



The Use of Blenderized Tube Feedings

Generally speaking, what is your experience with blenderized tube feeding (BTF)?

Cullinane: As a pediatrician, I am always glad when a dietitian recommends that a family makes their own blenderized foods for tube feedings. It seems natural that fresh, home-cooked foods would have a higher nutritional value and provide the daily variety that is inherent in regular diets. There are challenges, however, for families to ensure the correct balance of nutrients and ensure proper caloric intake. It is important for families to have the opportunity to consult with a registered dietitian. This can also provide needed encouragement and support because preparing a blenderized diet involves more labor and effort.

Novak/Wilson: Overall, we have found greater volume tolerance and improvements in reflux and constipation when switching from commercial formula to blenderized tube feeding. Although BTF and commercial formula with fiber often have similar amounts of fiber, we have found that BTF has been more effective in addressing constipation. The nutrient composition of the diet often improves with greater intake of trace minerals and phytonutrients. The use of blenderized family foods allows for greater inclusion in family meals and a “normalization” of the gastrostomy tube feedings. It promotes the view of the G-tube as another mouth, allowing the family to consider and plan what their child will eat just as

they do with a child who is an oral eater. It facilitates the transition from tube feeding to oral feeding, if that is in the medical plan, by introducing meal planning and by priming the gastrointestinal system and the senses for the complexities of food. In terms of introducing the oral sensation of taste by the use of BTF, one colleague eloquently stated, “If they burp it, they taste it.”

Some families use BTF at home only, using a commercial BTF (eg, Compleat Pediatric) at school. Many schools will not allow their staff to give a home BTF formula because of concerns regarding safe preparation and transport. Some families make the BTF from scratch, whereas others use a combination of formula and commercial jarred purees. It is important to develop a nutritionally adequate recipe for each child with guidance on appropriate water intake as well. When families have tried it on their own, the result is often inadequate fluid, protein, and nutrient intake. Regardless of how a family uses BTF, it is essential to make sure a commercial formula is identified and available for emergencies or travel (when refrigeration is not available).

Ausderau: In general, many families enjoy providing their child with a blenderized diet. Feeding is an intimate experience between a parent and a child. Providing their child with a homemade blenderized diet can return the parents to a more involved role in feeding and providing food for their child. It allows parents the opportunity to directly make

Each issue, we ask 4 different clinicians a set of questions about an aspect of their practice or a specific problem or disease condition they encounter. This month's topic is the use of blenderized tube feedings, specifically nutritional supplementation. Our participants are **Patricia Novak, MPH, RD, CLE; Karen E. Wilson, MS, RD, CSP; Karla Ausderau, OTR/L, MS, Advanced Practice in Swallowing (SWC);** and **Diane Cullinane, MD.** All participants are with the Pasadena Child Development Feeding Team (PCDA), a nonprofit, multidisciplinary team of pediatric specialists providing a range of services that include assessment, intervention, consultation, and training services to children from birth to 12 years of age and their families, primary caregivers, and the professionals who work with them. The services include behavior intervention and support, health and nursing services, occupational therapy, speech and language therapy, nutritional therapy, parent counseling and training, music therapy, and feeding team services. Therapies are guided by the DIR approach, which is a developmental-, relationship-, and play-based model integrating “Floortime” strategies to support social-emotional development and behavior. For more information, go to www.pasadenachilddevelopment.org.

and provide food for their child as they would for the rest of their family. Families often describe how it is a way for the child to participate in family food and mealtime.

In our practice, we have also seen many children tolerate blenderized food better versus other products. It also provides the opportunity for children who are still eating purees by mouth to be receiving the same food by mouth as they are through their G-tube. In essence, the G-tube is used as a second mouth with the child smelling, tasting, eating, and burping the same food through their mouth as their G-tube. Allowing the child to have blenderized food can also further support a G-tube transition in some children by normalizing the feeding experience and allowing the opportunity for their gastrointestinal system to become accustomed to table food.

What criteria would you require before seriously considering the use of BTF?

Agreed upon by the team:

- a. Medically stable; to include treated reflux (not necessary to be resolved) and stable pulmonary status
- b. Appropriate weight and linear gains with good fat and muscle stores OR clearly able to meet caloric and nutrient needs with BTF
- c. Motivated care providers with appropriate kitchen facilities and ability to follow recipe instructions and food-handling capacity
- d. Gastrostomy tub, at least 14 French
- e. Gastrostomy site well healed with no infection

Novak/Wilson: Unfortunately, there is limited research on the use of home-prepared BTF with children. Overall, some of the concerns we might have with tolerance when considering a commercial formula are the same concerns we have when creating a “formula” based on food. The advantage with food-based homemade formula is that we have many different foods to develop a unique “formula” that will allow the child to

thrive. We do not provide a standard BTF recipe; rather, we customize it for the child based on general health-promoting dietary guidelines, medical concerns, and the family’s traditional foods. The care of the G-tube site is no different than with the use of commercial formula, although the extension tubing may need to be changed more frequently.

Who are the best candidates for blenderized tube feedings?

Novak/Wilson: The best candidate is one whose family requests to use BTF. An interested family is willing to commit the time for instruction and for making BTF. It is important that there is adequate refrigeration and a heavy-duty blender. The care provider must be able to understand instruction for food handling and follow the BTF recipes.

Ausderau: The child and family readiness must both be taken into consideration when considering blenderized tube feedings. The best candidate would be a family who has considered the pros and cons of a blenderized diet and is ready to work with a dietitian to provide their child with the appropriate feedings. Providing a child with blenderized tube feedings requires significantly more thought, preparation, and overall time. The family must be ready and capable to prepare food in a safe and calorically appropriate manner to meet their child’s overall growth and nutrition needs. A child who is having difficulty tolerating commercial-based formulas may also be a good candidate to discuss the possibility of a blenderized diet with his or her gastroenterologist and dietitian.

Who would not be good candidates for BTF?

Novak/Wilson: A child who is unable to tolerate bolus feeds would not be a good candidate as BTF should not be used for drip feedings that will last more than an hour. A child who continues to use drip feedings may be able to take small bolus feedings of BTF and use a combination of bolus and drip feedings. It is challenging to develop a BTF for children with

significant dietary limitations due to allergies. Although as noted earlier, there are many different foods to use in a BTF, and needs can be met even for the child with multiple food allergies.

Delayed gastric emptying can be an issue in terms of volume tolerance, yet we have seen children in whom this is improved with the use of BTF. Food can ONLY be used with a gastrostomy tube; it cannot be used when children are fed with a jejunostomy tube. In addition, a child who has very high energy needs (eg, a child with hypertonia) may have trouble meeting his or her needs with blenderized food alone and may do better with inclusion of a high-calorie formula or commercial modular products in the BTF recipe. The children who have not been able to sustain BTF have been those with significant medical and gastrointestinal issues that often require frequent hospitalizations. Many of these children have also had difficulty with standard formula and have required elemental formula because of their considerable involvement.

Ausderau: A child who is not a good candidate for a blenderized feeding may be a child who has a complicated schedule with a variety of people administering the G-tube feedings, particularly outside the home. It is very important that the blenderized food be maintained in a safe manner, which can be difficult when transporting the child and the food from school to multiple therapy appointments. It is also essential that the family is in complete agreement with providing the blenderized food and it is not being forced upon them by a medical/feeding team or funding challenges with their current commercial formula.

Novak/Wilson: That last point is an important consideration. We have worked with some families who have had their child’s food (formula) funded by public agencies. They are selecting the BTF as they cannot afford the formula once the funding has stopped. Using the blenderized diet will be the first time the parents will need to pay for food and cook for their child. Many

parents will need considerable education regarding cooking and the child's nutritional needs. Unfortunately, the resources for this type of nutrition counseling and support are not always readily available. The family will need to have sufficient income, insurance, or public funding to allow for participation in nutrition counseling.

What are the potential risks and complications?

Cullinane: When a child is receiving a blenderized diet, rather than a standard formula, there is often the discovery of food allergy or intolerances. Generally, a blenderized diet is recommended after the child has had a period of gastrointestinal stability (ie, normal bowel pattern) and absence of other major health changes related to medical problems.

Novak/Wilson: Complications are often related to the underlying gastroenterological or neurological issues that have led to placement of the gastrostomy tube. Aspiration with reflux is always a concern, yet the risk is no greater with BTF than standard formula. Tube blockage risk is increased but can be decreased by monitoring the fiber content of the food. Allergic response requires monitoring as many foods will have their initial presentation via the BTF. Standard allergic precautions should be used, introducing one new food at a time with a sufficient interval between introductions. Parents should be made aware of signs of allergy and intolerance. To prevent food-borne illness, it is also important to instruct the families in equipment cleaning technique in addition to safe food-handling practices. The

syringes and the blender need to be completely dismantled, washed, and air-dried.

Ausderau: The most common set of risks and complications associated with blenderized tube feeding would be related to the child's original gastrointestinal challenges.

We have also seen weight loss related to parent error in food preparation, which resulted in decreased caloric and nutritional content. Therefore, we go slowly to allow the family and the gastrointestinal tract to accommodate. Frequent monitoring, especially when the BTF feeding is new, is important to assess parental understanding and the child's tolerance.

What equipment is most effective in developing blenderized tube feeding?

Novak/Wilson: Heavy-duty blenders such as the Vitamix blender (\$400-\$500) are often recommended, yet many families successfully use the Magic Bullet, which can be purchased at department and discount stores (\$50). In addition to the blender, it is obviously important that the family has the equipment to appropriately store the formula once made and facilities to clean the blender well.

Ausderau: Many families have their own preferences for the type of equipment for preparing blenderized food and continue to serve as the best resource for new families. Families are encouraged to check with their insurance providers and directly with the blender companies for coverage or company-based discounts. Again, family-to-family support is the best way to discover "preparation tricks" and financial breaks.

Summary

There are both medical and emotional benefits from the use of BTF. BTF allows for some normalization of the feeding process for gastrostomy tube-fed children. BTF can be better tolerated than commercial formula, providing greater variety and often a more health-promoting nutrient mix. This often results in improvement of reflux and constipation. The major concerns regarding BTF are the use in extremely medically involved children and parental commitment regarding nutrition education and BTF preparation. Many children with G-tubes have multiple therapies and medical interventions; this needs to be considered in terms of parental resources and formula transportation. ■

Additional Readings

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