Mealtime Skills
Increasing Gastrointestinal Comfort

PURPOSE

This is a protocol for increasing gastrointestinal comfort in infants and children who experience gastrointestinal discomfort during or following tube feedings.

The purpose is to describe a way in which the child and parent can reduce gagging, retching, vomiting, nausea or other gastrointestinal discomfort during meals.

TARGET GROUP

Infants and children who receive their nutrition through a feeding tube and who experience discomfort due to:

- nausea
- gagging
- vomiting
- gastroesophageal reflux
- abdominal cramps
- retching
- dumping
- inadequate perception of hunger and satiety cues
- parental pressure to take larger quantities of food

The parents of these children often experience both internal and external pressures to give the child a specific number of calories at each meal to support growth. The child's appetite and gastrointestinal comfort may vary widely during these meals, creating additional stress for both parent and child.

Most of the concepts and approaches described also apply to the child who is fed orally.

THE CHALLENGE AND PROGRAM COMPONENTS

In most instances a single behavior or factor cannot explain the child's discomfort during tube and oral feedings. They are based on a complex intermixture of physical, sensory, gastrointestinal, and emotional experiences that include the following:

Neurophysiological Foundations
Both reflux and retching can be viewed as having underlying causes as well as triggers that elicit these gastrointestinal patterns. Reflux is based on a wide variety of medical issues

that result in reduced competency of the lower esophageal sphincter. When a child's system is vulnerable for reflux, many environmental triggers can elicit the gastrointestinal pattern. This may include physical and emotional tension, regulatory disorders and sensory defensiveness, poor postural stability and reduced activity of the abdominal wall, allergic sensitivities, mucous congestion and postnasal drip, and delayed gastric emptying.

Surgical procedures such as a Nissen Fundoplication or Pyloroplasty may be done to mechanically increase the closure of the lower esophageal sphincter and reduce the length of time that food remains in the stomach. Ideally this results in the elimination of overt reflux and vomiting. However, some children who have had a fundoplication respond with violent gagging and retching, gas bloat, nausea, and generalized gastrointestinal discomfort. They loose interest in eating by mouth, and may become totally dependent upon slow continuous drip feedings delivered by a pump.

The underlying causes are speculative and may differ for different children. When the causes and triggers for reflux are not addressed before the fundoplication is done, these same triggers may create pressure against the lower esophageal sphincter and contribute to retching. In some children, the retching is so strong that the fundoplication loosens and no longer controls reflux and vomiting. In addition, surgical side-effects can include damage to the Vagus nerve, reduced size of the stomach, and shifts in stomach emptying time, resulting in delayed gastric emptying or dumping syndrome.

Typically when one or more of these components is present, parents are told that nothing can be done about the retching and gagging and that hopefully the child will grow out of it eventually.

Anticipation of Pain and Discomfort

When children repeatedly experience pain and discomfort during tube feeding, they build a strong anticipation of the distress. This negative anticipation causes the child to react with fear, caution, and anxiety. These emotions contribute to subtle gastrointestinal changes, and reduce the efficiency of digestion. Children recognize that they are in trouble and they hurt. Over time they can develop the belief that eating will always be painful, and they can do nothing about it. These experiences with tube feeding may generalize and influence the child's relationship to oral feedings. Many children perceive themselves as victims of the retching and a body that causes them discomfort.

Increased Physical Tension

Increases in physical tension increase the perception of pain. This is well recognized by clinics treating individuals with chronic pain and in the preparation of women for labor and childbirth. As an individual learns to relax into the discomfort, the perception of discomfort diminishes. Progressive relaxation, conscious breathing, meditation, and massage have been very effective in reducing pain to manageable levels in adults.

Children who experience the pain of esophagitis (from reflux) gas bloat or retching (from the fundoplication), frequently respond with increased physical tension. They may push back strongly into extension or curl up in strong flexion. The abdominal wall tightens, and

a vicious cycle of pain, tension, and increased pain results. The autonomic nervous system discomfort escalates, and the child cannot stop retching. Retching may become triggered by smaller and smaller signals of discomfort. Tension in the abdominal-pelvic girdle can prevent the child from passing gas or burping as the gas becomes incarcerated in the gastrointestinal system from strong tension. Many children with cerebral palsy push into strong extension. However, gas is passed more easily with a relaxed body and abdominal wall. Gentle elevation of the pelvis and bending the child's legs toward the abdomen also increase the ease with which the child handles or releases gas. These strategies are impossible when physical tension accompanies the initial discomfort.

Increased Mucous and Saliva Production
Saliva may increase rapidly from the stimulation of eating or from nausea and impending retching. Thick mucous may become lodged in the throat, and trigger gagging or coughing. This trigger may activate retching or reflux. Many children have increased retching or reflux when wakening after sleep. This is often related to the stimulation of post-nasal drip and mucous congestion during sleep. Thick mucous may be related to an allergic sensitivity to the formula or to something in the environment (i.e. dust mites, animal dander, pollens, cigarette smoke, household chemicals). Reduced water intake may contribute to thickening of mucous. Constipation may stimulate the body to release toxins through an increase in mucous production. Some children have difficulty handling these increases in secretions. Larger volume of saliva or thicker mucous may challenge a marginally functioning swallowing system. Some children discover that they can dislodge the mucous and get rid of it by gagging themselves.

Reduced Tolerance for Larger Amounts of Formula in the Stomach
Children who gag and retch may be given smaller bolus feedings more frequently or they may receive a continuous drip-feeding through a pump. This strategy alone may not eliminate the retching or reflux if the problem is partially triggered by the child's expectations and prior experience with discomfort. Intermittent retching can become an intermittent negative reinforcer that perpetuates the child's belief that feeding will be associated with discomfort.

Since reflux and retching have previously been associated with expansion of the stomach during larger volume meals, the child may respond to any increase in amount with retching. With smaller amounts, the stomach shrinks, and smaller amounts still trigger the sensation of expansion of the stomach walls. This sensation (and the child's perception that it means trouble) can serve as a trigger for emotional and physical tension, which then elicit gagging and retching.

Reduction of Water Intake
Many children who receive tube feedings do not receive adequate free water for optimum hydration of the cells throughout the body. As the size of bolus or rate of pump flow is reduced, the child must spend longer periods with slow tube feedings. The emphasis is on caloric intake, and water may be eliminated (except for the small amounts used to flush the tube). The child is getting liquid through the formula, but minimal amounts of free water. It is widely recognized that adults need 8-10 glasses of water per day. Health profession-

als do not say to drink 8-10 cups of coffee or glasses of milk to satisfy the body's need for liquid. When there is not enough free water in the cells, the brain will direct the available water to the most essential part of the body. This can result in less water being sent to the digestive tract resulting in reduced efficiency of digestion, thicker mucous, or constipation. These digestive difficulties create a greater vulnerability for retching, gagging, mucous, and gas bloat.

Limited Dietary Variety and the Risk of Allergic Sensitivities

Children who receive tube feedings typically get the same formula each day for months and years at a time. The digestive system of infants is designed for a liquid diet with the same formula until the age of 6-9 months. At that time a milk diet is supplemented with a wide variety of grains, fruits, and vegetables. The volume of these foods gradually increases so that milk is simply one part of the typical diet. However, even during the prime period of milk intake, the breast-fed baby receives a great deal of dietary variety. The fat content of breast milk changes from the beginning to the end of the feeding. The taste of foods in the mother's diet is transferred to breast milk, giving the baby's system many new experiences. In contrast, a child who is tube fed may receive the same liquid formula for the first 12-18 months and then a second, similar formula for older children for many years.

Processed formulas usually become the primary or exclusive diet. This results in reduced dietary variety. The body knows only a single eating experience that causes discomfort. There is usually a reduction in fiber, and a reduction in the trace nutrients that are found in live foods. This can contribute to allergic sensitivities. Some allergists observe that individuals can develop sensitivities or a systemic intolerance to foods that are eaten daily. Children whose parents, grandparents, or siblings have allergies to foods, pollen, medications, or chemicals may be at greater risk of developing sensitivities to components of a formula that is given for extended periods. Most formulas contain cow's milk or soy as their protein source and corn as the fat or carbohydrate source. All three foods are in the high-risk group for developing allergic reactions in young children. Many children can handle small, infrequent amounts of a food to which they are sensitive or allergic. However, if the food is given in large amounts every day, problems may develop. Since allergic symptoms can develop in every system of the body, this can affect the gastrointestinal system as well. Vomiting, reflux, increased gas, retching, and mucous congestion have all been observed in response to allergic sensitivities to foods.

Antibiotic Use

Increased use of antibiotics may further "weaken" the gastrointestinal system through the destruction of the healthy bacteria and creation of an imbalance with increased *candida albicans* yeast. Digestion is less efficient. More gas may be produced. *Leaky Gut* from imbedded yeast rhizomes in the walls of the intestines may result as the yeast grows and changes form. This increases the incidence of widespread allergic reactions, and challenges and weakens the immune system. A systemic yeast infection frequently produces gas in the intestinal tract because of poor digestion.

Feelings of Powerlessness – Attempts to Take Control
In children's world-view, the discomfort just happens to them. It is generally associated with the tube feeding. The child has no control over these feedings and no perceived control over the discomfort. Standard amounts are given at a feeding. The formula usually comes at a standard rate or is only stopped when the child retches or becomes uncomfortable. The child feels powerless . . . a victim of his own body. The only area of eating and food intake that children can really control is oral feeding. They often say "no" because they "know" or anticipate that eating orally will be uncomfortable. All children know that no one can make them eat or swallow. If there's any pressure, they stay in the safety zone and don't take risks. Children who are willing to eat often limit themselves to small quantities that don't push the feelings of potential discomfort.

Many children discover that adults give them a great deal of attention when they vomit or retch. They learn to feel powerful and in control of others through triggering these behaviors. Since they have minimal control in other areas of their lives, they find the stimulation of a gag a very powerful tool.

LEARNING PROTOCOL

Numerous simple, effective approaches can be included in a child's program to increase gastrointestinal comfort. The following components have been effective with individual infants and children. Select those that relate to the child's specific situation and needs.

Identify the Subtle Initial Signals of Gastrointestinal Discomfort
Carefully observe the child for body signals of initial discomfort. These may include facial expression, changes in the swallowing of saliva, increases in body tension, wiggling, shifts in attention, rumbling sounds in the stomach, coughing, and increases in hand-to-mouth patterns. When the very first signs of discomfort are identified, strategies to improve comfort can be initiated. Responses to the final discomfort signals of gagging, coughing, retching, and vomiting are usually less effective in stopping the pattern.

Stop the Flow of Formula Intermittently and at Any Early Sign of Discomfort
This allows the stomach to rest and adapt to a lesser discomfort. It prevents escalation of the autonomic nervous system into unstoppable gagging, retching, and reflux.

Reduce Physical, Sensory, and Emotional Tension
Comfort begins with a well-supported position. The specific position will vary with the child's physical abilities and limitations. Positioning on the right side can anatomically result in more efficient emptying of the stomach. Some children relax more easily with the gentle movement of swinging or rocking in a chair. Physical and verbal guidance can help reduce a child's tendency to push back into extension or tense the pelvis and abdomen. Emotional tension can be reduce through special calming music and an adult who engages the child as a partner in learning to work through and prevent gastrointestinal discomfort. There are many strategies that can calm the nervous system and reduce emotional and sensory triggers.

Build the Child's Awareness and Discovery of What Helps
Let the child be your partner in finding out what works to increase his comfort level. These discoveries can be made when he is still in control of his body and when there is mild discomfort. Together you can explore strategies such as softening the abdomen, gentle pressure on the abdomen with the knees, reminders to breathe more deeply, signaling the feeder to stop the flow of formula or to vent the tummy, sucking on a pacifier or a gentle trigger of a cough.

Empower the Child
Help the child shift her beliefs and establish new experiences related to eating. This includes feedback of moments when she is relaxed and comfortable, a focus on her ability to move through the retch or gag more easily, and use of positive suggestions during the meal.

Introduce Comfortable Bolus Feedings of Water
Water does not require digestion and moves through the gastrointestinal tract rapidly. Small bolus feedings of water can be given approximately 30 minutes before a tube feeding. The initial level is always kept within a range that the child can handle without discomfort 100% of the time. The size of the bolus feeding is increased by 15cc (i.e. 1/4 oz.) over a period of weeks and months until the child is comfortable with a 6-8 ounce bolus given within a 10-minute period. The goal is to provide a sense of fullness without pain and discomfort. Increased water can also improve the efficiency of digestion, remove toxins from the body, and thin down mucous and reduce congestion.

Move toward Positive Experiences with Bolus Feedings of Formula
As the child becomes comfortable with a water bolus of 4 ounces, small amounts of juice or formula can be mixed with water to provide a small digestive challenge with the experience of a larger volume in the stomach. Both the amount of food or formula and the amount of water can be increased slowly until the child can maintain the same level of comfort with a 4-6 ounce bolus feeding of food (i.e. formula, juice, blenderized food).

Reduce the Impact of Respiratory Congestion
Explore using a high-efficiency HEPA air filter in the child's bedroom during sleeping periods. Some children develop increased mucus and upper respiratory congestion because of sensitivities to pollens, molds and other airborne allergens. During sleep the congestion often worsens because of the child's position and lack of activity. Discomfort and attempts to cough out the mucus can trigger gagging, retching and vomiting in the sensitive child. Using a humidifier in the room can also help thin and loosen mucous congestion and reduce a trigger for gagging and vomiting.

Explore Diet and Nutritional Changes
Dietary changes are combined with a program to increase physical and emotional comfort during the meal. If the child is experientially sensitized to gastrointestinal pain and discomfort during the meal, dietary changes alone may not result in improvement of reflux and retching. If the child has already built an internal expectation that the meal will be uncomfortable, this experience may continue even if small improvements from a new formula or food supplement are present.

There are a wide variety of alternatives and approaches. The major focus is on providing dietary diversity, increasing calories through highly nutritious food supplements, live organic foods, and building a stronger state of wellness. The addition of high quality food supplements to the child's formula can provide super-support for the immune and digestive systems. Food supplements may include digestive enzymes (green papaya), soluble rice bran, glyconutrients, and phytonutrients from freeze dried fruits and vegetables.

Many children experience a reduction in gas and retching when blenderized foods are incorporated into the diet. . Rotational diets and diets that explore food combining strategies can also be very effective in reducing the production of gas in the intestines from incomplete digestion and the build up of allergic sensitivities. The addition of probiotic supplements that add healthy bacteria to the intestinal tract may also improve digestion and reduce gas production.

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