

NUTRITION AND AUTISM SPECTRUM DISORDERS

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Objectives

- Understand common nutritional concerns in children with ASD
- Discuss complications and deficiencies that result from various nutritional concerns
- Discuss recommendations for improving nutritional status of children with ASD
- Understand general principles of a healthy diet

Common Nutrition Concerns with ASD

- Food selectivity
- Common nutrient deficiencies
- New food anxiety
- Food/fluid refusal
- Overweight
- Underweight
- Obsessive/perseverative interests about food presentation or routine
- Other non nutritional factors

Food Selectivity in Children with ASD

Author	Year	Findings
Cornish	1998	70% children with ASD were selective eaters
Williams et al.	2000	67% of parents complained of food selectivity in their children with ASD
Schreck and Williams	2006	72% parents reported their children had limited foods
Schmitt et al.	2008	70% of children with ASD selected food based on texture (11% children without ASD)
Whiteley et al.	2000	83% parents reported children had restricted number of foods

Food Selectivity in Children with ASD

	Year	Findings
Bandini et al.	2010	41% children with ASD rejected food more often than typically developing children (19%)
Klein and Nowak	1999	53% of patients were unwilling to try new foods

Food Selectivity

- Texture
- Color
- Type
- Shape
- Brand
- Container/Packaging
- Temperature
- Visual presentation

Factors Associated with Food Selectivity: Texture

- Ayres describes an overreaction to certain experiences of touch resulting in an observable aversion or negative behavioral response to tactile stimuli.
- Ben-Sasson et al. studied toddlers and found of those with ASD; 89% were under responsive; 75% were over responsive and 67% were both under- and over responsive

Factors Associated with Food Selectivity: Texture (cont.)

- Eating is one of the areas of daily life activities that may be negatively affected by sensory aversions
- Oral defensiveness may be part of a larger problem in modulating sensory input
- Smith et al. found children with tactile defensiveness showed significant differences in eating habits and food choices as compared to children without tactile defensiveness
- Leekam et al. suggest particular sensory inputs can cause behavior problems in individuals with ASD
- Schmitt et al. found boys with ASD based food choices on texture more often than controls

Concerns with Selective Eating

- Nutrient deficiency
- Growth retardation
- Obesity
- Poor bone growth

Treatment for Food Selectivity

Author	Year	Findings
Laud et al.	2009	Feeding behaviors improved in children with ASD participating in an intensive interdisciplinary feeding program.
Sharp et al.	2011	After admission to an intensive feeding day treatment program, children with ASD showed significant improvements regarding food variety, consumption and appropriate mealtime behavior.

Nutrition Intervention: Selective Eating

- Multiple introductions of a new food
- Alternative sources of nutrients
- Complete pediatric MVI if needed
- Consider behavioral or feeding intervention if severe selectivity

Common Nutrient Deficiencies

- Lower intake of calcium
- Lower intake of protein

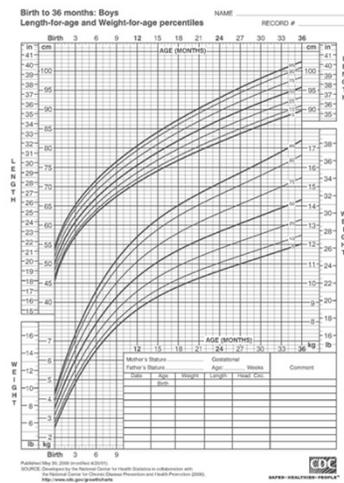
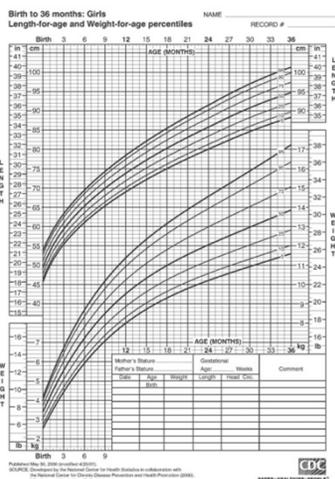
Nutrition Implications: Nutrient Deficiencies

- Suboptimal growth
- Disturbance in mood, emotion and behavior
- Suboptimal function of body functions-immune system, vascular system, metabolic system
- Cognitive function

Expected Childhood Growth

- Proportionality
- Preventing overweight/obesity
- Concerns for under nutrition

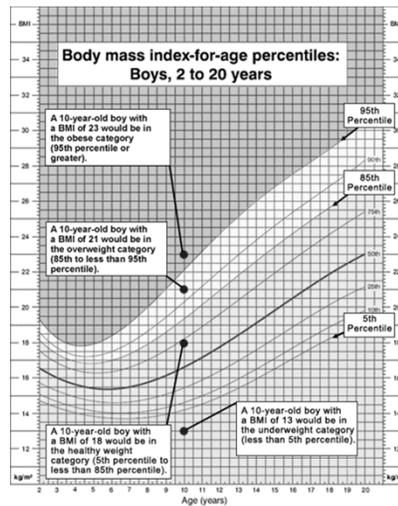
Expected Childhood Growth



Expected Childhood Growth

- Proportionality
 - BMI percentile
 - BMI= $\frac{\text{weight (kilograms)}}{\text{height (meters)}^2}$
 - Plotted on percentile chart

Interpreting BMI Percentile Results



Factors Related to Over/under Eating

- Hunger vs appetite
- Medications may affect hunger/satiety
 - May need to work on medication management

Risks of Overweight & Obesity

- Chronic medical complications
- Orthopedic complications
- Selective eating

Preventing Overweight & Obesity

- Encourage active play
- Limit screen time
- Eat right
- Stay on course

Risks of Underweight

- Nutrient deficiencies
- Poor growth
- Decreased immunity
- Less effective participation in school/activities/therapy

Preventing Underweight or Under Nutrition

- Continue to provide varied food options
- Use calorie boosters or oral supplements as needed
- Consider vitamin supplementation

Gluten Free Casein Free Diet

- Gluten is a protein occurring in wheat, barley, rye, commercially available oats
 - Initially developed for individuals with Celiac Disease
 - Digestive, autoimmune disorder
 - Symptoms include: bloating, abdominal pain, gas, diarrhea, weight loss, growth problems in children
- Casein is the protein most often found in milk and dairy products
- GFCCF diet eliminates these proteins

Prevalence of GFCCF Diet in Children with ASD

Author	Year	Finding
Harrington et al.	2006	66% of parents responding to survey reported using GFCCF as alternative treatment
Wong et al.	2006	30% parents used or had used GFCCF diet
Herndon et al.	2009	In a cross sectional study in Colorado, 31% of children with ASD used a GFCCF diet
Bandini et al.	2010	Based on 3 day food record, GFCCF diet was used in 20.7% of children
Hall et al.	2012	Found 30% used GFCCF if a study examining complementary practices

Prevalence of GF/CF Diet in Children with ASD

Author	Year	Finding
Harrington et al.	2006	66% of parents responding to survey reported using GF/CF as alternative treatment
Wong et al.	2006	30% parents used or had used GF/CF diet
Herndon et al.	2009	In a cross sectional study in Colorado, 31% of children with ASD used a GF/CF diet
Bandini et al.	2010	Based on 3 day food record, GF/CF diet was used in 20.7% of children
Hall et al.	2012	Found 30% used GF/CF if a study examining

Studies Examining GF and or GF/CF Diet

Author	Year	Type of Study	Finding
Millward et al.	2008	Review	Two small RCT were examined, 3 interventions favored the treatment, 3 interventions showed no effect. Efficacy for these diets were poor.
Buie	2013	Review	One double-blind, crossover study showed no benefit of GF diet, most studies were unblinded, observational studies and observer bias could not be controlled. Insufficient evidence to support GF diet
Mari-Bauset et al.	2014	Review	The evidence for using the GF/CF diet is weak and should only be used after diagnosis of intolerance or allergy

Concerns with Following GFCF Diet

- GFCF diet eliminates many grain products including wheat products which are enriched with iron, thiamin, niacin, riboflavin and folic acid
- GF diet may affect gut flora
 - gluten may act as prebiotic and nourish good gut bacteria
 - without gluten the proportion of harmful bacteria can increase
- Foods containing casein are also primary dietary sources of calcium
- What are long term effects of GFCF diet (osteoporosis, decreased bone density)

Most Common GI conditions in ASD

- Chronic constipation
- Abdominal pain, with or without diarrhea
- Encopresis (as a consequence of constipation)
- Others
 - GERD
 - Abdominal bloating
 - Disaccharidase deficiencies
 - Inflammation of the GI tract

Incidence of GI Symptoms in Patients with ASD

	Year	Finding
Molloy & Manning-Courtney	2003	24% of children aged 24-96 months had at least one chronic gastrointestinal symptom
Valicenti-McDermott et al.	2006	70% of children with ASD had a history of GI symptoms compared with 28% of typically developing children
Ibrahim et al.	2009	33.9% (vs. 17.6%) of children with ASD were identified with constipation, no difference in GI symptoms
Nikolov et al.	2009	22.7% of patients were positive for GI problems, primarily constipation and diarrhea
Wang et al.	2011	42% of parents reported GI problems in children with ASD compared to 12% of unaffected siblings
Gorrindo Et al.	2012	Parents reported 85% of children with ASD had GI dysfunction

Components of a Healthy Meal



General Principles of a Healthy Diet

- Balance
- Variety
- Moderation
- Changing nutrient needs based on age/developmental stage

Parent-Child Feeding Relationship

- Parent's Role
 - responsible for what is presented to eat and the manner in which it is presented
- Child's Role
 - responsible for how much and even whether they eat

How to Feed Yourself

- Trust yourself
- Be positive and dependable about feeding yourself
- Have food you enjoy
- Emphasize variety
- Don't use the terms "being good" or "being bad"
- Stop being phobic about sugar, fat and salt
- Be disciplined but not negative

Meal Planning-Tips

- Gets easier with practice
- Look for sales
- Shop your pantry
- Think seasonal
- Mix things up
- Picture the plate
- Recycle menus
- Be flexible (swap days)

Meal Planning-Benefits

- Eat healthier
- Save money
- Save time
- Make grocery shopping more efficient
- Grocery list helps prevent impulse purchases
- Eliminates last minute stress
- Helps answer 'what's for dinner?'