow variety of foods by type, texture, and/or presentation
  – Reject vegetables and fruits
  – Preference for crispy or crunchy snack foods

• THIS IS NOT JUST PICKY EATING
Environmental Influence:

A - Antecedent

B - Behavior

C - Consequence
Antecedent-based Interventions may involve:
• Identifying situations associated with challenging behavior
• Modify the environment to decrease probability of challenging behavior
  • Task demands, task presentation, length of engagement
  • Promotes contact with reinforcement
Gets upset when taken to the bathroom
vs.
Hits, cries, and flops on the floor when I try to take him to the bathroom

Does not sleep well at night
vs.
Wakes up 2 to 3 times per night and cries out for me

Does not like new food
vs.
Pushes away the plate and leaves the table when new food presented
Consequence

Behavior

Desirable/Pleasant Stimulus

Positive Reinforcement

Negative Reinforcement

Positive Punishment

Aversive/Unpleasant Stimulus

Negative Punishment
Key Points

• Once medically cleared……..

• Assessment and intervention should focus on both the antecedents and consequences associated with a behavior
  – Antecedent interventions: Match demand with child’s presentation
    • Promote contact with reinforcement
    • Stimulus fading beginning with a reasonable demand
  – Consequence Based Intervention
    • Consider the function of the behavior – escape, avoidance, attention, access
    • Reinforcement of alternative (more desirable) behavior
Assessment of Feeding Concerns

“We don’t have a 99 cent value menu. Eat your broccoli.”
Behavioral Observations

• Key Considerations:
  – Naturalistic versus Structured
  – Environment
  – Feeder
  – Foods (type, texture)
  – Presentation format
  – Bolus size

• Few examples in the literature
  – Munk & Repp (1994)
  – Ahearn, Castine, Nault, & Green (2001)
  – Sharp, Jaquess, & Lukens (2013)
Pre-scooped food placed on plate in front of child

5s delay

Verbal Prompt

5s delay

Gestural Prompt

5s delay

Physical Prompt

Bite Acceptance

Praise

Combined Inappropriate Behavior

20s break from the meal
Behavioral Observation: Pros/Cons

• Pros:
  – “Gold standard” of assessment, provides objective data regarding actually performance

• Cons:
  – Design questions
  – Cost (e.g., time, data collection, emotional response)
Think about mealtimes with your child over the past 6 months. Rate the following items according to how often each occurs, using the following scale:

<table>
<thead>
<tr>
<th>Never/Rarely</th>
<th>Seldom</th>
<th>Occasionally</th>
<th>Often</th>
<th>At Almost Every Meal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Circle YES if you think an item is a problem for you or NO if you think it is not a problem.

1. My child cries or screams during mealtimes.
2. My child turns his/her face or body away from food.
3. My child remains seated at the table until the meal is finished.
4. My child expels (spits out) food that he/she has eaten.
5. My child is aggressive during mealtimes (hitting, kicking, scratching others).
7. My child is disruptive during mealtimes (pushing/throwing utensils, food).
8. My child closes his/her mouth tightly when food is presented.
9. My child is flexible about mealtime routines (e.g., times for meals, seating arrangements, place settings).
10. My child is willing to try new foods.
Standardized Assessments: Pros/Cons

• Pros:
  – Quick access to information
    • Time
    • Scoring
    • Yields important data regarding parent perception of problem

• Cons:
  – No link with behavioral data
  – No cut-off scores for clinical interpretation

▪ Screening measure?
Nutrition Assessment: Diet Analysis

• Clinical interview
  – Preferred food list
  – Feeding schedule
    • School vs. weekend
    • Grazing
• Three-day food intake record
The Marcus Autism Center Pediatric Feeding Disorder Program

Instructions: Indicate foods your child currently eats (Preferred), foods your child used to eat (Dropped), and foods you would like for your child to eat (Target) by marking an X in the column.

<table>
<thead>
<tr>
<th>Protein</th>
<th>Preferred</th>
<th>Dropped</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baked Beans, Vegetarian</td>
<td></td>
<td></td>
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<tr>
<td>Black-eyed Pea</td>
<td></td>
<td></td>
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<tr>
<td>Cheese, slice</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Cheese, string</td>
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<td></td>
<td></td>
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<tr>
<td>Cottage Cheese</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Chicken Breast Strips - Tyson - fzn</td>
<td></td>
<td></td>
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<tr>
<td>Chicken Breast, canned, Swanson</td>
<td></td>
<td></td>
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<tr>
<td>Chicken Nuggets</td>
<td></td>
<td></td>
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<tr>
<td>Egg beaters - carton</td>
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<tr>
<td>Fish Stick</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Garbanzo Bean</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Hamburger, frozen, White Castle</td>
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<tr>
<td>Hot Dog</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Peanut Butter Sandwich, grape jelly</td>
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<td></td>
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<tr>
<td>Vienna Saugage</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Vanilla yogurt</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Strawberry Yogurt</td>
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</table>
Behavioral Intervention to Expand Dietary Diversity
Levels of Intervention

1. **Parent Consultation**
   - Limited clinical contact (e.g., 1 to 2 visits)
   - Involves guidance, education, and general recommendations
   - Educational handouts and parents primary agents of change

2. **Outpatient Treatment**
   - Regular, ongoing clinical contact (e.g., weekly appointments)
   - Child and family work directly with clinician to modify feeding behaviors or dietary intake
   - “Scope of practice” and cross disciplinary collaboration

3. **Intensive Programs**
   - Admission to inpatient or day treatment unit up to 8 weeks or more
   - Interdisciplinary treatment team: Behavioral psychology, nutrition, oral-motor, social work, nursing
   - Trained therapist implements treatment protocol and parent training occurs once behaviors stable
Child-guided approach

• Child’s behavior:
  – Guides starting point and behavioral elements
  – Decisions rules of increasing in feeding demand
    • Involves the following key behaviors
      – Increase approach: Rapid Acceptance with minimal prompting
      – Decreased avoidance: Crying, negative statements, gagging, grimaces

• Generalization to caregivers once target level achieved
Medical Considerations

Work with medical team to assess presence of:

• (1) Metabolic abnormalities or defects in absorption that accompany certain conditions
  – cystic fibrosis, mitochondrial disease, short bowel syndrome, or lactose intolerance
• (2) Gastrointestinal issues
  – gastroesophageal reflux, gastroenteritis, dysmotility
• (3) Food allergies
Articles in peer-reviewed scientific journals (1970–2010) evaluating treatment of severe food refusal or selectivity were identified.

Studies demonstrating strict experimental control were selected and analyzed.

Forty-eight single-case research studies reporting outcomes for 96 participants were included in the review.

Most children presented with complex medical and developmental concerns and were treated at multidisciplinary feeding disorders programs.

- 23.7% diagnosed with ASD

All studies involved behavioral intervention; no well controlled studies evaluating feeding interventions by other theoretical perspectives or clinical disciplines met inclusion criteria.
Sharp et al. (2010)

Setting:
• 60.4% - Inpatient or day treatment setting
• 29.2% - Home/school
• 10.4% - Outpatient clinics
• 6.3% - Residential facilities

Most Common Treatment Packages:
• Escape extinction
• Differential Reinforcement of an Alternative Behavior
• Antecedent Manipulations
# Pediatric Feeding Disorders: A Quantitative Synthesis of Treatment Outcomes

William G. Sharp · David L. Jaquess · Jane F. Morton · Caitlin V. Herzinger

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th># Contributing studies (%)</th>
<th># Contributing participants (%)</th>
<th>Mean PND (Standard deviation) n = 109&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Mean NAP (Standard deviation) n = 109&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Effect size (d) n = 106&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceptance (Percent)</td>
<td>n = 29 (60.4%)</td>
<td>n = 54 (56.3%)</td>
<td>87.87 (31.63)</td>
<td>.97 (.09)</td>
<td>2.598</td>
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<tr>
<td>Acceptance (Frequency)</td>
<td>n = 6 (12.5%)</td>
<td>n = 17 (17.7%)</td>
<td>88.8 (24.8)</td>
<td>.98 (.04)</td>
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<tr>
<td>Swallowing (Percent)</td>
<td>n = 11 (22.9%)</td>
<td>n = 22 (22.9%)</td>
<td>81.75 (36.04)</td>
<td>.91 (.04)</td>
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<td>Swallowing (Frequency)</td>
<td>n = 2 (4.2%)</td>
<td>n = 7 (7.3%)</td>
<td>98.85 (3.27)</td>
<td>.98 (.03)</td>
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<tr>
<td>Volume</td>
<td>n = 6 (12.5%)</td>
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<td>95.40 (5.5)</td>
<td>.97 (.03)</td>
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<tr>
<td>Total</td>
<td>n = 54</td>
<td>n = 109&lt;sup&gt;a&lt;/sup&gt;</td>
<td>87.95 (29.54)</td>
<td>.96 (.12)</td>
<td>2.46</td>
</tr>
</tbody>
</table>

PND percent of non-overlapping data, NAP non-overlap of all pairs
<sup>a</sup> Data for some participants contributed to more than one dependent variable

Metric (small effect = .2, medium = .5, large = .8)
Evidence-based treatments for depression and anxiety versus treatment-as-usual: A meta-analysis of direct comparisons

Bruce E. Wampold a,b, Stephanie L. Budge c, Kevin M. Laska a, A.C. Del Re a,d, Timothy P. Baardseth a, Christoph Flückiger a,e, Takuya Minami a, D. Martin Kivlighan II a, Wade Gunn a

a University of Wisconsin, Madison, USA
b Forskningsinstituttet, Medos Bad Psychiatric Center, Norway
c University of Louisville, USA
d VA Palo Alto Health Care System & Stanford University School of Medicine, USA
e University of Bern, Switzerland

<table>
<thead>
<tr>
<th>Author (Year)</th>
<th>TAU PPI</th>
<th>Observed d [95% CI]</th>
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<tr>
<td>Cuijpers (2005)</td>
<td>1</td>
<td>0.18 [-0.01, 0.37]</td>
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<td>Addis (2004)</td>
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<td>Marcus (1997)</td>
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<td>van Schalk (2006)</td>
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<td>Wagner (2007)</td>
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<td>0.91 [-0.37, 2.20]</td>
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Fig. 2. Forest plot of effects, in order of TAU PPI.
A Retrospective Chart Review of Dietary Diversity and Feeding Behavior of Children With Autism Spectrum Disorder Before and After Admission to a Day-Treatment Program

William G. Sharp,¹,² David L. Jaquess,¹,² Jane F. Morton,¹,² and Aida G. Miles³

Figure 1. Acceptance and swallowing of nonpreferred food by time
Sharp et al. (2010)

• Key points:
  – With relatively few interdisciplinary feeding programs spread out geographically, developing and evaluating alternative treatment avenues will help assure appropriate access to care.
  – Need to establish evidence base for other disciplines providing feeding therapy (e.g., medical, occupational therapy, speech therapy, dietetics).
# Key – Data Collection

## Therapist Bite-by-Bite Data Sheet

**Child:** | **Date:** | **Data Collector:** | **Feeder:**
---|---|---|---
**Start Time:** | **Stop Time:** | **Protocol:** | **Bolus size:**
**Pre-Session Food Weight:** | **Post-Session Food Weight:** | **Food Spill:** | **Food Weight Difference:**

<table>
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<tr>
<th>Module</th>
<th>Session #</th>
<th>Bite Number</th>
<th>Act ((\geq 5)/1(VGP))</th>
<th>Expel (a/p)</th>
<th>Pack (✓)</th>
<th>Mouth Clean (✓)</th>
<th>Gag (✓)</th>
<th>Cough (✓)</th>
<th>Emesis (✓)</th>
<th>CLS (✓)</th>
<th>Negative Voc (✓)</th>
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<td>5.</td>
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**Session Totals**

| 6. |
| 7. |
| 8. |
| 9. |
| 10. |

**Session Totals**
General Behavioral Concepts

Treatment must involve:

- **Escape Extinction**
  - Levels-
    - Ignoring negative statements
    - Non-removal of the plate
    - Non-removal of the spoon
    - Physical guidance

- **Exposure with Response Prevention**

- **Differential Reinforcement**
  - Types-
    - Praise and attention
    - Access to preferred activities
    - Consumption of preferred food
    - Escape / break

- **Persistence with a Feeding Demand**
General Behavioral Concepts

- Reasonable Demand (a.k.a. - Antecedent manipulations + fading)
  - Match feeding demand to child’s response during meals
  - Increase demand after stability (Must take data!!!!)
    - 3 meals with no problems behaviors, double the bite size
- Manipulation: Portion size, bite volume, food texture, mealtime variety
Parent Consultation

• Increase structure and routine:
  – Regular meal/snack schedule
  – Meals involve a table with age appropriate seating

• Differential Attention
  – Provide attention and praise for appropriate mealtime behaviors-
    • Accepting bites, swallowing, eating properly with a spoon, trying a new food, or staying seated throughout the meal
  – Ignore minor behavior problems
    • Whining, negative statements regarding food, messy eating (if age appropriate)
Parent Consultation

• Education regarding developmental considerations
  – Oral motor skills – Age and texture?
  – Self-feeding skills – Messy eating?
  – Pickiness and appetite fluctuations – Selectivity?
Outpatient treatment

- Extinction + differential reinforcement + antecedent manipulation

**Antecedent Manipulations:**
- Bite Size
  - Decrease demand
- Food Texture
  - Taste Exposure
- Mealtime Variety
  - Select items previously accepted or similar
- Blending Foods
  - Ratio preferred to non-preferred
- Bite Placement/Presentation
  - Flipped spoon
Treatment – Tangibles

• Differential Reinforcement:
  – To increase a behavior: reinforce it
    • Praise / attention
    • Brief toy play
    • Brief break (escape)
  – Go in small steps for complex behavior

• End on a good note:
  – Meal termination rule:
    • 20 bites or 20 minutes, whichever comes first
    • Occurs even if doing well
Extinction - Reinforcement Removal

• Attention:
  – Selective ignoring (especially verbal – but also non-verbal)
  – Change in feeder attitude is “attention”
• Escape (Caution):
  – Acceptance
    • Non-removal of the food
    • Non-removal of the spoon
  – Expelling: re-presentation (size of a pea)
  – Packing / pocketing
    • Redistribution
    • Helper food
• Issue: Extinction burst
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<tr>
<th>Food</th>
<th>¼ pea</th>
<th>½ pea</th>
<th>Pea</th>
<th>2 pea</th>
<th>½ level</th>
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</table>
Inpatient and Day Treatment Programs

• Most support for behavioral intervention has occurred in this treatment setting.
• Typically involves multidisciplinary approach
  – Nutritionist
  – OT/Speech
  – Psychologist
  – Nursing
  – Social Work
• Trained therapist implement treatment (initially)
• 4 meals daily, 6 to 8 week admissions
• When to refer?
Feeding Recommendations

1) Bite presentations: The family is encouraged to gradually introduce feeding demands with parents presenting bites on a spoon using the non-removal of the spoon (NRS) protocol enclosed. This includes ignoring disruptions, limiting prompting, and gentle blocking disruptions as needed. These procedures were also modeled during the evaluation process.

2) Use of a toy/video: Continue to provide access to a toy throughout the meal using the non-contingent access (NCA) protocol enclosed.

3) Collecting behavioral data: The family was encouraged to record child's mealtime behaviors and use this information to guide the introduction of new foods or increasing the bolus. A data sheet was provided to the family to help in this process. This information will be used with the decision rules provided below.

4) Meal length: The family should begin with a reduced session length. 5 bites was the targeted length discussed to introduce treatment. Conduct as many sessions per day as possible based on the family's schedule. The sessions should not occur during regular mealtimes, but rather as separate "snack times".
5) **Feeding demand:** All presentations should involve an empty spoon initially. Use the following decision rule to add new foods into the meal or increase the bites per meal.

**3 Meal Rule:** The following criteria must be met across three meal blocks for the empty spoon:
- 80% or > 5 sec ACC (rapid acceptance) - i.e., at least 4 out of the 5 bite presentations
- No disruptions or crying

Once a food is introduced, add the following criteria:
- 80% or > swallowing

Steps to introduce food include using the same **3 meal rule:**
1) Preferred crackers (1/4 spoon size)
2) Increase to 10 bites per session
3) 2 peas bite size *currently accepted fruit or vegetable* when mixed with rice, such as banana or okra. These foods should be cut into very small pieces, mashed or pureed based on her response. The family should pick one food to work on at a time.
4) Increase to 20 bites per session
5) Increase the bite volume for new food.
   - 1/4 level spoon
   - 1/2 level spoon
   - level spoon
5) Once she is accepting the food at a full spoon, introduce this food into meals and select another food to target and begin at step 3 for this food.
Reference - Feeding