Complex Child E-Magazine

www.ComplexChild.com

Gut Motility Problems in Children

by Susan Agrawal

In the past few years, doctors have become more aware of the great importance of motility in the gastrointestinal system. Symptoms and problems that for many years have been impossible to diagnosis, difficult to treat, and misunderstood by science are beginning to be addressed by specialists in gut motility.

What is motility? Very simply put, motility is the movement of food from the point of entry into the body, usually the mouth, until the point of exit from the body, usually the anus in the form of stool. Food must travel through a complex and very long path through the digestive system—as long as 30 feet in an adult! If even one inch of this digestive tract malfunctions due to anatomical, neurological, or other problems, a child may experience serious, painful, disruptive, and even life-threatening symptoms.

In the normal digestive tract, food travels through the entire system propelled by peristalsis, or regular contractions of the gut. Peristalsis is controlled by the brain and the enteric nervous system, the "little brain" of the gut. These peristaltic contractions vary throughout the length of the digestive tract. In the stomach they should be strong and regular, while in the intestine they are more irregular. The Interstitial Cells of Cajal, neural cells that are a cross between nerve and muscle cells, are the pacemakers in the gut and regulate the rate and strength of peristalsis, influencing the motor neurons in the gut to drive food through the entire digestive system.

The digestive tract consists of four main areas, all separated from one another by sphincters:

- Esophagus
- Stomach
- Small Intestine
- Large Intestine

Motility problems can affect any one of these four divisions, and in some children, may affect more than one area.

Motility Problems of the Esophagus

Normally when a child swallows food, the esophagus contracts rhythmically to propel the food toward the stomach. The Lower Esophageal Sphincter (LES) opens up after

Copyright 2008 by Complex Child E-Magazine. All Rights Reserved. This document may be distributed for educational use only with proper citation.

swallowing to allow food into the stomach and then quickly closes back up to prevent reflux. Motility problems can affect the swallow, esophageal contractions, or the function of the LES.

To determine if a child has an esophageal motility problem, a doctor may order a Swallow Study, a test that takes live X-rays using fluoroscopy to watch how effectively a child swallows and how food or formula progresses from the mouth to the stomach. A more sophisticated test, Esophogeal Manometry, can measure the contractions within the esophagus using a tube threaded through the nostril and into the esophagus.

Dysphagia, or ineffectual swallowing, is a motility problem that is relatively common in children with neurological impairments, anatomical abnormalities, and a variety of other conditions. Some children do not have the muscle coordination or strength to swallow properly, causing food to stick in the esophagus or to be aspirated into the lungs. This type of motility problem may be helped with speech therapy or VitalStim therapy to help develop and coordinate the muscles needed for swallowing. Other children have spasms or uncoordinated contractions of the esophagus that can lead to vomiting, a feeling of food stuck in the esophagus, and pain. While more difficult to treat, esophageal spasms may be helped by anti-spasmodic medications or medications that relax the nerves in the gut.

Achalasia is another esophageal motility problem characterized by an absence of contractions in the esophagus and an inability of the LES to relax and allow food into the stomach. Symptoms include vomiting, reflux, food sticking in the esophagus, pain, and weight loss. Achalasia is very difficult to treat, and often requires either surgery to open the LES or botox injections to relax it. Sometimes medications like beta blockers may be helpful as well.

Gastroesophageal reflux disease (GERD) is also a considered a motility disorder, especially when it results from frequent relaxations of the LES or a weak LES. Stomach contents reflux back into the esophagus and may cause burning, passive spitting up, respiratory problems, and pain. GERD is typically treated with medications that reduce the acid levels of gastric contents, and lifestyle changes such as raising the head of the bed, avoiding acidic foods, or eating smaller meals. In severe cases, surgery may be performed to tighten the LES. This surgery, called fundoplication, is only for children who have life-threatening reflux.

Motility Problems of the Stomach

In a normal GI tract, the stomach contracts and uses acid to break down food into a liquid that can pass through the pyloric valve and into the small intestine. The upper and lower parts of the stomach actually contract separately. The lower part of the stomach contracts rhythmically approximately every 20 seconds to break up food into small pieces, while the upper part of the stomach relaxes with each swallow to accommodate food and to help empty the stomach. Once food is broken down, the pylorus opens up and allows passage of the gastric contents into the small intestine.

A child with suspected motility problems of the stomach may have a test called a Gastric Emptying Scan. This test involves swallowing food or formula with a radioactive isotope in it. A nuclear medicine scanner takes pictures for approximately two hours to see how long the stomach takes to empty. A more sophisticated test, antroduodenal manometry, uses a tube placed through the nose or a G-tube to measure the contractions of the stomach.

Delayed Gastric Emptying (Gastroparesis) is one of the most common motility disorders, and involves slow emptying of the stomach due to a variety of causes. In some children, the pylorus does not open spontaneously or frequently enough. Other children have weak peristalsis or stomach contractions that are not effective in pushing food into the small intestine. Some children also have dysmotility, or contractions that are not rhythmic or are disorganized. Gastroparesis may range from mild to extremely severe. In mild cases, treatment with pro-motility medications like Reglan, Bethanechol, or low-dose Erythromycin may be helpful. Some children require a Pyloroplasty, a surgery to open the pylorus, or botox injections into the pylorus to relax it. Children with dysmotility may be treated with anti-spasmodic medications or medications that relax the nerves in the gut. Gastroparesis often has a neurological cause, but may also result from viruses (post-viral gastroparesis), anatomical abnormalities, and unknown causes. Severe gastroparesis may require tube feedings into the small intestine to avoid use of the stomach or even IV fluids and nutrition.

Rapid Gastric Emptying (Dumping Syndrome) is the exact opposite of gastroparesis—it is the rapid movement of undigested gastric contents into the small intestine. There are two types of dumping: early dumping that occurs during or shortly after a meal, and late dumping that occurs 1-3 hours after a meal. Early dumping is characterized by diarrhea, cramping, nausea, vomiting, fatigue, and dizziness. Late dumping can lead to problems with blood sugar regulation, dizziness, paleness, sweating, and weakness. The most common cause of dumping is surgery to the stomach, including pyloroplasty, though some children may have more functional reasons for dumping. In most cases, dumping can be treated with dietary changes, including eating smaller meals, not drinking while eating, avoiding high sugar foods, adding fat, fiber, or protein to the diet, or adding cornstarch to feeds to help counter blood sugar problems. Medication may also be helpful for some children.

Motility Problems of the Small Intestine

The normal motility of the small intestine is complicated and involves a wide variety or both regular and irregular contractions that ultimately move food down into the large intestine. It takes roughly one and a half to five hours for a meal to move through the small intestine.

Children who are suspected of having motility problems of the small intestine are usually diagnosed using manometry testing along with other standard GI tests such as endoscopy and bloodwork.

Chronic Intestinal Pseudo-Obstruction or Intestinal Dysmotility is the name given to most motility problems of the small intestine, regardless of cause. These fall into two main categories: motility problems that affect the muscles and result in weak or absent contractions, or motility problems that affect the nerves and result in uncontrolled or unsynchronized peristalsis. Weak or absent contractions are often caused by connective tissue disorders, while uncoordinated contractions are more likely neurological in nature. In either case, the intestine acts as if it is obstructed by something mechanical; however, no actual obstruction exists. Symptoms include pain, vomiting, diarrhea, constipation, and feeding disorders. Another common problem is bacterial overgrowth that develops because the "housekeeper" waves that normally flush bacteria out of the intestine are disrupted. While Intestinal Dysmotility can be difficult to treat, many children benefit from dietary changes or tube feedings, along with antibiotic treatment for bacterial overgrowth. Children with severe disease may require IV nutrition, surgery to remove diseased intestine, or even intestinal transplant.

Motility Problems of the Large Intestine, Rectum, and Anus

In the normal digestive tract, food remains in the large intestine for a very long time, as long as 30 hours. The primary role of the large intestine is to reabsorb water back into the body, and most of the contractions in the large intestine are small, uncoordinated movements designed to help with this reabsorption. Six to eight times a day, a strong contraction occurs, pushing intestinal contents toward the rectum and often leading to a bowel movement.

Anorectal and colonic manometry are the primary tests used to identify motility problems in the large intestine. Barium enemas and rectal biopsy may also be helpful in diagnosing certain motility disorders of the large intestine.

Hirschsprung's Disease is an uncommon motility problem marked by an absence of nerve cells in the walls of the rectum or colon. This condition is present at birth and can be hereditary. Without the necessary nerve cells, intestinal contractions cannot occur, and stool remains trapped in the large intestine, called obstruction. Not passing meconium, constipation, and vomiting are common symptoms. Treatment is primarily surgical, with the removal of affected tissue from the bowel.

Constipation is a very common motility problem of the large intestine resulting in infrequent, large, or painful stools. Some children may simply have difficulty passing stools despite normal motility, due to size or hardness of the stool. Other children have decreased motility in the intestine and difficulty in passing stools. In some children, the anus is unable to relax or they have trouble coordinating the process of releasing stool (outlet obstruction type constipation). Children with large or hard stools may benefit from laxatives or enemas, as well as dietary changes to increase the water and fiber content of their stool. Children with decreased intestinal motility or problems with the anal sphincter are more difficult to treat. Laxatives and enemas may help some children, while others may need surgical intervention to help manage their constipation.

Diarrhea is another common motility problem characterized by loose stools. Extra contractions of the large intestine may cause diarrhea, though it may also be caused by disorders of the small intestine or malabsorption. Chronic diarrhea can be treated with pancreatic enzymes if there is a pancreatic insufficiency or absorption problem. Correcting dumping syndrome may also help to treat some types of diarrhea. Antispasmodics may help some children with excess contractions.

Functional Problems of the GI Tract

While not strictly motility problems, functional disorders of the GI tract, or disorders without anatomical or infectious cause, are closely related. These primarily include functional dyspepsia or hyperalgesia in the stomach and irritable bowel syndrome in the intestines, though it is possible to have a functional problem in any part of the GI tract. Fecal retention is another common functional problem that affects many young children. While functional problems in the gut can be behavioral, in many cases they have a neurological or neuropathic basis. Functional GI problems are difficult to treat, but can be managed with symptomatic relief and medications that affect neuropathic pain, such as Neurontin, Lyrica, or Amitriptyline.

For More Information

Motility Centers are relatively new to the United States, and only now is the second generation of gastroenterologists specializing in motility beginning to spread to children's hospitals around the United States. If you suspect your child has a motility problem, seek out a specialist who trained at one of the top Motility Centers in the country. For children with more complex issues, it may be worthwhile taking your child to one of the top Motility Centers in the country for more specialized testing, such as Children's Hospital Boston, Children's Hospital of Wisconsin, Columbus (OH) Nationwide Children's, or KU Medical Center (Kansas City).