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Speaker



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I have a commercial relationship with Nestlé Health Science and Avanos as a consultant/member of speaker's bureau and will provide practice recommendations that are based on formal structured review of the literature.

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Objectives

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- Identify practical tips the acute-care clinician should know when providing nutrition therapy to inpatients that receive a food-based tube feeding at home.
- Explain the recent literature pertaining to food-based tube feedings.
- Describe the key steps to implement a successful food-based tube feeding regimen with patients/caregivers.
- · Identify the potential benefits of a food-based tube feeding formula.

Notifie Nutritio BTF in History

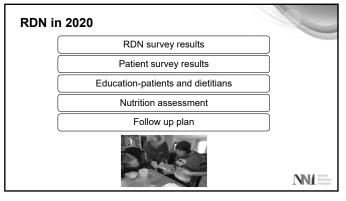
BTF started 3500 years ago (rectally)

1793 the first BTF formula was administered into the stomach via tube

Modern commercial tube feeding formulas introduced in 1960-1970s

Chernoff R. An Overview of tube feeding: from ancient times to the future. NCP 2006;21(4): 408-410.
McMamish MA, Bounous G, Geraghty ME. History of enteral feeding: past and present perspective. In: Rombeau JR, Rolondo R, eds.
Clinical Nutrition: Enteral and Tube Feeding. 3rd ed. Philadelphia, PA: W.B. Saunders; 1997

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Surveys

Dietitians

- 2,448 dietitians responded
- > 58% use and recommend BTF
- > Most common reason for use was parent request (70.2%)

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- > 244 parents responded, 50% using BTF in some way
- Only half (49.3%) of parents using BTF referred to dietitians for feeding oversight

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RDN Challenges

- >221 RDN responded to survey
- •24% had confidence in managing patients on BTF
- •27% of respondents did not have BTF education -Informal education
- · Limited perceived competence on BTF practice and formula education opportunities are needed.

Kariya C, Bell K, Bellamy C, Lau J, Yee K. Blenderized Tube Feeding: A Survey of Dietitians' Perspectives, Education, and Perceived Competence. Can J Diet Pract Res. 2019;80(4):190-194.

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Patient-Centered Assessment

- >Formula guide-over 130 formulas
- > https://www.nutritioncare.org/Guidelines and Clinical Resources/EN Formula Guide/Enteral Nutrition Formula Guide/
- >Mimic previous oral diet
- "What did you eat before?"
- >Patient/caregiver may not be part of decision in hospital but involve them when possible.
- · Patient centered approach

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Patient-Centered Planning

- > Include primary care provider
- > Nutrition professional available
- > Appropriate tube
 - Gastrostomy preferred Mature stoma
 - · 12 French or greater tube
 - Smaller French sizes may work with some commercial formulas and thinner home blends
 - Some formulas may work with nasal tubes
 Tube formulary helpful
- > Determine a system for monitoring
- > Tools available



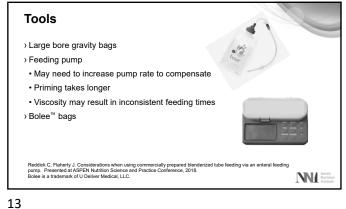
Tools

- Blender study
- Blenders tested: Oster ® Blender, Cuisinart ® Food Processor, Magic Bullet ®, Mega Kitchen-Ninja ® System and Vitamix
- Vitamix ® seems to blend better than all of the devices, for thicker recipes, with the exception of the Mega Kitchen-Ninja ® System
- · Increased blending time helped with less powerful blender
- Blendtec® worked as well as Vitamix®
- > ENFit® O ring syringes
- · Don't get sticky
- · Easier to push
- · May help to oil syringes > Straight bolus extension sets

Mundi M, Epp L, Duellman W, Davidson J, Yaramala S, Corner S, Hurt R. Efficiency of blenders used to prepare home blenderized tube feeding. Presented at ASPEN Clinical Nutrition Week, 2017. ENRIFe la englistered trademark of GEDSA.



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Thermal Effect of Food

- > Increased calories needed?
- Thermal effect of food (7-10%)
- · Home recipes may not be precise
- Change in digestion due to diverse microbiota
- Participants required 20-50% more calories to maintain their body mass index while on BTF compared with commercial formula



Formula Journey is Never-Ending

- > Multiple standard ⇒ specialty ⇒ elemental ⇒ food based
- > Elemental ⇒ food based
- > Start with home blends right away
- > Home blends ⇒ food based commercial formula
- > Avoid placing your own opinions on the patient, avoid "shaming"

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Formula Journey is Never-Ending

- > Blend foods into standard commercial formula (green beans for diarrhea)
- > Food based formulas + added foods (variety)
- > Food based formula
- > Home blending
- Exchanges

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- Standard recipe
- · Plate method (family meal)

Commercial formula + carrot and applesauce



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Standard Formula + Added Food

- > 1 can of standard 1kcal/mL formula
- 1/2 banana
- 1/2 cup cooked steel cut oatmeal
- 1/2 cup blackberries

This provides approximately 400 kcal and 13 grams protein

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Food-Based Formula + Added Foods

Examples

- 1 pouch commercial blenderized product + ½ cup fresh picked black raspberries.
- 1 pouch commercial blenderized product + 1 tablespoon coconut oil
- 1 pouch commercial blenderized product + 2 tablespoons peanut butter

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The following information is being provided for a learning experience and not to promote any one product over another*.

- Compleat ® Organic Blends is a registered trademark of Nestlé Health Science.
- Kate Farms® is a registered trademark of Kate Farms.
- Liquid Hope® and Nourish® are registered trademarks of Nutritional Medicinals, LLC.
- Pediasure Harvest[™] is a trademark of Abbott Nutrition.
- Real Food Blends™ is a trademark of Real Food Blends.
- Kitchen Blends® is a registered trademark of Medline, Inc.
- Whole Story Meals™ is a trademark of Whole Story Meals.

*Information obtained from manufacturer's websites October 2020.

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Food-Based Formulas*

- 1. Compleat®, Compleat® Pediatric, Compleat® Pediatric Reduced Calorie, Compleat® Organic Blends, Compleat® Pediatric Organic Blends, Compleat® Peptide 1.5 Cal, Compleat® Pediatric Peptide 1.5 Cal
- 2. Kate Farms®: Standard 1.0, Standard 1.4, Pediatric Standard 1.2, Pediatric Peptide 1.5, Pediatric Peptide 1.0, Peptide 1.5 (plant-based; not food-based)
- 3. Kitchen Blends™
- 4. Liquid Hope®, Liquid Hope® Peptide, Nourish®, Nourish® Peptide, Keto
- Pediasure Harvest™
- 6. Real Food Blends®
- 7. Whole Story Meals™

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*Formulas available as of October 2020

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Food-Based Formulas

Pros

- > Precise/consistent macronutrients and micronutrients
- > Variety of options
- > Convenient
- More consistent viscosity

Cons-improving

- > Limited published peer reviewed publications
- > Possible decreased pump accuracy, pump alarms
- > Insurance coverage (B4149, B4153)
- > Supplier availability

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Recipe Idea 500 kcal (Exchanges)

INGREDIENT	AMOUNT
Starch – well-cooked oatmeal, rice, pasta or potato	½ cup
Yogurt, reduced fat (2%)	¼ cup
Milk, 1%	% cup (6 oz)
Oil, flaxseed, canola, soybean, walnut	2 teaspoons
Fruit – canned, fresh or frozen apple, banana, peaches, mandarin oranges	½ cup
Vegetable – canned, fresh or frozen well cooked broccoli, carrots, green beans or cauliflower	½ cup
Protein – cooked tender chicken, turkey, beef, fish or smooth soft tofu	½ cup

PROCEDURE:

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Put all items in a blender and mix well. Fits into a Magic Bullet® Blender. Refrigerate if not used immediately.

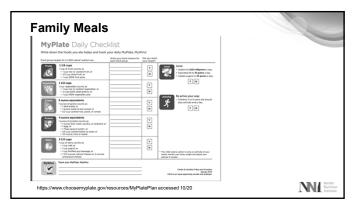
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Standard Recipe 1000 kcal

Ingredients	Volume
Cooked oatmeal	1 cup
Egg, cooked	1 each
Melon	½ cup
Whole milk	8 fluid ounces
Olive oil	1 teaspoon
Cooked brown rice	½ cup
Cooked green beans	½ cup
Canned peaches (drained)	½ cup
Yogurt (reduced fat 2%)	6 oz
Cooked carrots	½ cup
Tofu-cubed	½ cup
Avocado	4 tablespoons

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Documenting Medical Necessity

- · Guidelines are from 1984
- Retiring current Local Coverage Determination on 11/12/2020 to provide more consistent guidelines throughout the country and reflect current practice and remove outdated tests and documentation requirements
- Still need clear documentation in EHR that tube feeding is sole source of nutrition and will be for greater than 3 months
- More focus on changes to parenteral nutrition
- This link provides month information: https://www.casmedicare.com/io/pubs.hews/2020/10/cope19135.html#:~text=The%20DME%20MACs%20will%20be%20reting%20the%20Enteral.to%20the%20evolution%20criteral%20nutrition%20clinical%20parations.
- · Varies by state
- > Commercial insurance
- > Examples of medical necessity
- · Diarrhea, reflux, increased use of stool softeners, vomiting, not reaching goal volumes on standard formula

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Post Pyloric Feeding

- > Feeding food based formula into the small bowel requires clinical judgement
- Remember French size of jejunal extension (If GJ tube)
- · Adding water decreases hang time to 4 hours
- Adults may be safer as their gut is more mature
- · Gastric bypass, gastrectomy
- More experience/research needed

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Hospital Setting

- > Continue patient centered approach
- > Proposed guidelines
- · Limited use in the ICU
- -Would not feed a critically ill patient a big salad
- · Commercial food based product
- · Home blends if able to self administer feedings
- -Order from pureed menu
- -Commercial grade blender
- -Follow same protocols as tray service



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COVID-19 Challenges

- COVID may change family income/time, making home blending a challenge
- Food security (for food or formula if paying out of pocket)
- School may have new protocols preventing use of home
- May be educating virtually
- · Zoom (create a tool kit)
- · Phone visits

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COVID-19 Requires Planning Ahead

- Surge in cases, supply shortages (pumps, bags) and shipping delays are concerning.
- > Shipping delays
- · Unable to order early
- UPS, FedEx and postal service delays
- · Weather (Wild fires causing delays in CA)
- > Emergency stock needed
- · Commercial product
- Private purchase emergency supply (rotate)
- Foods to blend

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Hang Time Reminder

- > Hang time of food is 2 hours
 - Per USDA "Perishable food should not be left out more than 2 hours at room temperature -- 1 hour when the temperature is above 90 °F (32.2 °C)."
- > Commercially prepared formulas 8-12 hours
- Adding modulars decreases hang time to 4 hours
- > Nothing, so far, that shows us that adding ice packs increases hang time.

Boullata JL, et al. ASPEN Safe Practices for Enteral Nutrition Therapy. JPEN. 2017;41:15-103. http://www.fiss.usda.gov/wps/portal/fsis/topics/food-safety-education/get-answers/food-safety-fairhandling, Accessed 10/20

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Storage: Commercial vs Homemade

- >Once opened, unused formula should be stored in a clean, tightly sealed, container, refrigerated, and used within 24 hours.
- >Leftovers can be kept in the refrigerator for 3 to 4 days or frozen for 3 to 4 months.
- >Use clean food storage container with tight fitting lid

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Clinical Benefits: Review of Recent Literature

- >Improved GI symptoms (reflux, vomiting, bowel regularity)
- >Building patient rapport
- >Patient-centered and individualized health care
- Improved quality of life
- Decrease in health care utilization

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Poll

In your practice, what is needed to support food-based formulas as the best option for tube-fed patients?

- A. Protocols from ASPEN
- B. Additional literature
- C. I already think it is best
- D. More time

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Literature Review

17 of 20 pediatric patients were transitioned from standard formula to homemade BTF

> BTF micronutrient content was superior, Prevalence of vomiting decreased with BTF, The bacterial diversity and richness in stool samples significantly increased, while the relative abundance of Proteobacteria decreased and Caregivers were more satisfied with BTF and unanimously indicated they would recommend BTF.

42 were on food-based, blenderized formulas; 28 were receiving conventional formulas

> greater satisfaction ratings, lower symptom scores on Pediatric Gastroesophageal Reflux Disease Symptom and Quality of Life Questionnaire and greater scores on the Pediatric Quality of Life Inventory Gastrointestinal Symptoms Scale, indicating less nausea and vomiting, abdominal pain, diarrhea), and fewer total symptoms.

Hon B, Fishman E, Lurie M, et al. Blenderized Enteral Nutrition Diet Study: Feasibility, Clinical, and Microbiome Outcome of Providing Blenderized Feeds Through a Gasthic Tube in a Medically Complex Pediatric Population.

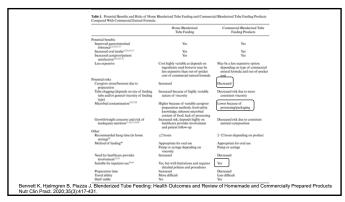
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Meeting Nutritional Needs

Blenderized Tube Feedings for Adult Patients on Home Enteral Nutrition: A Pilot Study.

- >Open-label pilot study, in which all participants who had been on traditional EN formulas were changed to BTF for 6 weeks.
- >BTF was found to be safe and effective in promoting weight gain in adult participants who required HEN for at least 6 weeks.

Hurt R, Epp L, Duellman W, et al. Blenderized Tube Feedings for Adult Patients on Home Enteral Nutrition: A Pilot Study. J Altern Complement Med. 2019;25(4):413-416.



Clinical Hesitation

- > Limited published peer reviewed publications
- > Microbial contamination
- > Variability of nutritional composition
- > Increase in clinician's time
- > Potential increase in cost/lose reimbursement
- > Possible tube clogging, tube wears out more quickly
- May be more difficult for travel
- > Facility or hospital may not support

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Literature Review

Microbial contamination

- 1. Philippines, 78.8-87.8 degrees F
- 1. Increased bacteria at time of preparation
- 2. Home BTF in Brazil tested
- 1. high levels of bacterial contamination
- 2. lower values for protein, fat, fiber, carbohydrate and energy (used sieves)
- 3. Iran

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- 1. Refrigerator temp 49.8 degrees F
- 2. At the time of food preparation, 70% were contaminated

alivan M.M. Sorreda-Esquera P. Santos EE, et al. Bacterial contamination of blenderized whole food and commercial enteral tube feedings in the injoines. J Hosp Infect. 2001;14(4):288-273.

Hosp Infect. 2001;14

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Microbial Contamination: Hospital

- >Three formulas
- · Commercial formula
- · Baby food
- Whole Foods
- >All 3 feeding formulas at zero hour, 2 hours, and 4 hours for each of the 3 sampling dates were acceptable for human consumption.

Johnson T, Milton DL, Johnson K, et al. Comparison of microbial growth between commercial formula and blenderized food for tube feeding. Nutr Clin Pract. 2019;34(2):257-263.



Microbial Contamination: Home

- >50 participants made blended formula in their home
- >Microbial counts observed over 48 hours
- >88% of the samples met the US Food Code criteria for safe food consumption
- > Established safe food-handling procedures can minimize bacterial contamination of BTF

Milton, DL, Johnson TW, Johnson K et al. Accepted Safe Food-Handling Procedures Minimizes Microbial Contamination of Home-Prepared Blenderized Tube-Feeding Nutr Clin Prac. 2020;35(3):479-486. doi: 10.1002/ncp.10450.

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Clinical Outcomes Associated With Commercial and Homemade Blenderized Tube Feedings: A Literature Review

- > "The results indicate that BTF, compared with commercial enteral formula (CEF), may be inadequate in calories, macronutrients, and some micronutrients, given variability in BTF formula."
- > "BTF may result in significantly more weight loss than CEF." Thus, BTF may not be appropriate for adult patients who are malnourished or are at risk for malnutrition due to the potential worsening of clinical outcomes.
- > Potential for bias, read beyond the abstract.

Brown T, Zelig R, Rigassio Radler D. Clinical Outcomes Associated With Commercial and Homemade Blenderized Tube Feedings: A Literature Review. Nutr Clin Pract. 2020; 35:442-453.10.1002/ncp.10487



Commercial vs. Pureed Feeding

- Thirty-seven patients aged between 2 and 26 years with severe neurologic impairment
- •17 received commercial formula
- •20 received pureed food
- >Patients in both groups improved in their weight-for-age Z scores and body height but was higher with CF

Orel A, Homan M, Blagus R, et al. Nutrition of patients with severe neurologic impairment. Radiol Oncol. 2018;52(1):83-6



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Case Report #1

Former 24-week premature female infant, now 7-years old with developmental delay on homemade blended diet for 2 years

- Since March 2020, caregiver had increase in responsibilities (working from home, distance learning)
- · Mother didn't want to ask for help
- · RDN provided assessment and reminded mom there are many good ways to feed her child

Change to food-based commercial formula with discussion that this doesn't have to be forever

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Case Report #2

3-year old boy with CP and continued vomiting with home blends via g-tube.

- . Drop in weight for age z score
- · Constipation due to poor fluid intake
- · Firm family preferences of food choices for religious reasons
- GI provider had recommended GJ for 1 year, family resisted
- . No dietitian follow up during that time

Dietitian met with family to discuss options for formula and this resulted in changing to GJ

Patient was able to get a vegetarian commercial product via jejunal extension. (which made

- Had 14 French low profile gastrojejunostomy placed, reminder jejunal extension is
- Diluted 1 pouch formula with 150mL water which changed hang time to 4 hours.

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Case Report #3

66-year old male s/p stroke with continued dysphagia now dismissing from inpatient

- Patient had NG in hospital and RDN decided on standard 1.2 kcal/mL formula
- PEG placed and changed to 1.5kcal/mL formula to decrease volume
- · Ready to go home and supplies set up with DME
- Wife very upset about what he had been getting.
- · Discussed formula ingredients and options

Don't assume patients don't want to/can't pay for formula.



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Case Report #4

70-year old male on standard commercial formula while undergoing chemoradiation for tonsil

- c/o fullness, bloating and inability to achieve goal feedings leading to 5% weight loss in 3
- Changed to commercial blended formula with improved tolerance and stabilization of weight. We did have to increase calorie goal by 15%.

"Patient failed standard tube feeding product due to fullness, bloating and inability to achieve goal feedings, resulting in weight loss. Therefore, a commercial food-based formula is needed."

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Conclusion

Food based formulas appear to be used in many HEN patients and have been used for 1000s of years.

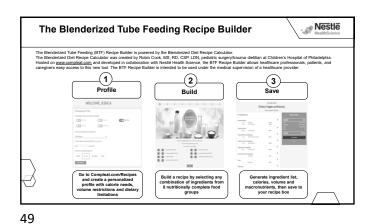
Literature is starting to emerge regarding benefits of foodbased formulas (in a variety of forms).

Can meet nutrition needs with the help of a registered dietitian and close follow-up.

Current ASPEN task force working on guidelines which may make hospital use more accepted.

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Resources The Recipe Builder—Tool to Create Blenderized Tube Feeding Recipes www.Compleat.com/Recipes Academy of Nutrition and Dietetics www.eatright.org
• The Registered Dietitian Nutritionist's Guide to Homemade Tube ASPEN videos: https://www.nutritioncare.org/Guidelines_and_Clinical_Resources/Enteral_Nutrition_Resources/ Oley Foundation https://oley.org/page/HEN_LandingPage Seattle Children's Hospital https://www.seattlechildrens.org/pdf/PE442.pdf NAT Note Note Institute



Questions? The Recipe Builder www.Compleat.com/Recipes The Recipe Builder: Take the Guesswork Out of Blenderized Tube Feedings Presented by Robin Cook, Robin Cook, MS, RD, CSP, LDN Pediatric Surgery/Trauma Dietitian, Children's Hospital of Philadelphia (Access the recording on the Nestlé Nutrition Institute website under ${\bf videos.})$ Nestlé Health Science Medical Hub https://www.nestlemedicalhub.com Resource center for healthcare professionals to support everyday practice and professional development. Find a variety of educational resources, best practices on nutrition management, information and clinical evidence for products, patient resources, and information about programs and trainings conducted throughout the year. MyCE www.MyCEeducation.com Offering CE to dietitians and nurses

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