## A Practical Guide to Blenderized Tube Feeds



February 06, 2025



## **Land Honouring**

I am presenting from the traditional, historical, and unceded territories of the Coast Salish people of the Musqueam, Squamish and Tsleil Waututh Nations.





I have presented a webinar on home blenderized tube feeds in the past for Nestle Health Sciences.



By the end of this presentation, learners will be able to:

- 1. Present current evidence and practical guidance on blenderized tube feeds (BTF)
- 2. List the advantages and disadvantages of BTF
- 3. Describe the steps to initiate, prepare, and monitor BTF



- 1. What is BTF?
- 2. Advantages
- 3. Disadvantages
- 4. Clinical Hesitation
- 5. Risk-Benefit Analysis
- 6. Initiation
- 7. Preparation
- 8. Monitoring















## What is **BTF**?

Blended food and/or fluid, in any amount, that is prepared in a home or hospital blender and administered through a feeding tube.







.....









### Limited published guidelines

Clinician's lack of training, confidence, time

## **Risk-Benefit Analysis**

- Medically stable
- G-tube vs J-tube
- Mature stoma site
- >/=14 Fr
- Bolus feeds

- Lifestyle/abilities
- Access to equipment
- Clinician access
- Clinician abilities
- Access to emergency medical care

## **Risk-Benefit Analysis**

#### Extra caution:

- Feedings that require >2 hr hang time
- Specialty formula required
- Immunocompromised patients







# Step #1: Initiation



## **Step #1: Initiation Macronutrient Needs**

- Total calories, protein, carbohydrates, fibre, fat, fluids
- Initially aim for 1:1 calorie replacement if switching from commercial formula





Optimize hydration before starting transition to BTF to minimize risk of dehydration and constipation

Free water calculation: total volume of fluid containing ingredients x 0.7-0.75

• E.g. commercial formula, meat, vegetables, milk, grains

Additional free water is determined from the difference between estimated daily fluid requirements and amount of free water of the BTF



<u>Essential Fatty Acids</u>: cold water fish, flax, pumpkin seeds, hemp oil, canola oil, walnuts

<u>Sodium</u>: Add table salt or pre-made sauces and other seasonings seasoning

Vitamin D: May not be sufficient in BTF





## Step #2: Preparatio







## Step #2 Preparation Choose the Method

- 1. Recommended daily intake of food groups
- 2. Blend family meal
- 3. Recipe templates



## Step #2 Preparation Equipment

- Blender
  - Sieve
  - Measuring set
  - Spatula
  - Airtight storage containers
- Clean food/water
- Refrigerator/freezer
- Administration sets



## **Step #2 Preparation Food Selection**

Food Group	Food tips for easy blending	Foods to use with caution
Grains	Cooked grains Toasted bread Ready-to-eat cereal	Refined grains
Fruits/Vegetables	Steamed/soft cooked/thawed Choose different colours Choose fruit rather than juice	Stringy vegetables (celery, kale, corn) Fruits with lots of seeds (raspberry, blackberry)
Meats/alternatives	Moist cooking methods Smooth nut butters Legumes Tofu	Tough meats (bacon, jerky, sausage casing) Eggs can become lumpy if not fully cooked Sesame and poppy seeds

## **Step #2 Preparation Food Selection**

Food Group	Food tips for easy blending	Foods to use with caution
Milk/alternatives	Milk, yogurt and soft cheese blend better than hard cheese	
Fats	Avocado, seeds, nut/nut butters, fatty fish, coconut cream, oil, butter, full fat dairy	
Liquids	Calorie-containing liquids: coconut milk, 3.25% milk, fortified plant beverages, commercial formula Sodium: V8, broth	
Other	Sweeteners, sauces, spices, herbs	

## Step #2 Preparation Food Selection

#### Consider using convenience foods:

- Pre-made purees/baby food
- Shelf-stable items
- Frozen fruits and vegetables
- Pre-cooked grains and meat
- Commercial BTF



## **Step #2 Preparation Food Safety**

Follow basic food safety principles.







## Step #2 Preparation Blend Textures





## Step #2: Preparation Storage and Warming

- 1. Room temperature for up to 2 hours
  - 2. Freeze blends within 24 hours
  - 3. Refrigerate for up to 48 hours
  - 4. Freeze for up to 2 months (label and portion into meal-sized containers)

Note: Blends may thicken when stored





## Step #2: Preparation Planning for One-Offs

#### Plan for busy days, travel days, hospital stays, emergencies.









## Step #3: Monitoring





## Step #3: Monitoring Nutritional Adequacy

- Accurate prediction of macronutrient and micronutrient content of blends is difficult
- Monitor for hydration and calories
  - Nutritional blood work may be useful to monitor patients



## Step #3 Monitoring Nutritional Adequacy

- Professional tools:
  - E.g. Nutritionist Pro
- Free tools:
  - Canadian Nutrient File (Canada)
  - USDA database (USA)
  - MyFitness Pal

Other: food journaling, 3-day food record, usual intake

## Step #3 Monitoring GI Symptoms

## Constipation







## Step #3 Monitoring Tube Occlusions



## Step #3 Monitoring Tube Wear and Tear



## **Cleaning Tools**



## Step #3 Monitoring Food-borne Illnesses

- Canned formulas are sterile before opening; BTF are not.
- Repeated exposure to contaminated foods may occur after blending batches of formula.



## A Sample Day of BTF



## Sample Day using BTF 2000 kcal



Food Group	Number of portions per day	Foods selected
Grains/Starches	6 portions	<ul><li>1 cup cooked quick oats (2 portions)</li><li>1 cup cooked rice (2 portions)</li><li>1 cup cooked quinoa (2 portions)</li></ul>
Vegetables	5 portions	1 cup spinach (1 portion) 1 cup cooked carrots (2 portions) 1/2 cup frozen peas (1 portion) 1/2 cup canned corn (1 portion)
Fruit	2 cups	1 cup frozen mixed berries 1 cup applesauce

## Sample Day using BTF 2000 kcal



Food Group	Number of portions per day	Foods selected
Milk/Alternatives	3 cups	1 cup soy milk (1 portion) 1 cup cottage cheese (1 portion) 1 cup 10% MF yogurt (1 portion)
Meat/Alternatives	5.5 portions	<ul> <li>1 tbsp smooth peanut butter (1 portion)</li> <li>1/2 cup black beans (2 portions)</li> <li>1/2 can tuna (1.5 portions)</li> <li>1 hard boiled egg (1 portion)</li> </ul>
Fats	6 tsp	1/2 avocado (4 tsp) 2 tsp flaxseed oil (2 tsp)
Liquids	Add liquids to achieve an appropriate consistency	Consider adding broth or V8 if extra sodium needed.

## Sample Day using BTF 2000 kcal

Meal	Foods selected
Breakfast	1 cup cooked quick oats made with 1 cup soy milk and 1 cup coffee, 1 cup frozen and thawed mixed berries, 1 tbsp peanut butter
Lunch	1 cup cooked rice made with coconut milk, ½ cup spiced black beans, 1 tsp flaxseed oil, 1 cup carrots, 1 cup applesauce, 1 cup cottage cheese, add water/broth as needed to blend
Snack	1 cup yogurt, 1 hard boiled egg, ½ avocado, 1 cup spinach, add coconut milk/water as needed to blend
Dinner	1 cup cooked quinoa made with broth, $\frac{1}{2}$ cup frozen peas, $\frac{1}{2}$ cup canned corn, $\frac{1}{2}$ can drained tuna, 1 tsp flaxseed oil, add broth/water/coconut milk as needed to blend









### References

Borghi R, Duta Araujo T, Airoldi Vieira RI, Theodoro de Souza T, and Waitzberg DL. ILSI task force on enteral nutrition; estimated composition and costs of blenderized diets. Nutr Hosp. 2013;28(6):2033–38.

O'Hara C. Scurvy related to the use of a homemade tube feeding formula. Infant Child Adolesc Nutr. 2015;7(6):381–384.

Papakostas P, Tsaousi G, Stavrou G, Rachovistsas D, Tsiropoulos G, Rova C, et al.Percutaneous endoscopic gastrostomy feeding of locally advanced oro-pharygo-laryngeal cancer patients: blenderized or commercial food? Oral Oncol. 2017;74:135–141.

Viera MMC, Santos VFN, Bottoni A, and Morais TB. Nutritional and microbiological quality of commercial and homemade blenderized whole food enteral diets for home-based enteral nutritional therapy in adults. Clin Nutr. 2018;37(1):177–81.

Sullivan MM, Sorreda-Esguerra P, Platon MB, Castro CG, Chou NR, Shott S, et al.Nutritional analysis of blenderized enteral diets in the Philippines. Asia Pac J Clin Nutr. 2004;13(4):385–90.

Armstrong J, Buchanan E, Duncan H, Ross K, and Gerasimidis K. Dietitians' perceptions and experience of blenderised feeds for paediatric tube-feeding. Arch Dis Child. 2017;102(2):152–156.

Kariya C, Bell K, Bellamy C, Lau J, and Yee K. Blenderized tube feeding: a survey of dietitians' perspectives, education and perceived competence. Can J Diet Pract Res. 2019;80(4):190–194.

### References

Katzberg HD and Benatar M. Enteral tube feeding for amyotrophic lateral sclerosis/motor neuron disease. Cochrane Database Syst Rev. 2011;CD004030.

Madden AM, Baines S, Bothwell S, Chen E, Goh S, Jerome L, et al. A laboratory-based evaluation of tube blocking and microbial risks associated with one blended enteral feed recipe. J Hum Nutr Diet. 2019;32(5):667–675.

Mundi MS, Epp L, and Hurt RT. Increased force required with proposed standardized enteral feed connector in blenderized tube feeding. Nutr Clin Pract. 2016;31(6):795–798.

Gallagher K, Flint A, Mouzaki M, Carpenter A, Haliburton B, Bannister L, et al. Blenderized enteral nutrition diet study: feasibility, clinical, and microbiome outcomes of providing blenderized feeds through a gastric tube in a medically complex pediatric population. J Parenter Enteral Nutr. 2018;42(6):1046–1060.

Pentiuk S, O'Flahtery T, Santoro K, Willging P, and Kaul A. Pureed by gastrostomy tube diet improves gagging and retching in children with fundoplication. J Parenter Enteral Nutr. 2011;35(3):375–379.

Kernizan D, Mintz D, Colin M, Lee M, Yoakam L, Chen YP, et al. Outcomes and safety of blenderized tube feedings in pediatric patients: a single center's experience. J Pediatr Gastroenterol Nutr. 2020;71(4):e124–e128.

### References



Hurt RT, Edakkanambeth Varayil J, Epp LM, Pattinson AK, Lammert LM, Lintz JE, et al. Blenderized tube feeding use in adult home enteral nutrition patients: a cross-sectional study. Nutr Clin Pract. 2015;30(6):824–829.

Johnson TW, Spurlock AL, Epp L, Hurt RT, and Mundi MS. Reemergence of blended tube feeding and parent's reported experiences in their tube fed children. J Altern Complement Med. 2018;24(4):369–373.

Phillips G. Patient and carer experience of blended diet via gastrostomy: a qualitative study. J Hum Nutr Diet. 2019;32:391–399.

Boston M and Wile H. Caregivers' perceptions of real-food containing tube feeding: a Canadian survey. Can J Diet Pract Res. 2020;81(4):193–197.

Batsis ID, Davis L, Pritchett L, Linxuan W, Shores D, Yeung KA, et al. Efficacy and tolerance of blended diets in children receiving gastrostomy feeds. Nutr Clin Pract. 2020;35(2):282–288.

Klein, M. D., & Morris, S. E. (2017). Homemade blended formula handbook. [Paperback].