The Trend to Blend

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Disclosures

I have a commercial relationship with Nestle, Abbott and Avanos as a consultant/member of speaker’s bureau, etc. and will provide practice recommendations that are based on formal structured review of the literature.
Objectives

- Evaluate who is using blenderized tube feeding (BTF).
- Define criteria that should be met prior to starting BTF.
- Be able to list tools needed to make and administer BTF.
- Construct sample recipes for BTF.
- Discuss differences between the premade whole food formulas.
Who is blending?
Mayo patients blending

- Authors conducted a study of Mayo patients (54 adults).
- BTF was used by 55.5% of patients.
- 90% expressed a desire to use BTF if provided with adequate information.
- GI symptoms
  - 83% had no symptoms on BTF
  - 67% had no symptoms on commercial formula

Results: BTF is tolerated as well as commercial formulas.

Oley Foundation Survey

Pediatrics (125 respondents)
- 89.6% of pediatric patients used BTF
- 71% of total daily intake
- 75% used homemade blends
- 90.2% reported no weight loss when using BTF compared to 58.9% reported no weight loss when using commercial formulas

Adults (91 respondents)
- 65.9% of adult patients used BTF
- 56% of total daily intake
- 67% used homemade blends
- 51 (85%) reported no weight loss when on BTF vs 31 (32%) reporting no weight loss with commercial enteral formulas.

Results: using commercial EN formula was more likely to lead to weight loss than using BTF ($P < .0001$).

HEN Demographics survey

- Online survey linked on Oley Foundation and Feeding Tube Awareness Foundation online.
- Coram and Pediatric Home Services also helped administer the surveys.
- 1519 surveys completed
  - 1062 <18 years old
    - 23.6% reported use of BTF
  - 457 ≥18 years old
    - 14.9% reported use of BTF

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Take away

- Many patients are blending and this should be part of every nutrition assessment for an enterally fed patient.
- Clinicians refusing to consider these formulas or homemade recipes may lead to patient harm.
- Some patients may not be able to blend and may feel “shame”.
- “much more energy with blenderized feedings & regular bowel movements”
- “its great to have flexibility and choice”
- “Feel the best I have in 10 years”
Criteria

- Talk to your primary care provider
- Mature stoma (negotiable)
  - 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
- Determine a system for monitoring
- Nutrition professional available
- Gastric tube
  - Feeding commercial blenderized formula into the small bowel requires clinical judgement
  - Remember French size of jejunal extension (if GJ tube)
- More experience/research needed
Clinical benefits

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

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


Clinical Benefits

- Improve reflux
- Decrease in vomiting
- Bowel regularity
  - Improved diarrhea
- Increased bacterial diversity of gut
- Bowel adaptation improved


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 to travel
- Facility or hospital may not support it


Tools needed
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.

- Catheter tip O ring syringes
  - Don’t get sticky
  - Easier to push
  - May help to oil syringes

- Straight bolus extension sets
Tools

- Large bore gravity bags
- EcoTubie syringe
- EnteraLite® Infinity® pump
  - May need to increase pump rate to compensate
  - Viscosity may results in inconsistent feeding times
- Bolee™ bags

Its Just Food and Water
Recipe development

- Exchanges
- Standard recipe
- Plate method
Recipe idea 500 kcal (exchanges)

<table>
<thead>
<tr>
<th>INGREDIENT</th>
<th>AMOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starch – well-cooked oatmeal, rice, pasta or potato</td>
<td>½ cup</td>
</tr>
<tr>
<td>Yogurt, reduced fat (2%)</td>
<td>¼ cup</td>
</tr>
<tr>
<td>Milk, 1%</td>
<td>¾ cup (6 oz)</td>
</tr>
<tr>
<td>Oil, canola</td>
<td>2 teaspoons</td>
</tr>
<tr>
<td>Fruit – canned, fresh or frozen apple, banana, peaches, mandarin oranges</td>
<td>½ cup</td>
</tr>
<tr>
<td>Vegetable – canned, fresh or frozen well cooked broccoli, carrots, green beans or cauliflower</td>
<td>½ cup</td>
</tr>
<tr>
<td>Meat – cooked tender chicken, turkey, beef, fish or smooth, soft tofu</td>
<td>½ cup</td>
</tr>
</tbody>
</table>

PROCEDURE: Put all items in a blender and mix well. This fits into a Magic Bullet. Refrigerate if not used immediately.
Standard Recipe 1000 kcal

<table>
<thead>
<tr>
<th>INGREDIENTS</th>
<th>Total Volume to send:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooked oatmeal</td>
<td>1 cup</td>
</tr>
<tr>
<td>Egg, cooked</td>
<td>1 each</td>
</tr>
<tr>
<td>Melon</td>
<td>½ cup</td>
</tr>
<tr>
<td>Whole milk</td>
<td>4 fl oz</td>
</tr>
<tr>
<td>Canola oil</td>
<td>1 teaspoon</td>
</tr>
<tr>
<td>Cooked brown rice</td>
<td>½ cup</td>
</tr>
<tr>
<td>Cooked green beans</td>
<td>½ cup</td>
</tr>
<tr>
<td>Canned peaches (drained)</td>
<td>½ cup</td>
</tr>
<tr>
<td>Yogurt (reduced fat 2%)</td>
<td>6 oz</td>
</tr>
<tr>
<td>Whole milk</td>
<td>4 fl oz</td>
</tr>
<tr>
<td>Pureed carrots</td>
<td>½ cup</td>
</tr>
<tr>
<td>Tofu</td>
<td>½ cup</td>
</tr>
<tr>
<td>Avocado</td>
<td>4 tablespoons</td>
</tr>
</tbody>
</table>
**MyPlate Daily Checklist**

Write down the foods you ate today and track your daily MyPlate, MyWins!

<table>
<thead>
<tr>
<th>Food group targets for a 1,400 calorie pattern are:</th>
<th>Write your food choices for each food group</th>
<th>Did you reach your target?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 1/2 cups</td>
<td></td>
<td>Y or N</td>
</tr>
<tr>
<td><strong>Fruits</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 cup of fruits counts as</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 1 cup raw or cooked fruit; or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 1/2 cup dried fruit; or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 1 cup 100% fruit juice.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Limit</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Sodium to 1,500 milligrams a day.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Saturated fat to 16 grams a day.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Added sugars to 22 grams a day.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Activity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Be active your way:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Children 2 to 5 years old should play actively every day.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Vegetables</strong></td>
<td></td>
<td>Y or N</td>
</tr>
<tr>
<td>1 cup of vegetables counts as</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 1 cup raw or cooked vegetables; or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 2 cups leafy salad greens; or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 1 cup 100% vegetable juice.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Grains</strong></td>
<td></td>
<td>Y or N</td>
</tr>
<tr>
<td>5 ounce equivalents</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 ounce of grains counts as</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 1 slice bread; or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 1 ounce ready-to-eat cereal or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 1/2 cup cooked rice, pasta, or cereal.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Limit</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Protein</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 ounce equivalents</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 ounce of protein counts as</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 1 ounce lean meat, poultry, or seafood; or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 1 egg; or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 1 Tbsp peanut butter; or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 1/4 cup cooked beans or peas; or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 1/2 ounce nuts or seeds.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Dairy</strong></td>
<td></td>
<td>Y or N</td>
</tr>
<tr>
<td>2 1/2 cups</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 cup of dairy counts as</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 1 cup milk; or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 1 cup yogurt; or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 1 cup fortified soy beverage; or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 1/2 ounces natural cheese or 2 ounces processed cheese</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**MyWins**

Track your MyPlate, MyWins

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Serving examples

- **Fruit** - 1 cup watermelon, ½ cup prunes, 1 cup pear juice.
- **Vegetable** - 2 cups chopped kale, 1 cup cooked green beans, 1 cup tomato juice.
- **Protein** - 1 oz cooked chicken, 1 hard boiled egg, ¼ cup pinto beans
- **Grain** - 1 piece of whole wheat toast, ½ cup cooked brown rice, ¼ cup grape nuts
- **Fat** (5 grams/serving) - 1 teaspoon olive oil, ½ tablespoon butter, 10 olives
- **Dairy** - 1 cup whole milk, 1 cup soy milk, 1 cup kefir.
Commercial Formula + Food

- One can of standard 1.0 kcal/mL formula
  - ½ cup sliced peaches
  - ½ cup cooked steel cut oatmeal
  - ½ blueberries

This provides approximately 400 kcal and 13 grams protein
Commercial Blenderized Formulas + Added Foods

Examples

- 1 pouch commercial blenderized product + ½ cup strawberries
- 1 pouch commercial blenderized product + 1 tablespoon flaxseed oil
- 1 pouch commercial blenderized product + 2 tablespoons sunflower seed butter
Consumer Recipe shortcomings

- Too many fruits/vegetables
- Too much protein
- Low in salt and potassium
- Forget the carbohydrate
- Too much water
- Not enough water
Hang times

- Hang time of food is 2 hours
  - Per USDA “Perishable food should not be left out more than 2 hours at room temperature--one hour when the temperature is above 90 °F (32.2 ºC).”
- Commercially prepared formulas 8-12 hours
- Adding modulars decreases hang time to 4 hours
Storage

Commercial vs. Homemade

- Once opened, unused commercial 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.
The following information is being provided for a learning experience and not to promote any one product over another.
Commercial products

1. Compleat®, Compleat® Pediatric, Compleat® Pediatric Reduced Calorie, Compleat® Organic Blends
2. Kate Farms® Komplete, Core Essentials, Peptide Plus 1.5, Kate Farms Pediatric Peptide 1.5, Kate Farms Pediatric Standard 1.2
3. Liquid Hope® and Nourish®
4. Pediasure Harvest™
5. Real Food Blends™
Conclusion

- Blended formula appears to be used in the majority of Mayo/Oley HEN patients

- Can meet nutrition needs with the help of a registered dietitian.

- There are many options available for patients who wish to use BTF.
References