Assessment and Treatment of Feeding Problems in Children with ASD

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Learning Objectives

• Describe food selectivity and related mealtime concerns in ASD
• Identify medical outcomes and nutrition issues associated with atypical patterns of intake
• Recognize possible contributing factors, focusing on evidence of gastrointestinal (GI) concerns in ASD
• 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 Disorder (ASD)

• DSM – 5:

Neurodevelopmental disorder(s) of unknown genetic origin where symptoms unfold over the first few years of life:

– *Persistent deficits in social communication and social interaction*

– *Restrictive, repetitive patterns of behavior, interests, or activities*
Volume: Associated Factors

• Medical Issues:
  ▪ Congenital or acquired respiratory, cardiac, and gastrointestinal problems, which cause difficult or painful eating experiences

• These include:
  ▪ Gastroesophageal reflux
  ▪ Food allergies
  ▪ Gastroenteritis
  ▪ Dysmotility
  ▪ Prematurity (with intubation)
  ▪ Bronchopulmonary dysplasia
  ▪ Short bowel syndrome
  ▪ Lactose intolerance

• Feeding problems occurs in 40-70% of children with chronic medical conditions (Lukens & Silverman, 2014)
Variety: Associated Factors

- Autism Spectrum Disorder (ASD)
Pediatric Feeding Disorders

• Chronic feeding concerns generally involve either:
  – 1) Volume - Food Refusal
  – 2) Variety - Food Selectivity

Severe problem behaviors during meals:
  – Crying
  – Disruptions
  – Elopement
  – Aggression
  – Spitting
  – Expulsion
Historical Background


- "Food is the earliest intrusion that is brought to the child from the outside world."
Research Support

• Ledford & Gast (2006)
  – Most comprehensive summary at the time
  – 7 descriptive studies identified
  – N = 381 children with ASD

• Estimates ranged from 46% and 89% of children with ASD displaying significant feeding problems
  – Often no identifiable organic precursor
Research Support

• Limitations
  – No control group and mostly descriptive studies
  – Involved biased clinical sample – e.g., feeding disorders clinic
  – Lack of uniformity definition of feeding problem
Feeding Problems and Nutrient Intake in Children with Autism Spectrum Disorders: A Meta-analysis and Comprehensive Review of the Literature

William G. Sharp · Rashelle C. Berry · Courtney McCracken · Nadrat N. Nuhu · Elizabeth Marvel · Celine A. Saulnier · Ami Klin · Warren Jones · David L. Jaquess

**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)

Fig. 1 Flow diagram of included and excluded studies
Fivefold increase in the odds of having a feeding problem in ASD

**Food Selectivity**
Preference - carbohydrates, snacks, fats, and/or processed food
Rejection - fruits and vegetables

Picky Eating vs. Food Selectivity

Food selectivity in ASD is distinct from picky eating in terms of **duration** and **intensity**

- **Duration** - Food selectivity is a chronic concern that persists overtime
  - Suarez, Nelson, and Curtis (2013) indicated no change in food selectivity in 52 children with ASD over a 20-month period.

- **Intensity** – Food selectivity more likely to involve strong refusal behaviors (e.g., crying, throwing objects, aggression)
Figure 1: Life span model of food neophobia as proposed by Dovey et al. (2008)
<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>
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<td></td>
<td></td>
<td>SMD (SE)</td>
<td>OR</td>
<td>LCL</td>
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<tr>
<td>Calcium</td>
<td>8</td>
<td>-0.65 (0.29)</td>
<td>0.31</td>
<td>0.11</td>
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<tr>
<td>Carbohydrates</td>
<td>7</td>
<td>-0.02 (0.07)</td>
<td>0.97</td>
<td>0.76</td>
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<tr>
<td>Energy</td>
<td>6</td>
<td>0 (0.06)</td>
<td>0.99</td>
<td>0.80</td>
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<tr>
<td>Fiber</td>
<td>6</td>
<td>0.09 (0.12)</td>
<td>1.18</td>
<td>0.77</td>
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<tr>
<td>Iron</td>
<td>7</td>
<td>0.17 (0.20)</td>
<td>1.35</td>
<td>0.66</td>
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<tr>
<td>Protein</td>
<td>7</td>
<td>-0.58 (0.25)</td>
<td>0.35</td>
<td>0.14</td>
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<tr>
<td>Total fat</td>
<td>6</td>
<td>0.03 (0.06)</td>
<td>1.05</td>
<td>0.84</td>
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<tr>
<td>Vitamin A</td>
<td>6</td>
<td>-0.51 (0.35)</td>
<td>0.39</td>
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<tr>
<td>Vitamin C</td>
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<td>-0.13 (0.19)</td>
<td>0.98</td>
<td>0.52</td>
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<tr>
<td>Vitamin D</td>
<td>6</td>
<td>-0.07 (0.19)</td>
<td>0.88</td>
<td>0.45</td>
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<tr>
<td>Vitamin E</td>
<td>5</td>
<td>0.05 (0.17)</td>
<td>1.10</td>
<td>0.61</td>
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<tr>
<td>Zinc</td>
<td>6</td>
<td>-0.03 (0.09)</td>
<td>0.95</td>
<td>0.69</td>
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</table>

Daily Living and Quality of Life

- Increased parental stress regarding health and development
- Reduced opportunities to eat at restaurants or social occasions
- Disrupted family meals & further limitations in social interactions
- Required to prepare multiple menus for each meal
Mothers’ Challenges in Feeding their Children with Autism Spectrum Disorder—Managing More Than Just Picky Eating

Laura G. Rogers • Joyce Magill-Evans • Gwen R. Rempel
Parent Report

• “I’m worried about his health. How can he stay alive eating two foods and drinking water?”

• “If you ever saw those meltdowns you wouldn’t want to offer non-preferred food either.”

• “He’ll gag and almost get physically sick just watching us eat something like spaghetti and meat sauce.”

• “My younger children won’t eat the food they don’t like, but my son with autism won’t even come to the table.”
The Parent Experience

• Meals described as stressful, chaotic, and energy depleting
• Mealtimes lack positive interactions
• Child’s food selectivity limited other family members’ food choices during meals
• Caregivers reported ceasing family meals to avoid further worry, guilt, and stress.

Marquenie, K., Rodger, S., Mangohig, K., & Cronin, A. (2011); Suarez, Atchison, & Lagerwey (2016)
Inclusion criteria:
1. Published between 1980 and 2012
2. Focused on pediatric population (birth to 18 years)
3. Involved a comparison group
4. Evaluated GI concerns 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 GI clinics)
2. Studies using a healthy control group (i.e., screening out children with known gut issues)
<table>
<thead>
<tr>
<th>ASD Search Terms</th>
<th>GI Search Terms</th>
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<tbody>
<tr>
<td>Asperger’s</td>
<td>Abdominal pain/abdomen</td>
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<td>Autism</td>
<td>Celiac</td>
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<tr>
<td>Autism spectrum disorder</td>
<td>Colitis</td>
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<td>Autistic</td>
<td>Constipation</td>
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<td>PDD-NOS</td>
<td>Diarrhea</td>
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<td></td>
<td>Digestion</td>
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<td>Digestive disorders/system</td>
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<td>Disaccharidase</td>
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<td>Endoscopy/colonoscopy</td>
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<td>Esophagitis/oesophagitis</td>
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<td>Gastroenterology</td>
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<td>Gastritis</td>
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<td>Gastrointestinal</td>
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<td></td>
<td>Gluten(s)</td>
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<tr>
<td></td>
<td>Gastroesophageal reflux</td>
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<tr>
<td></td>
<td>Intestines/intestinal</td>
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<tr>
<td></td>
<td>Vomiting</td>
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</table>

PDD-NOS, pervasive developmental disorder not otherwise specified.
### Table 4

**ESs, 95% Confidence Limits, and Within-Group Tests for Heterogeneity for Studies Included in the Meta-analysis for GI Symptoms**

<table>
<thead>
<tr>
<th>GI Symptom</th>
<th>Number of Contributing Studies</th>
<th>Random Effects Model</th>
<th>95% Confidence Limits</th>
<th>P</th>
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</thead>
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<td>SMD (SE)</td>
<td>Odds Ratio</td>
<td>Lower</td>
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<td>General GI concerns</td>
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<td>0.91 (0.23)</td>
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<td>Diarrhea</td>
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<td>0.71 (0.19)</td>
<td>3.63</td>
<td>1.82</td>
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<tr>
<td>Constipation</td>
<td>9</td>
<td>0.75 (0.16)</td>
<td>3.86</td>
<td>2.23</td>
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<tr>
<td>Abdominal pain</td>
<td>8</td>
<td>0.49 (0.20)</td>
<td>2.45</td>
<td>1.19</td>
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</table>

Other key findings

• Insufficient data to analyze data on other GI concerns, such as reflux or EOE, often link with organic pathology

• Although organic factors leading to difficult or painful eating, such as gastroesophageal reflux, gastroenteritis, and food allergies, often precipitate or play a role in the development of chronic feeding concerns in other pediatric populations, research has yet to identify a clear GI link to account for the emergence, maintenance, and topography of feeding problems associated with ASD.
Buie et al. (2010)

- All of the common gastrointestinal conditions encountered by individuals with typical neurologic development are also present in individuals with ASDs.
- The communication impairments characteristic of ASDs may lead to unusual presentations of gastrointestinal disorders, including sleep disturbances and problem behaviors.
- Caregivers and health care professionals should be alert to the presentation of atypical signs of common gastrointestinal disorders in patients with ASDs.
Clinical Implications

When a feeding concerns is present in ASD:

• An important first step when working with any child with a feeding disorder involves ruling out the potential contribution of organic factors (e.g., gastroesophageal reflux, food allergy) that may cause pain or discomfort along the GI tract.

• This may require adopting a lower threshold for obtaining subspecialty consultation (e.g. pediatric gastroenterologist; allergist) and increased reliance on objective testing in order to recognize pathology and facilitate a diagnosis given limitations in communication often observed in ASD (Buie et al., 2010)
A Measurement Problem

1) No universally accepted definition

2) High variability in item content

3) No direct link with actual diet and nutritional status

4) Food selectivity has been viewed as a monolithic construct (e.g., total number of items accepted or rejected), without consideration to symptom severity or dietary diversity.
Bandini et al. (2010)

Three Part Definition of Food Selectivity:

• 1) Food Refusal: Percentage of foods offered that the child will not eat

• 2) Limited Food Repertoire: Number of unique foods consumed over a three-day period

• 3) High Frequency Single Food Intake (HFSFI): Number of single food items eaten 4 to 5 or more times daily.
Bandini et al. (2010)

- 53 children with ASD vs. 58 typically developing children (ages 3-11 years).
- Children with ASD:
  - 1) Exhibited greater food refusal (rejecting 41.7% of food items versus 18.9% rejected by peers)
  - 2) Consumed a more limited dietary repertoire (consuming an average of 19 foods over a three day period vs 22.5 consumed by peers)
- HFSFI was rarely observed in both groups.
Framework for defining food selectivity by severity

<table>
<thead>
<tr>
<th>Category</th>
<th>Criteria</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe Food Selectivity</td>
<td>• Complete rejection of one or more food groups</td>
<td>Increases the risk of micro- and/or macronutrient deficiency (e.g., scurvy; iron deficiency anemia; kwashiorkor)</td>
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<tr>
<td></td>
<td>• Accepts five or fewer total food items</td>
<td>Further narrowing of the diet would eliminate additional food groups</td>
</tr>
<tr>
<td>Moderate Food Selectivity</td>
<td>• Consumes two or fewer items in one or more food groups</td>
<td>Reflects a diet that may lack diversity of nutrient-dense foods; further restriction increases likelihood of nutrient deficiency</td>
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<tr>
<td></td>
<td>• Regularly (weekly) accepts at least one item across the five food groups</td>
<td>Decreases likelihood of being diagnosed with a nutrient deficiency; however, intake may be limited to a handful of preferred items or involve high intake of a single food group</td>
</tr>
<tr>
<td>Mild Food Selectivity</td>
<td>• Diet involves at least three or more items from each good group (15 total foods); more than half of items fall into one food group</td>
<td>Suggests low probability of nutrient deficiency while recognizing child may show preference for a certain food group (e.g., grains)</td>
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<tr>
<td></td>
<td>• Consistently (daily) accepts foods from all five food groups</td>
<td>Indicates the child maintains a consistent degree of dietary diversity</td>
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</table>
The Behavioral Perspective

• Why?
  – Symptom severity
  – Medical concern vs. quality of life issue

• How?
  – Severe  -> Intensive Multidisciplinary Intervention
  – Moderate -> Outpatient/home interventions
  – Mild    -> Adapt Existing Guidelines for Introducing Food (e.g., Ellen Satter)
The Autism MEAL Plan: A parent-training curriculum to manage eating aversions and low intake among children with autism

William G Sharp, T Lindsey Burrell, and David L Jaquess

Behavioral Parent Training to Address Feeding Problems in Children with Autism Spectrum Disorder: A Pilot Trial

Cynthia R. Johnson, Emily Foldes, Alexandra DeMand, and Maria Mori Brooks
Parent vs. Child Perspective

• Parent
  – Experienced eater
  – Flexibility with different food types and tastes
  – Eats large portions of foods

• Child
  – Non-preferred foods are aversive/noxious
  – Preferred foods can be contaminated
    • Change in presentation and contact with non-preferred foods
  – Highly motivated to avoid contact
Involve children in the process through choice

- Food items to target
- Initial bite volume
- Jump in volume
- Which foods to add next
Designing Interventions

• Overarching philosophy:
  – Treatment involves persisting with a reasonable demand
  – In order to establish traction for behavior change, begin with “zone of likely success”
    • Can not reinforce a behavior is low probability of occurring
  – And should consider the complete tool box of antecedent and consequence based strategies
    • If only relying on consequences, may not be able to replace/override function
Other aspects of the meal.....

• 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)
General Behavioral Concepts

Treatment must involve:

Levels-
- Ignoring negative statements
- Non-removal of the plate/spoon

Types-
- Praise and attention
- Access to preferred activities
- Consumption of preferred food
- Escape / break
Decision Rules

• Make sure behavior is stable across meals
  – After 3 meals with few problem behaviors, increase the demand
    • Add new food item
    • Increase bite number
    • Increase bite volume
    • Increase meal length
  – If problem behaviors persist across 2 meals, reduce the demand and break into smaller steps
# Therapist Bite-by-Bite Data Sheet

<table>
<thead>
<tr>
<th>Module</th>
<th>Session #</th>
<th>Bite Number</th>
<th>Angle (&gt;5°/≤5°)</th>
<th>Pack (✓)</th>
<th>Mouth Clean (✓)</th>
<th>Gag (✓)</th>
<th>Cough (✓)</th>
<th>Emission (✓)</th>
<th>CI's (✓)</th>
<th>Negative Voice (✓)</th>
<th>Food</th>
<th>Instructions</th>
<th>Prompts</th>
<th>Consequences</th>
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</table>
Power of Choice

- Food items to target
- Initial bite volume
- Jump in volume
- Which foods to add next
<table>
<thead>
<tr>
<th>Food</th>
<th>¼ pea</th>
<th>½ pea</th>
<th>Pea</th>
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<th>½ level</th>
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### What Is Known

1) Food selectivity is primarily an issue of poor dietary diversity; compromised growth is less likely. Associated sequelae may include vitamin and mineral deficiencies, decreased quality of life for families and increased risk for childhood obesity.

2) Nutritional monitoring — including serum testing of vitamin levels in cases of severe food selectivity — should be included as part of routine health screening to detect possible underlying nutritional insufficiencies.

3) GI symptoms (e.g., constipation, diarrhea) are prevalent in children with ASD; however, the relationship between possible GI dysfunction and food selectivity remains unknown.

4) Degree of dietary restriction in ASD ranges from mild to severe. Children with severe food selectivity are at risk for severe malnutrition (e.g., scurvy, rickets), while mild food selectivity more closely resembles “pickiness” often observed in young children.

5) Behavioral intervention is the only well-established treatment for food selectivity in ASD, although optimal care should involve contributions from a multidisciplinary team to screen for possible dietary, oral-motor, and/or medical concerns.
Questions?
References - Feeding


References - Feeding


