

NASPGHAN Satellite Symposium October 14, 2022 6:30am

Build Your Nutrition Toolbox with Innovative Solutions: Practical Management of Your Pediatric Patients



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Agenda & Housekeeping



6:30 – 6:40 am Introduction Ann Scheimann, MD, MBA
6:40 – 7:00 am Eosinophilic Esophagitis Alison Cassin, MS, RD, CSP, LD

7:00 – 7:20 am US Current Practices of Nutritional Nishant Patel, MD

Management of Infants with Failure to Thrive:

What's new?

7:20 – 7:40 am Blenderized Formula: Exploring the Thick of it. Sharon Weston, MS, RD, CSP, LDN

7:40 – 8:00 am Panel Discussion



Learning Objectives



- 1. Recognize clinical scenarios in which ready-to-feed amino acid-based formula may be indicated
- 2. Identify a novel, evidence-based way of managing term infants with malnutrition and growth failure
- 3. Explore GI symptom management with enteral patients using whole food formula

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Eosinophilic Esophagitis (EoE)

Alison Cassin, MS, RD, CSP, LD Cincinnati Children's Hospital



Disclosures



Honorarium provided by Nutricia

None pose any conflict of interest for this presentation

The opinions reflected in this presentation are those of the speaker and independent of Nutricia North America

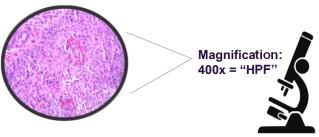
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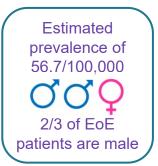
EoE is clearly defined



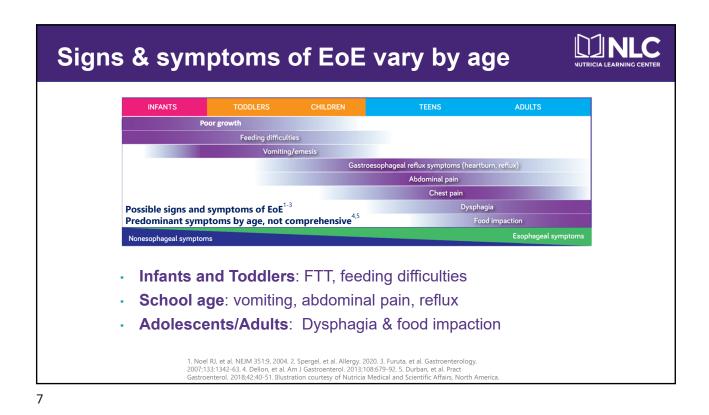
"Eosinophilic Esophagitis (EoE) represents a chronic, immune/antigen-mediated esophageal disease characterized clinically by symptoms related to esophageal dysfunction and histologically by eosinophil-predominant inflammation."

EoE if >15 eos / hpf (400x microscope field)





Dellon, et al. Am J Gastroenterol. 2013. 2... 'Image by Mattopaedia. https://creativecommons.org/licenses/by-sa/3.0/deed.en, 3. . Spergel, et al. J Pediatr Gastroenterol Nutr. 2009. 4. Dellon et al. Clin Gastroenterol Henatol. 2014.



EoE Management

Dietary management

Dietary management

Esophageal dilation

Pharmacologic management

Elemental diet

(AAF)

Dupilumab

Steroi

PPIs

Combination

(elimination diet + AAF supplementation)

Liacouras, et al. J Allergy Clin Immunol. 2011. 2. Dellon E, et al. Gastroenterology. 2018.

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Elimination diet

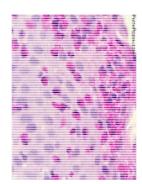
Empiric

Food "triggers" in EoE



- □ Cow milk most common
 - Peds: 65-74%Adults: 39-64%
- Wheat
 - 25-40% (up to 60% adults in one study)
- □ Egg and Soy variable
- Peanuts & Tree nuts
 - **<** 20%

Kliewer, et al 2017



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EoE can impair feeding and QoL



- Children with EoE often follow challenging elimination diets
- Restrictions impact participation- family meals, school, social activities
- □ Children with EGIDs have lower health-related quality of life (QoL) and poorer psychosocial functioning than healthy children and children with other chronic illnesses.^{2,3}
- Mothers of children with EGIDs report higher levels of parenting stress²

Wu YP, Franciosi JP, Rothenberg MA, Hommel KA. Behavioral feeding problems and parenting stress in eosinophilic gastrointestinal disorders in children. Pediatr Allergy Immun. 2012; 23:730-73. Cortina S. McGraw KJ. deAlarcon A et al. Psychological functioning of children and adolescents with eosinophili-associated gastrointestinal disorders. Child Health Care. 2010; 39:968-778.

Case History



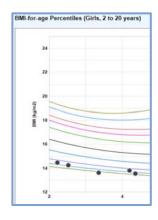
- □ 3-year-old female
- Breastfed in infancy
 - history of vomiting with standard formula
- Feeding challenges
 - prefers to eat purees, refused textured foods
 - referred to speech/OT for feeding evaluation



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Case History, cont.





■ Mild malnutrition

■ BMI z-score = -1.8

EoE diagnosis & therapy



- Referred to GI when feeding issues persisted
- Diagnosed with EoE after EGD with biopsies
- Therapy
 - Initially treated with high dose PPI
 - Follow up EGD showed persistent inflammation
 - Parents elected diet elimination therapy

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Empiric six food elimination diet (SFED)





Elimination diets are potentially low in:



- □ Protein
- □ Fat and essential fatty acids, omega-3s
- Calcium and vitamin D
- □ Zinc, copper, selenium, iodine

Meyer et al 2018, Berry et al 2015, Christie et al 2002

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Nutrient profiles of plant-based 'milk' (PBM) Nutritional Protein Calories Fat Carbohydrate Sugar Calcium Vitamin D comparison of cow milk with plant-based 'milks' IU mg Cow Milk 150 13 12 8 8 120 300 9 to 22 7 to 20 0 to 1 2 to 3.5 1 to 20 0 to 18 125 100 to 450 5 0 to 1 8 to 13 0 to 9 125 100 to 450 2.5 100 70 to 170 2 to 4 5 to 6 1 to 35 0 to 23 150 400 4 2.5 24 19 120 350 8 5 10 11 150 450 1 2.5 20 13 120 300 Note: there are variations in plant-based milk nutrients because of different products available: averages or ranges are required



North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition Position Paper: Plantbased Milks

*Russell J. Merritt, [†]Sarah E. Fleet, [‡]Amanda Fifi, [§]Candi Jump, ^{||}Sally Schwartz, [¶]Timothy Sentongo, ^{#**}Debora Duro, ^{††}Jeffrey Rudolph, and ^{‡‡}Justine Turner, for the NASPGHAN Committee on Nutrition

Recommendations

- When cow's milk is contraindicated, hypoallergenic formula is preferable
 - this is consistent with ESPGHAN & DRACMA guidelines

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Patient accepted a few SFED-compliant foods



- Applesauce
- Organic O's cereal
- Coconut milk yogurt
- Chickpea puffs
- Low fat
- Low protein
- Low calorie
- Deficient in several micronutrients

Formula selection for our patient



- □ Ready-to-feed (RTF) amino acid-based formula (AAF)
- □ 8 ounces, 2-3 times daily
- Daycare reticent to mix formulaRTF preferred!

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Benefits of RTF AAF



- Good source of protein while following elimination diet in context of feeding concerns
- Provides 500-600 calories per day (40% of needs)
- □ Good source of vitamins/minerals



Benefits of RTF AAF



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- Good source of micronutrients



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Addition of formula improved outcomes for our patient



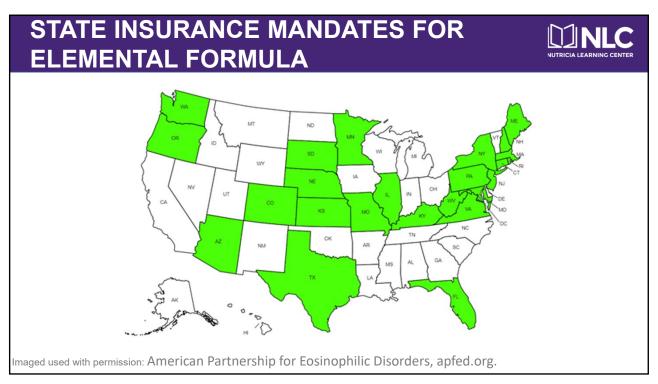
- Growth improvement
 - Weight gain
 - BMI z-score: -0.40
- Hypoallergenic nature of formula did not interfere with diet therapy

"Fringe" formula benefits



- Provided caregivers with reassurance on nutritional adequacy of diet
 - Improvements to QoL
- Reduced reliance on high-cost allergenfree food alternatives

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Diet elimination was effective!



- Patient pursued feeding therapy to expand PO food intake
- Trialed and reintroduced soy, egg and nuts
- Continues to drink
 RTF AAF as her milkalternative beverage



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US Current Practices
of Nutritional
Management of Infants
with Failure to Thrive:
What's new?



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Disclosures



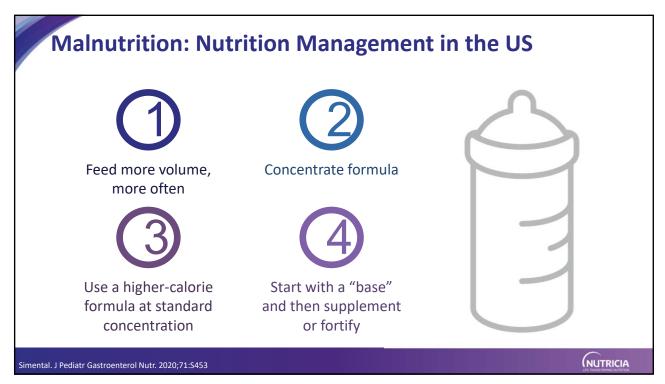
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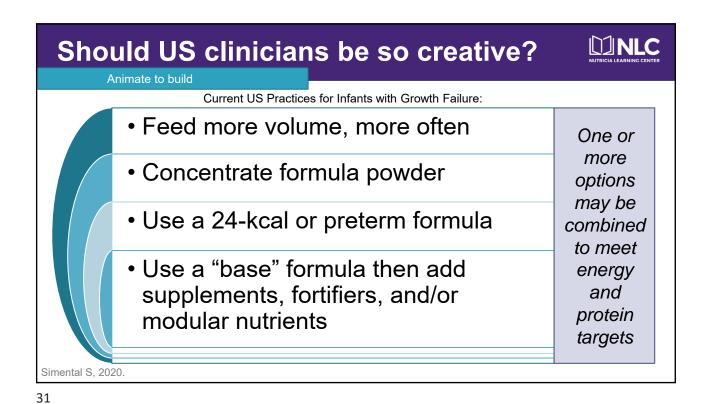
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What are challenges we encounter in feeding infants with growth failure?

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Tolerability and Hydration

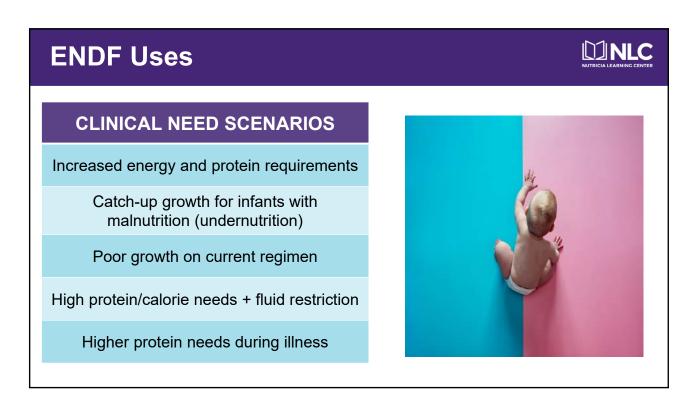
Unbalanced Nutrient Ratio

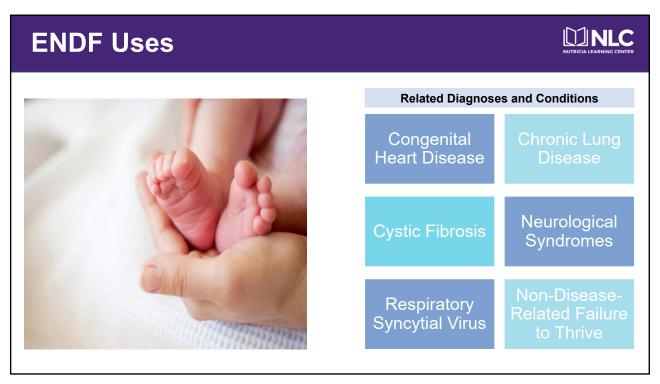
Mixing Errors

Delays in Advancing

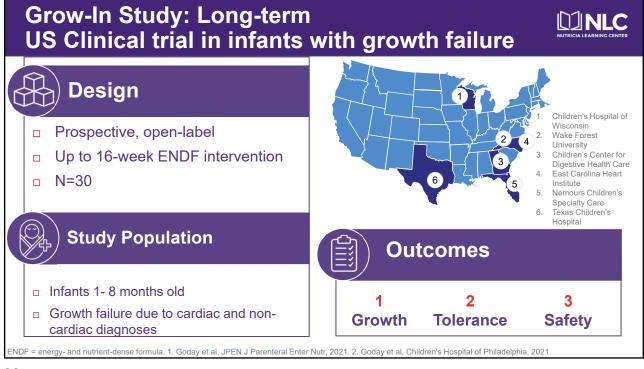
Parental Stress

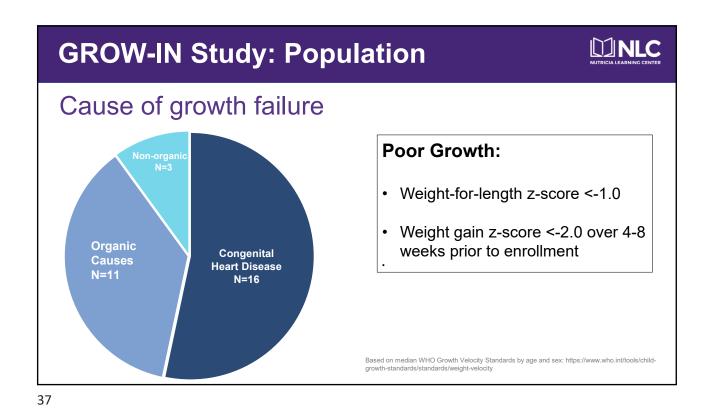
Breastfeeding



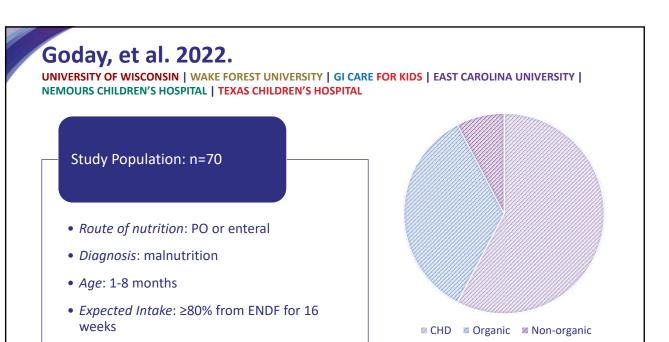












Goday, et al. 2022.

UNIVERSITY OF WISCONSIN | WAKE FOREST UNIVERSITY | GI CARE FOR KIDS | EAST CAROLINA UNIVERSITY | NEMOURS CHILDREN'S HOSPITAL | TEXAS CHILDREN'S HOSPITAL

Outcomes: Nutrient Intake

Goday, et al. JPEN J Parenter Enteral Nutr. 2022;1-13
PO = per os; ENDF = energy and nutrient dense formula; CHD = congenital heart defects

	kcal/kg/d		
Total energy intake	123±32		
ENDF intake	116±32		

Goday, et al. JPEN J Parenter Enteral Nutr. 2022;1-13

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NUTRICIA

Goday, et al. 2022.

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Outcomes: Nutrient Intake

	kcal/kg/d	
Total energy intake	123±32	(94%)
ENDF intake	116±32	

Goday, et al. JPEN J Parenter Enteral Nutr. 2022;1-13

NUTRICIA

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Goday, et al. 2022.

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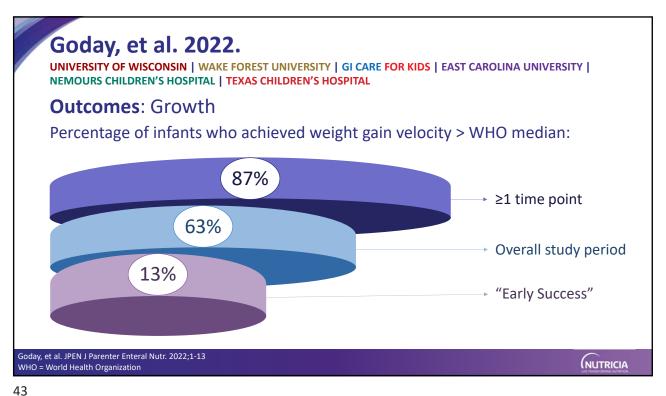
Outcomes: Growth

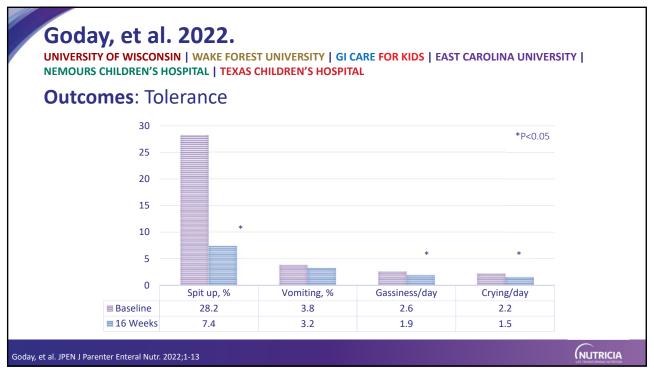
Weight-for-Age	Length-for-Age	Weight-for- Length	Head Circumference
+0.86 ± 0.74	+0.25 ± 0.61	+0.77 ± 0.81	+0.54 ± 0.68
mean WAZ from	mean LAZ from	mean WLZ from	mean HCZ from
baseline (p=0.0001)	baseline (p=0.003)	baseline (p=0.0001)	baseline (p=0.001)

Goday, et al. JPEN J Parenter Enteral Nutr. 2022;1-13

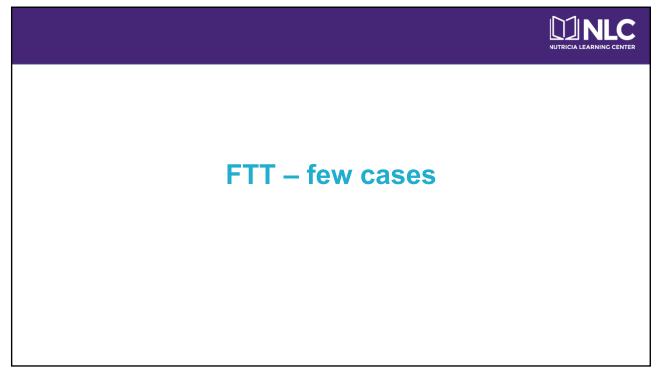
WAZ = weight-for-age z-score; LAZ = length-for-age z-score; WLZ= weight- for-length z-score; HCZ = head circumference z-score

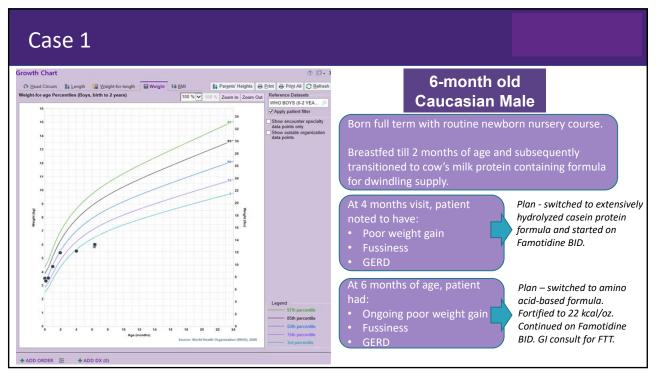
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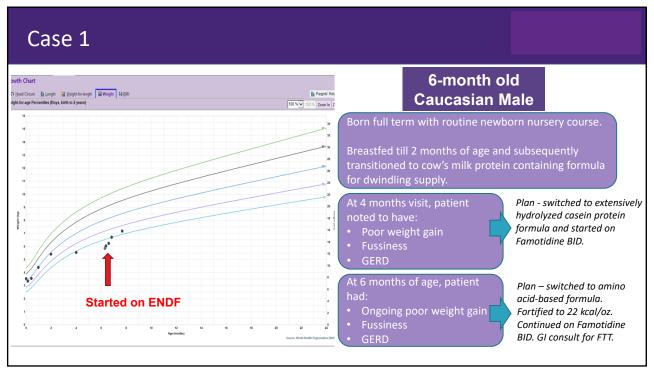


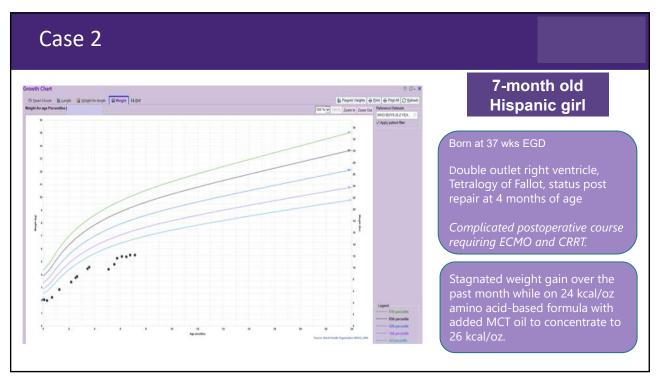


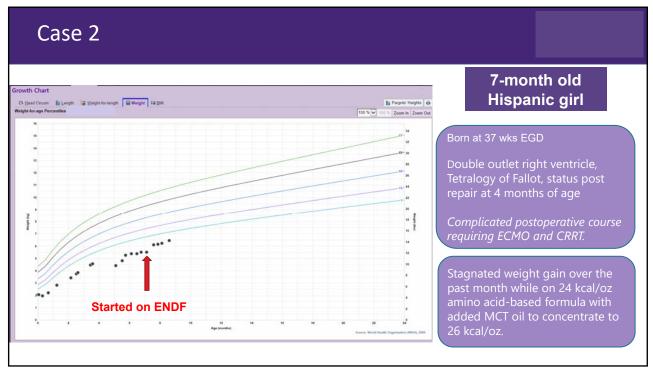


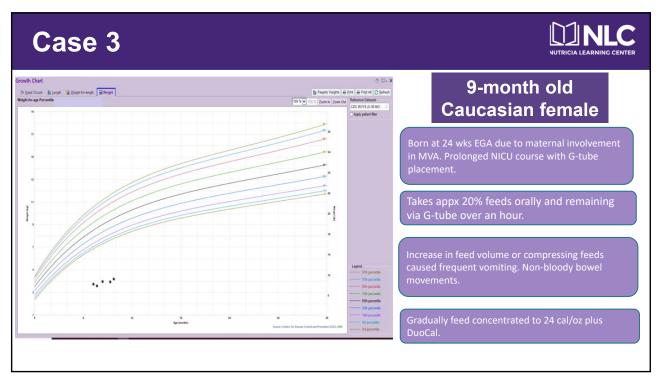


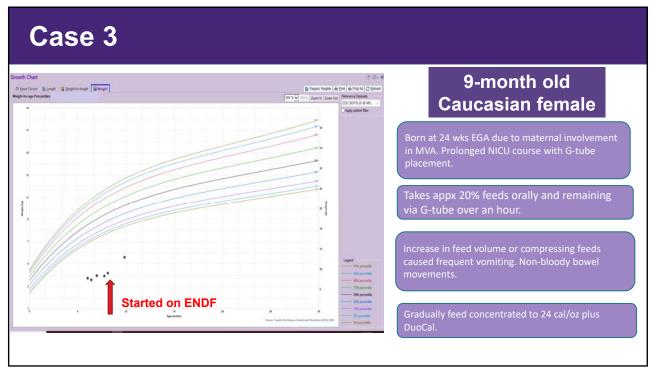












SUMMARY

- Malnutrition has serious implications for infants. It's critical to prevent, identify and resolve malnutrition in a timely and safe manner.
- ENDF provide optimal energy, protein, and micronutrients to support lean tissue gain for catch-up growth and support increased protein needs during critical illness.
- ENDF can help meet infant's nutritional needs without the risks seen with concentrating and fortifying with formula or modular.



ENDF = energy- and nutrient-dense formula

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Blenderized Formula: Exploring the Thick of It



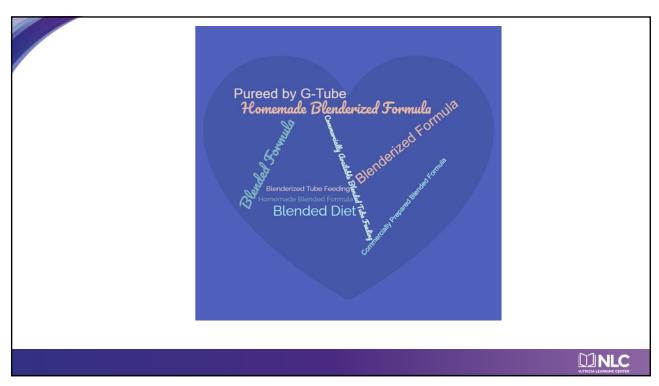
Sharon Weston, MS, RD, CSP, LDN Sr. Clinical Nutrition Specialist

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Objectives

- Describe benefits of using blenderized formula (BF)
- Compare and contrast homemade and commercially available BF products
- Review administration guidelines when using BF
- Discuss the unique viscosity characteristics of BF and how to measure using the International Dysphagia Diet Standardisation Inititiative (IDDSI) Framework





Benefits of BF





- □ Reduces gagging, retching and vomiting
- Improves constipation
- Improves oral intake
- Can reduce the need for medications (reflux, constipation)



DINLC NUTRICIA LEARNING CENTER

Benefits of Homemade BF



- Can modify ingredients to fit specific needs of the child (e.g. food allergies/intolerances, fiber needs, etc.)
- Can include foods from the family meals
- Homemade feedings allow for normalization of mealtimes; the tube is like another mouth to feed



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Criteria to Consider for Patients Who Want to Try Homemade BFs

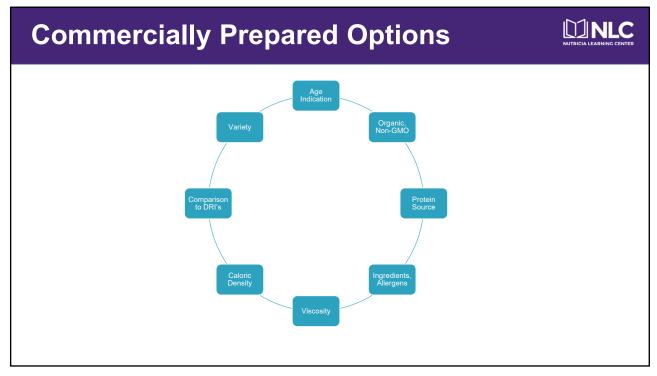


- Medically stable
- Clearly able to meet calorie and protein needs from BTF
- Care providers must be motivated
- Providers must have appropriate kitchen facilities, show the ability to follow recipes, and practice safe foodhandling guidelines



Nutritional Considerations Calories, protein and fluid requirements Vitamins and mineral requirements Volume tolerance Food safety: cleanliness in preparation and storage, hang time, temperature concerns, freezing and thawing, transportation of formula outside home (school, etc.) GNOME icon artists. https://creativecommons.org/licenses/by-sa/4.0/

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Commercially Prepared Food-Based Formula Benefits



- Simple solution for patients who wish to try blenderized diet without the need to do all the food preparation, blending, storage and clean up
- Easier for travel, school, hospitalizations
- Provides a consistent nutrient profile
- Consistent viscosity and hang time for pump feedings
- Can be used in combination with homemade blended formula, or can replace the homemade blends



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Commercially Prepared Food-Based Formula Challenges



 More expensive out-of-pocket cost as compared to homemade blends; may pose challenges with coverage by insurance or DME provider



- Provides less dietary variety as compared to homemade recipes
- Composition may not meet nutritional needs adequately without supplementation, or may provide excessive levels of certain micronutrients.
 A nutrient analysis should be performed to ensure appropriate intake levels are met
- Storage (pouches take up more space)

How to Administer



- Bolus by pushing in with a syringe
- Pump may need modifications
- Hang times of CBFs range based on the manufacturer's guidelines
- Addition of water reduces hang time (ASPEN guidelines)

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Viscosity of BFs



- □ Blenderized formula can vary significantly in viscosity
- □ Viscosity changes can impact GI tolerance as well as administration of feeds
- Alterations to viscosity can occur from freezing/thawing
- □ Volume of liquid needed to thin CBF varies significantly
- □ The method used to add liquid to a CBF can also result in variations in viscosity

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The International Dysphagia Diet Standardisation Initiative (IDDSI) framework of terminology and definitions includes an objective measurement for liquid thickness.

FOODS

Level 4: Use IDDSI fork-drip or spoon-tilt tests instead

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Effect of Added Free Water to Enteral Tube Feeds in Children Receiving Commercial Blends

Suzanna Hirsch, Toni Solari, and Rachel Rosen

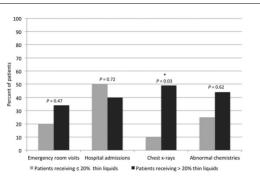
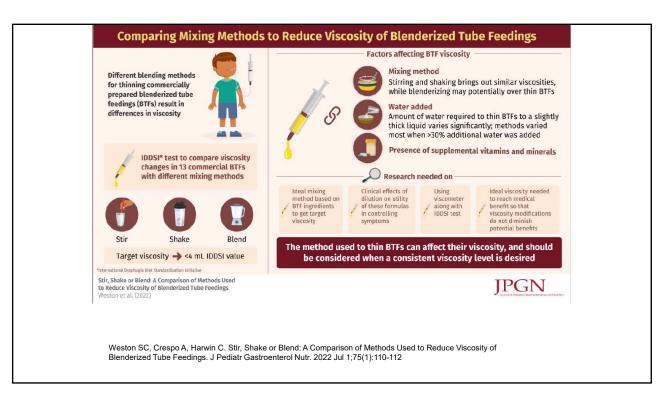


FIGURE 2. Effect of the proportion of thin feeds on patient outcomes.

Hirsch, S., Solari, T. & Rosen, R. (2022). Effect of Added Free Water to Enteral Tube Feeds in Children Receiving Commercial Blends. Journal of Pediatric Gastroenterology and Nutrition, 74 (3), 419-423.

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Case Study:

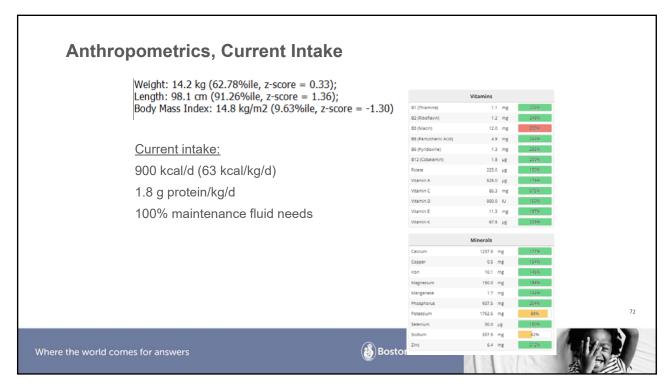
- 2 year 7 month old male
- PMHx significant for lissencephaly, hypotonia, aspiration on all consistencies, GT dependent
- Presented on a feeding regimen of 225 ml a standard pediatric formula run by GT @ 250 ml/hr, 4x/day
- Water flushes given pre- and post GT feeds (15 ml pre, 15 ml post), additional water flushes with medications (90 ml/d), water boluses (120 ml 2x/d)
- Noted to vomit multiple times a day, mother reported she would need to stop the feeds intermittently, could not move him after a feed or emesis would occur

Where the world comes for answers





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Nutrition Intervention

- Transitioned to a Commercially prepared Blenderized Formula (CBF)
- Each bolus consisted of 165 ml CBF mixed with 60 ml water (225 ml final volume). Mixed varieties of CBF were used in the daily regimen.
- 225 ml boluses administered by pump at 250 ml/hr 4x/day.
- Water flushes given pre- and post GT feeds (15 ml pre, 15 ml post), additional water flushes with medications (90 ml/d), water boluses (120 ml 2x/d)
- · Added MVI, Calcium with D, and Morton Lite Salt
- · Vomiting completely stopped

Modified intake:

64 kcal/kg/d

2.0 g protein/kg/d

95% maintenance fluid needs

Boston Children's





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2. Follow instructions at the end of the survey