PRACTICE TOOL

Blenderized Tube Feedings: ASPEN Practice Recommendations, Sections 1 and 4

The increasing use of blenderized tube feeding (BTF) in various patient care settings highlights a need for practice recommendations that can provide guidance for nutrition professionals and patients. To meet this need, the ASPEN Enteral Nutrition Committee identified salient clinical questions concerning BTF, conducted a comprehensive literature search, and subsequently developed practice recommendations pertaining to its use. This practice tool will highlight the practice recommendations for sections 1 and 4 of *Blenderized Tube Feedings: Practice Recommendations From the American Society for Parenteral and Enteral Nutrition.* Nutr Clin Pract. 2023;38:1190-1219.

Executive Summary of BTF Practice Recommendations (Sections 1 and 4)[1]

Common BTF-Related Practice Questions	Practice Recommendations
Section 1: Practice Recommendations for General Use of BTF	
1.1 What factors should be considered when deciding whether to use commercial BTF or prepared BTF?	1. Before initiating BTF, consider the patient's entire clinical picture, including patient-related factors (psychosocial, socioeconomic, and clinical), their enteral access device (EAD), nutrition needs and dietary requirements, dietary preferences, access to resources and food, tolerance, food safety issues, and costs. 2. Ensure that the patient, caregiver, and the health professional team have the availability, resources, and ability to analyze the BTF's nutrition profile. 3. Establish a shared decision-making process with the patient to ensure all food preferences including cultural and religious, allergies, and tolerance issues are considered in the choice of the commercial BTF or prepared BTF. 4. Determine whether an enteral feeding pump is required to administer the BTF. The use of feeding pumps may restrict the choice to commercial BTF formulas based on manufacturers' recommendations and/or to those with specific consistencies on the IDDSI scale (Figures 1 and 2 in Epp paper[1]). 5. Determine whether the patient or caregiver has the time, equipment, skill, and resources to shop for food and to prepare and store the prepared BTF. 6. Research and consider financial considerations. Costs vary significantly between commercial BTF and prepared BTF depending on the ingredients and level of health insurance support offered for BTF. 7. For inpatient services, review or revisit policies and training for appropriate use, storage, and safety of BTF.
1.2 What factors should be considered with respect to EADs, including type, size, timing of replacement, and clogging, when using BTF? Specifically: a. Which types of EADs are appropriate for BTF? b. What are the recommendations regarding appropriateness of BTF for jejunal feeding? c. What are the recommendations regarding appropriateness of ESBC EADs for BTF? d. What French sizes of the EAD are appropriate for BTF? e. How often do EADs need to be replaced when using BTF? f. What is the clogging potential of the EAD when using BTF compared with CEF	1. Gastrostomy tubes are preferred, but nasal tubes as well as jejunostomy/gastrojejunostomy tubes may be considered based on the patient's clinical status. 2. At this time, specific recommendations for BTF for jejunal feeding are unavailable. The use of BTF in patients requiring jejunal feeding is limited due to the necessity for pump administration and a hang time of prepared BTF of only 2 h. However, commercial BTF may be appropriate for jejunal feeding in select patients and circumstances. 3. ESBC feeding tubes can be used for commercial BTF and prepared BTF. Patients choosing to transition to ESBC tubes may experience an increase or decrease in feeding times via gravity or an increase or decrease in force required for push mode (or syringe) of feeding. Clinicians should collaborate with patients to select the appropriate ESBC tube type and feeding mode to meet feeding preferences and desired flow rates. 4. A 14-French or larger EAD is preferred for BTF. BTF formulas may be used with smaller French sizes if good care and technique are implemented. EADs as small as 10 French have been used for administration of BTF. 5. EADs should be changed at the manufacturer-recommended intervals. 6. Tube clogging depends on the size of the EAD, particle size of the formula, and proper flushing technique with feedings and medications. Evidence is lacking comparing tube clogging between BTF and CEF.

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Common BTF-Related Practice Questions	Practice Recommendations
1.3 What factors should be considered with respect to blenders when using BTF? Specifically: a. What specific blender is preferred for the preparation of prepared BTF? b. What is the optimal blending time for a prepared BTF formula?	1. Due to BTF variability, choose a blender with the recipe in mind and considering the types of foods used, blending frequency, and therapy duration. 2. When selecting a blender, consider the following: a. Professional, jug, or wand blender options b. High-powered motors or extended warranties 3. Depending on duration for BTF therapy and foods used, specific brands may produce a smaller particle size and last longer. 4. Given the variability of BTF recipes, the time needed for blending to decrease the particle size to be appropriate for administration via EAD varies. a. The general recommended blending time is 3–6 min. b. When using less-powerful blenders, increasing the blending time (eg, more than 3–6 min) may decrease the prepared BTF particle size.
1.4 What are the recommendations regarding preparing a large batch of prepared BTF to be frozen for later use rather than daily preparation?	1. Freezing prepared BTF is appropriate with proper education, proper food safety and sanitation technique, and proper formula or recipe storage to prevent microbial contamination. RDs or healthcare professionals should provide best-practices education to patients and caregivers. 2. Freezing keeps food safe almost indefinitely; therefore, recommended storage times are for quality only (Table 4). 3. Freezing unused prepared BTF within 24 h is recommended. 4. Thawed prepared BTF may be safely refrozen, although quality may be diminished.[1] Do not refreeze any foods left outside the refrigerator longer than 2 h or 1 h in temperatures above 90°F.
1.5 What is the hang time of BTF, how should BTF be stored, and when should BTF be discarded?	*Hang time* 1. For BTF, follow standard hang time limits (Table 3). 2. For prepared BTF, the hang time should be limited to 2 h or less. a. Perishable food should not be left out of the refrigerator for more than 2 h at room temperature (77°F [25°C]). b. If the temperature is above 90°F (32.2°C), perishable food should not be left out for more than 1 h. 3. For commercial BTF, refer to manufacturer recommendations for hang time limits. *Storage* 1. Store prepared BTF in the refrigerator or freezer; if not frozen, discard after 3–4 days. 2. Store unopened commercial BTF per manufacturers' recommendations. Refrigerate opened commercial BTF and discard unused formula within 24 h of opening per manufacturer's guidelines.
1.6 What are the tools that may be needed to administer BTF?	1. The following tools are recommended for administering BTF: a. Syringes Note: ESBC O-ring syringes may be easier to push compared with syringes with a full rubber stopper, due to decreased stickiness. b. Administration sets i. Large-bore gravity bags ii. Reusable tube feeding pouches c. Pumps i. Select a pump with attention to food safety guidelines and hang times. ii. Consult with a nutrition support professional when selecting pumps, since accuracy is variable, which may affect feeding times and the ability to achieve nutrition goals. d. Other supplies i. Straight bolus extension sets (not right-angle bolus extension sets) are recommended for skin-level EAD because they allow for better flow and less clogging between the skin-level EAD and the extension set.

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Common BTF-Related Practice Questions	Practice Recommendations
1.7 How should BTF preparation equipment be sanitized (for both hospital and home)?	1. Sanitize mechanical devices and equipment (eg, blenders) used to prepare BTF after each use per manufacturer's guidelines and with established protocols and recommendations. 2. In instances where additional guidance is unavailable, the FDA code should be followed, which follows the published guidelines for cleaning and sanitizing dishes and utensils. Specifically: a. Disassemble the blender and wash food-contact portions in warm, soapy water. b. Wash the microwave dish, measuring cups, and spoons—and any other equipment used—in warm soapy water. c. Rinse all items in warm water. d. Sanitize the items by soaking them in 2 gallons of water and 2 tbsp (30 ml) of chlorine bleach for 2 min. e. Remove objects from the chlorine solution and allow them to air dry; do not dry with a towel or a disposable towel.
1.8 How should BTF administration sets be cleaned (for both hospital and home)?	1. Rinse administration sets with safe drinking water between uses to clear any debris that may cause mechanical obstruction. 2. Change administration sets according to institutional policy for use in hospitals and care facilities. Use water designated in institutional protocols. 3. Strong evidence is lacking to support routine use of bleach in cleaning administration sets. 4. Store administration sets in the refrigerator in a plastic bag between uses. 5. Discard administration sets at the time interval recommended by the manufacturer, usually after 24 h.
1.9 How should BTF feeding supplies (eg, syringes, bottles) be cleaned (for both hospital and home) between uses?	1. Follow the manufacturer guidelines for cleaning and sanitizing feeding supplies. 2. In the absence of the manufacturer guidelines, follow the CDC guidelines for cleaning feeding items (Figure 3 in Epp paper[1]). 3. In hospital settings, feeding supplies should be discarded after a single use.
Section 4: Practice Recommendations for Follow-Up and Monitoring for Patients Receiving BTF	
4.1 What are the follow-up plan and monitoring recommendations for patients receiving BTF? Specifically: a) What is the recommended frequency for followup/ monitoring for patients receiving BTF? b) What laboratory monitoring is recommended for patients receiving BTF?	1. Follow-up with an RD or nutrition support specialist knowledgeable in BTF is needed for a successful regimen. Experts in the field recommend initial visits occur every 1–2 months. Visit follow-up may be extended to every 4–6 months based on patient stability after the initiation phase. 2. Laboratory parameters should be monitored as indicated by nutrition assessment, and any signs or symptoms of nutrition abnormalities or deficiencies identified. The specific laboratory parameters are individualized based on the patient's clinical and nutrition status.

EAD, enteral access device

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Potential Benefits and Risks of Prepared BTF and Commercial BTF

	Prepared BTF	Commercial BTF
Potential Benefits		
Improved gastrointestinal tolerance	Yes	Yes
Increased oral intake	Yes	Yes
Increased caregiver/patient satisfaction	Yes	Yes
Potential Risks		
Caregiver stress/burnout due to preparation	May be increased	May be decreased
Microbial contamination	Higher due to variable caregiver preparation methods, food safety knowledge, inherent microbial content of food, lack of processing	Lower due to processing/packaging
Growth/weight concerns and risk of inadequate nutrition	Increased risk depending on RD involvement and patient follow-up	Decreased risk due to consistent nutrient composition
Recommended hang time (in home setting)	2 h or less	2–12 h depending on product
Method of feeding	Appropriate for oral use, large-bore gravity bags, reusable tube feeding pouches, or syringe, depending on rating on IDDSI scale	Appropriate for oral use, gravity bag, pump, reusable tube feeding pouches, or syringe
Need for healthcare provider involvement	May be increased	May be decreased
Suitable for inpatient use	Yes, but with limitations and requires detailed policies and procedures	Yes
Preparation time	Increased	Decreased
Shelf stable	No	Yes

BTF, blenderized tube feeding; IDDSI, International Dysphagia Diet Standardization Initiative; RD, registered dietitian.
Reprinted from Epp.[1]

References:

1. Epp L, Blackmer A,Church A, et al. Blenderized tube feedings:practice recommendations from the AmericanSociety for Parenteral and Enteral Nutrition. Nutr Clin Pract. 2023;38(6):1190-1219.
2.Boullata JI, Carrera AL, Harvey L, et al. ASPEN safe practices for enteral nutrition therapy. *JPEN J Parenter Enteral Nutr.* 2017;41(1):15-103.
3. FDA Food Code 2017. US Food and Drug Administration; 2017. Accessed November 19, 2022. https://www.fda.gov/media/110822/download.

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