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## Eosinophilic Esophagitis: Introduction and Implications for Feeding

Rhonda Mattingly, Ed.D, CCC-SLP

Moderated by:  
Amy Hansen, MA, CCC-SLP, Managing Editor, [SpeechPathology.com](http://SpeechPathology.com)



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# Eosinophilic Esophagitis

Overview and implications for feeding and Development

continued<sup>ed</sup>

## Disclosure

- The presenter receives a salary for her work as an Associate Professor and Director of Clinical Education at the University of Louisville. She also received a stipend from [speechpathology.com](http://speechpathology.com) to present this course.

## Learning Objectives

After this course, participants will be able to:

- List 3 characteristics of Eosinophilic Esophagitis.
- Describe 3 characteristics of treatment of Eosinophilic Esophagitis.
- Identify 3 ways that Eosinophilic Esophagitis may influence feeding development.

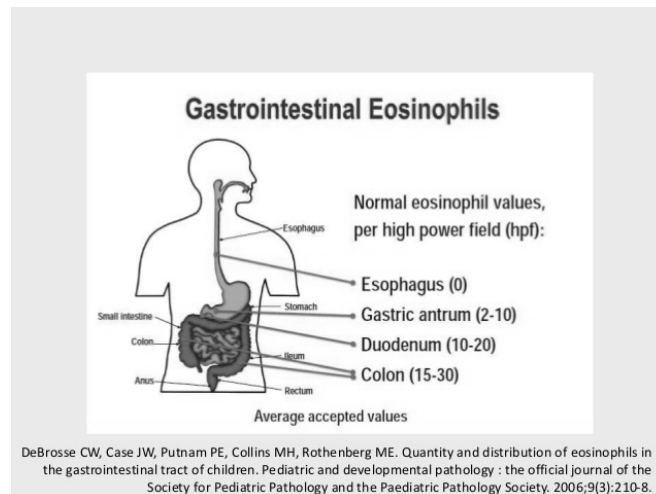
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## Eosinophils

- White blood cell/Immune system cell
- High amounts can cause autoimmune conditions
- Once they circulate in the blood they can do the following:
  - Fend off bacteria/parasites
  - Participate in allergic reactions
  - Play a role in inflammatory process
  - Kill cells

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## Gastrointestinal Eosinophils



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## History of Eosinophilic Esophagitis (EoE)

- Cases suggestive of EoE described 1970's
- EoE described in early 1990's
- Distinct EoE by Kelly, et al. in 1995

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## EoE Clinicopathologic Diagnosis (2007)

### Clinical Symptoms

- Vomiting
- Abdominal pain
- Heartburn
- Dysphagia
- Reflux symptoms
- Avoidance of Feeding/Eating

### Pathological Findings

- > 15 eosinophils per 40x high-power field
- Histology of other areas of GI tract are normal

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## EoE Clinicopathologic Diagnosis (2007)

- Exclusion of other GI Diagnoses
  - GERD
  - Infection
  - Crohn's disease
  - Hypereosinophilic syndrome

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## Consensus Report (2011)

- “Eosinophilic esophagitis represents a chronic, immune/antigen mediated, esophageal disease characterized clinically by symptoms related to esophageal dysfunction and histologically by eosinophil-predominant inflammation”.

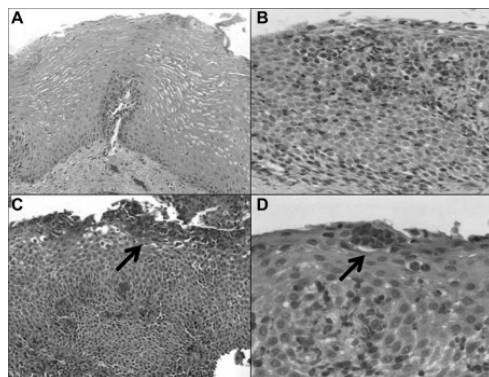
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## Diagnostic Guidelines

- Clinically – Characterized by esophageal dysfunction
- Pathologically – 1 or more biopsies revealing 15 or more Eosinophils in peak high-powered field
- Other causes for eosinophils are ruled out
- Use of PPI trial needed to make the diagnosis

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Histology of the esophagus (mucosal biopsy specimens).

A , Normal esophagus. B , EoE. C , EoE, superficial layering of surface eosinophils (arrow). D , EoE, microabscess (arrow).

Eosinophilic esophagitis: Updated consensus recommendations for children and adults  
Iacouras, Chris A., MD, Journal of Allergy and Clinical Immunology, The, Volume 128, Issue 1, 3-20.e6

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## Proton Pump Inhibitors and EoE

- Group of pharmacological agents– main action to reduce gastric acid production
- Used as part of diagnostic process – No response to PPI indicates EoE
- If PPIs effective – PPI Responsive Esophageal Eosinophilia

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## PPI Responsive Esophageal Eosinophilia

- Medication
- Disease that has same features of Eoe but is responsive to PPIs
- Some controversy about status of the diagnosis
- Possible explanations for PPI-REE:
  - Patients with PPI-REE have GERD-induced esophageal eosinophilia that responds to PPIs though pH and endoscopic monitoring has been normal
  - Patients with PPI-REE have EoE that responds to anti-inflammatory effects of PPIs that are independent of their effects on gastric acid secretion

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## Diagnoses Associated w/EoE

- Crohn's disease
- Eosinophilic gastroenteritis
- Hypereosinophilic syndrome
- Celiac disease
- Achalasia

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## Crohn's Disease

- Inflammatory bowel disease characterized by severe/chronic inflammation of intestinal wall or portion of GI tract
- Ileum and rectum most commonly affected
- Esophagus may be involved
- Symptoms include diarrhea, abdominal fever, weight loss
- Cause is unknown

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## Eosinophilic Gastroenteritis

- Less incidence than EoE
- Involves different site of disease
- Shares many common features of EoE
- Clinical manifestations – protean (can vary from nausea/vomiting to protein losing enteropathy or bowel obstruction)
- Systemic corticosteroids effectively treat but if used for longer period can result in corticosteroid toxicity

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## Hypereosinophilic Syndrome

- Rare blood disorder
- Blood contains high number of eosinophils
- Normally 500 eosinophils per microliter of blood/Hypereosinophilic – >1500 eosinophils per microliter of blood for 6 months or longer (cause not identified)
- Excessive eosinophils cause inflammation in varying tissues/eventually organ dysfunction
- Most commonly involved organs skin, lungs, heart, nervous system
- Symptoms-rash, dizziness, memory loss/confusion, cough, shortness of breath, fatigue, fever, mouth sores

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## Celiac Disease

- Inherited autoimmune disorder
- Affects digestive process of small intestine
- Celiac disease typically found in duodenum and jejunum
- Immune system reacts to intake of gluten by attacking small intestine
- Result is malabsorption of nutrients
- May be asymptomatic or may result in symptoms: abdominal bloating, chronic diarrhea or constipation, vomiting, liver/biliary tract disorders, weight loss, pale stool, iron-deficiency anemia, fatigue, FTT, delayed puberty, and/or joint pain

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## Achalasia

- Nerve cells in esophagus degenerate
- Cause unknown
- Result of degeneration: (1) Esophageal muscles do not contract normally (2) Lower esophageal sphincter does not function properly
- Most common symptom is difficulty swallowing
- May also include symptoms of chest pain, regurgitation, heartburn, difficulty burping, sensation of food being “stuck”, hiccups, and/or weight loss

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## Incidence/Prevalence of EoE

- 1-2:10,000 (Noel et al, 2004)
- 4-5: 10:00 (Liacouras et al, 2012)
- 3:1 Males with EoE (Furuta et al, 2007)
- Multiple reports familial clustering (Furuta et al, 2007)
- Chronic Condition in children/adults (Furuta et al, 2007)
- Most patients with EoE/average 4-5 foods to which responsive
- Up to 25% patients with EoE/severe food allergies

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## Incidence of Food Allergies and EoE

- When food allergy defined as food sensitivity
  - ~70% of children with EoE/will have skin-prick positivity to food
  - 50%-60% of adults with EoE/will have skin-prick positivity to food
- When food allergy defined in relation to outcome – removal of problem foods to improve endoscopy results/quality of life
  - ~50-70% improve

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## Foods most frequently implicated in Children

- |              |             |
|--------------|-------------|
| ■ Egg        | ■ Tree nuts |
| ■ Cow's milk | ■ Shellfish |
| ■ Soy        | ■ Fish      |
| ■ Wheat      | ■ Beef      |
| ■ Corn       | ■ Rye       |
| ■ Peanuts    |             |

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## Aeroallergens and EoE

- Appear to be less common triggers
- Findings suggest that aspergillus/dust mites can result in eosinophils in esophagus (some individuals have EoE during pollen season)
- Immunotherapy for aeroallergens has been shown to improve EoE (case reports)

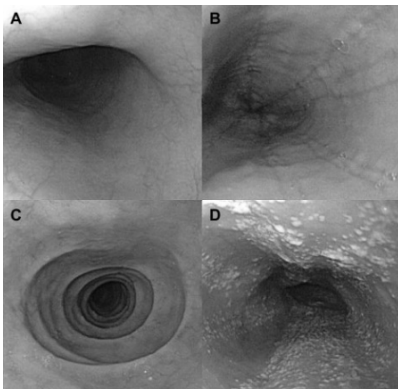
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## Commonly Occurring Symptoms of EoE

- |  |  |  |
|--|--|--|
| <ul style="list-style-type: none"> <li>▪ Infants               <ul style="list-style-type: none"> <li>▪ Refusal to feed</li> <li>▪ Failure to thrive</li> <li>▪ Feeding intolerance</li> <li>▪ Food/Oral aversion</li> <li>▪ Reflux</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>• Children               <ul style="list-style-type: none"> <li>• Vomiting</li> <li>• Dysphagia</li> <li>• Abdominal pain</li> <li>• Heartburn</li> <li>• Regurgitation</li> <li>• Food refusal</li> <li>• Food aversion</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>• Adults               <ul style="list-style-type: none"> <li>• Difficulty swallowing</li> <li>• Heartburn</li> <li>• Food impaction</li> <li>• Chest pain</li> </ul> </li> </ul> |
|--|--|--|

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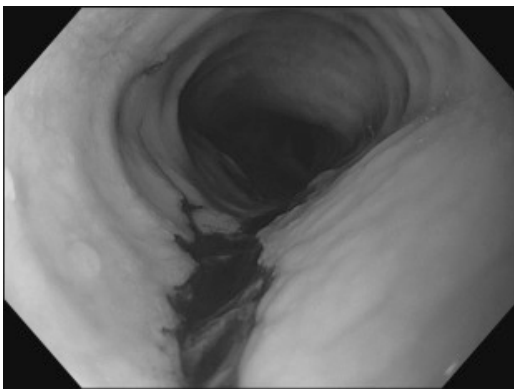
Endoscopic findings in EoE. ( A ) Normal esophagus, ( B ) linear furrows, ( C ) esophageal rings, ( D ) white plaques.

Eosinophilic Esophagitis: Diagnosis and Management  
Lieberman, Jay A., MD, Immunology and Allergy Clinics of North America, Volume 32,  
Issue 1, 67-81

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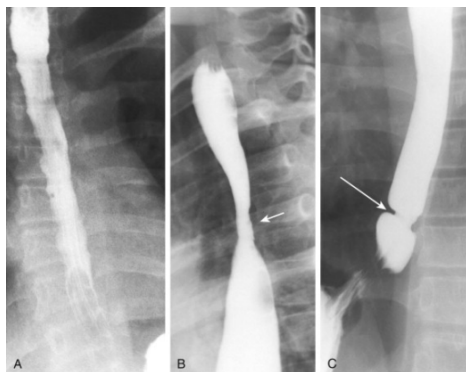
Esophageal mucosal tear after dilation in EoE patient. Patient had minimal discomfort lasting less than 24 h. These tears represent an effective esophageal dilation, probably are universal after EoE dilation, and should not be considered a complication unless hospitalization is required.

Esophageal dilation in eosinophilic esophagitis  
Richter, Joel E., MD, FACP, MACG, Best Practice & Research: Clinical Gastroenterology,  
Volume 29, Issue 5, 815-828

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Eosinophilic esophagitis. A, An esophagram shows diffuse irregular contractions of the esophagus. B, An esophagram shows a stricture ( arrow ) of the mid esophagus. C, An esophagram shows a Schatzki ring ( arrow ) of the distal esophagus.

Acquired Esophageal Disorders

Towbin, Alexander J., Caffey's Pediatric Diagnostic Imaging, Chapter 99, 1019-1031.e2

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## Treatment Options

- Dilation
- Pharmacological Therapy
- Nutrition
- Combination

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## Esophageal Dilation

- Procedure in which narrowed section of esophagus is stretched
- Typically used more often in adult patients with EoE
- Recommendation for dilation in stages
- Impacts diameter of esophagus but does not influence other symptoms/used in conjunction with nutrition and/or medication

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## Pharmacological Therapy

- PPI (to rule out EoE or to confirm)
- Corticosteroid (budesonide or fluticasone) mixed with viscous solution to reduce inflammation
- Corticosteroid / viscous liquid mixture (Slurry) shown to have a 90% resolution of EoE
- ~5% of individuals develop yeast infection
- Systemic steroids for severe cases/short term

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## Determining the Offending Substance

- Skin prick test
- Six food elimination diet (empiric elimination diet)
- Variation of six food elimination diet
- Directed/targeted elimination diet
- Oral food challenges

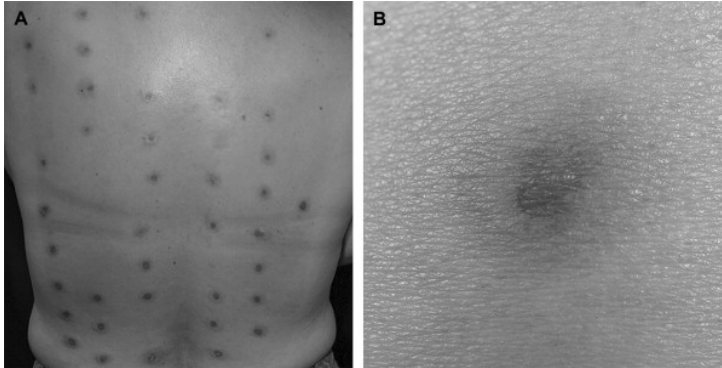
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## Skin Prick Test

- Most common standardized/validated test used for allergies
- Commercially made food/aeroallergen extract dropped on skin/scratched through
- Elicits immediate hypersensitivity response (within 15 minutes)
- Disadvantage - EoE is not only IgE mediated

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Pathergy response on the back in the pattern of skin prick testing (A) with close-up (B).

Pathergy response to skin prick testing

Johnson, Thomas L., USAF, MC, MD, Journal of Allergy and Clinical Immunology, The, Volume 119, Issue 5, 1270-1272

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## Six Food Elimination

- Six foods removed from diet
- Milk, soy, wheat, peanuts/tree nuts, eggs, and fish/shell fish
- Approach works in 50%-70% of children/adults
- Biopsies done at start/repeated every 6 weeks

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## Variation on the Six Food Elimination

- Removal of only milk, eggs, soy, wheat
- Effective approximately 50% of the time
- Removal of milk only “may be” beneficial 60%-70% of the time

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## Directed/Targeted Elimination Diet

- Eliminate food by child's history/symptoms
- Must consider that more than one food is causing reaction
- Elimination of item(s) based on diagnostic testing may be inaccurate

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## Keys to Success/Elimination Diets

- Food labels must be read
- Avoidance of food(s) if any doubt
- Consider cross-contamination
- Emphasis must be on what **CAN** be eaten

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## Elemental Formula Therapy

- Built on amino acid-based formulas
- Used less frequently than other therapies
- Effective for both children/adults approximately 90% (usually range from 96%-98%)
- Disadvantage – formula is not palatable, individual does not eat/drink anything else, repeat endoscopies as food group challenges are initiated
- Can be used with Elemental Semi-Solid-Neocate Nutra
- Water
- Typically follow 4-6 weeks / repeat endoscopy

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## Oral Food Challenges

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### Incremental Dose Challenge

**Day 1:** Consume test food between meals

- **A.M.:** Eat a small quantity of the test food  
Wait 4 hours, monitoring for adverse reaction  
If no symptoms:
- **Mid-Day:** Eat double the quantity of test food  
Wait four hours, monitoring for adverse reaction  
If no symptoms:
- **P.M.:** Eat double the quantity of test food eaten  
in the morning/afternoon

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continued

## Incremental Dose Challenge (continued)

### Day 2:

- Test food not eaten
- Eat basic elimination diet
- Monitor for any adverse reactions during the night and day

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continued

## Incremental Dose Challenge (continued)

### Day 3:

- **If no adverse reactions experienced**
  - Proceed to testing a new food, starting Day 1
- **If the results of Day 1 and/or Day 2 are unclear :**
  - Repeat Day 1, using the same food, the same test protocol, but larger doses of the test food

### Day 4:

- Monitor for delayed reactions as on Day 2

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## Sequential Incremental Dose Challenge

- Continue testing in the same manner until all excluded foods, beverages, and additives have been tested
- For each food component, the first day is the test day, and the second is a monitoring day for delayed reactions

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## Final Diet

- Exclude all foods/additives to which a positive reaction has been recorded
- Must be nutritionally (inclusive of all macro and micro-nutrients)
- There is no benefit from a rotation diet in the management of *food allergy*
- A rotation diet may be beneficial when the condition is due to dose-dependent *food intolerance*

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## Treatment Goals of EoE

- Eliminate symptoms
- Prevent complications
- Quality of life

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## Consider EoE in the Developing Child

- **Feeding Development**

- Relational Process
- Exploratory Process
- Observational Process
- Trial and error
- In the context of homeostasis, attachment, individuation
- Associated with hunger / satiation
- Associated with neural pathways being strengthened / pruned

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## Feeding/Swallowing Tx and EoE

- **Flashback** to Characteristics of Infants and Children with EoE:

### ► Infants

- Refusal to feed
- FTT
- Feeding intolerance
- Food/oral aversion
- Reflux

### ► Children

- Vomiting
- Dysphagia
- Abdominal pain
- Heartburn
- Regurgitation
- Food refusal and/or aversion

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## Roles and Responsibilities of the Feeding Therapist

- Perform clinical/instrumental swallowing exam
- ID normal/abnormal anatomy/physiology
- ID signs of possible disorders in upper aerodigestive tract/ refer
- Make decisions about mgmt of swallowing/feeding disorders
- Develop treatment plans
- Provide treatment/provide teaching
- Educate other professionals
- Integral part of the team

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## Missing Piece...

- Feeding and swallowing therapy may be included to address intolerance in infants
- Feeding and swallowing therapy may be included to address food refusal, avoidance, dysphagia
- **Feeding and swallowing therapy rarely part of the early process**

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## Infant/Child Pre-Diagnosis of EoE

- May be experiencing:
  - Overall Discomfort
  - Increasing discomfort with intake
  - Nausea
  - Regurgitation
  - Vomiting
  - Abdominal pain
  - Burning feeling
  - Difficulty swallowing
  - Gagging

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## Infant/Child During Dx/Tx Process

- May experience:
  - Multiple medical appointments
  - Uncomfortable medical testing
  - Removal of previously liked foods
  - Introduction of non-preferred foods
  - Introduction of medication
  - Re-introduction of food that may cause symptoms
  - Increased anxiety of parent

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## The Impact

- Negative experiences lead to oral / feeding aversion
- Lack of positive experiences lead to oral / feeding aversion
- Atypical experiences with feeding increase stress for parent

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## Minimizing Oral/Feeding Aversion

### Secondary to Medical Restrictions

- Encourage positive nonnutritive oral stimulation/experience
- “Possibly” therapeutic tastes (depends on many factors!)
- Exposure to allowed “mealtime” experiences
- Facilitate positive caregiver-child interaction
- Encourage “typical” care activities (cleaning gums, brushing teeth, wiping face)
- Provide infant/child with support/structure

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## Minimizing Oral/Feeding Aversion

### Secondary to Oral Food Challenges

- Food challenges are introduced as ordered by MD
- Typical non-nutritive oral experiences have been reinforced & continue
  - Exploration
  - Interaction
- Approved foods offered in a variety of forms
- Child is encouraged/not forced/within a rule-based environment

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## Rule-Based Environment

- Set of acceptable behaviors
- Consequences for behaviors that do not reinforce negative
- Reinforcement of positive behaviors
- Safe environment

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## Additive Function Model

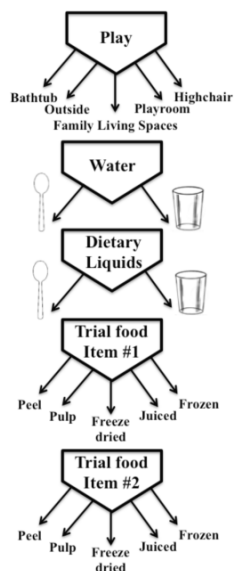
- As child is permitted foods/oral food trials offer multiple variations of allowed food
- Encourage flexibility of feeder/location/utensil/variation of permitted food – proactively
- Offer within socially appropriate feeding context-reinforcing parent / child interaction

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## Additive Function and Feeding Development

The therapy schematic is additive function, as you move from one stage to the next, while using all tools at the therapist's disposal.

(Mattingly et al, 2015)



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## Case Study

- Living with EoE

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Thank You!

**Contact Dr. Rhonda Mattingly at  
rrmatt02@louisville.edu**

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