

# Bowel Management Algorithm

Many children and adolescents suffer from abdominal discomfort caused not by a disease process but by problems with stool elimination.

## Normal and Abnormal Bowel Function:

All mammals have a continuous tubular gastrointestinal tract with a variable number of sphincters separating segments and chambers that have specialized functions (e.g. oropharynx, esophagus, stomach, small intestine, large intestine, rectal vault). Peristalsis is the coordinated, sequential muscular activity in the walls of these segments that is regulated by nerves and neurochemicals. It consists of proximal distention that triggers contraction of that segment along with receptive relaxation of segments below and their sphincters (e.g. rectal distention relaxing the internal anal sphincter, allowing stool expulsion). Distention of some segments with food, stool, or gas will trigger nerve-stimulated motility that “jumps” to proximal or distal segments (such mechanisms are called saltatory). Examples include gastric distention stimulating contraction of the cecum to initiate bowel movements or distention of the cecum from retained stool slowing gastric emptying and causing nausea, early satiety, and promoting gastroesophageal reflux. Babies, puppies, and many mammals generally have bowel movements shortly after a meal distends the stomach (the gastro-colic reflex). Conversely, stool retention can cause cramping pain when a meal triggers colonic motility.

In humans, meconium should be passed promptly and completely within 2 days after birth unless there is an anatomic, neurogenic (Hirschsprung’s aganglioneurosis), or malabsorption (cystic fibrosis) disease. Normal infants can vary in bowel movement frequency and in the amount of discomfort associated with bowel movements. These may be affected by nursing or feeding patterns and by introduction of formula or solid foods. The normal infant should not have persistent abdominal distension. Infants should be able to eat and gain weight and calm down after an eventually successful bowel movement. Infants should not routinely require assistance (suppository, rectal stimulation or enema) to pass stool.

Around the age of 16 –24 months, the external, or voluntary, anal sphincter begins to function. This muscle contracts in response to relaxation of the internal sphincter (which is triggered by rectal distension). This contraction can be sensed by the brain and leads to conscious awareness of an impending bowel movement. The external sphincter is weaker than the internal sphincter and is unable to maintain prolonged continence. If there have been painful, difficult-to-pass, uncomfortable, or anxiety provoking bowel movements, then this sphincter may remain chronically contracted, resulting in stool retention. This may establish a cycle of stool retention, with denser and larger difficult-to-pass stools, rectal pain, rectal fissures, and further retention. Intermittent soiling, leaking, or non-intentional stool release (encopresis) may occur in children past the normal age range of toilet training (ages 2-4 years). Chronic stool retention will cause colonic distention and subsequent pain and/or nausea and early satiety.

## Stool Retention Related Disorders:

Many chronic gastrointestinal complaints in children and adolescents can be explained by excessive stool retention. Some of these symptoms may be manifestations of much less common diseases – the symptoms and signs associated with these conditions, listed below, should prompt further investigation.

**Indications for GI consultation** for possible underlying disease pathology:

1. Delayed or prolonged passage of meconium, >2 days after birth
2. Weight loss, short stature, or low weight for length/height

3. Melena or hematochezia, with blood mixed into stool
4. Persistent vomiting, especially if bilious (bright yellow or green)
5. Persistent abdominal distention
6. Persistent pain in the RUQ, subxiphoid epigastrium, or RLQ
7. Nocturnal symptoms of pain, vomiting, or urgency that awaken the child from deep sleep
8. Fever, oral or genital ulceration, eye inflammation, rash
9. Clubbing or arthritis
10. Anemia; elevated ESR, CRP, WBC band count, or AST; low albumin
11. Positive celiac disease serology or hypothyroidism..
12. Perianal disease: skin tag or fissure off of the sagittal (6, 12 o'clock) plane.
13. Sacrococcygeal abnormalities, including sacral dimple or sinus, hair patch or pigmentation above the gluteal cleft (may indicate spinal dysraphism/spina bifida occulta).
14. Abnormal lower extremity neurologic exam, including gait or weight bearing or gross motor delay (look for tethered cord).
15. Absent anal wink or cremasteric response.
16. Failure to respond to or worsening with the Bowel Management Program.

### **Indications for a trial of the Bowel Management Program:**

Most patients who do not have any of the concerning signs, symptoms, or lab values listed above, but who have the following symptoms may benefit from an initial trial of a bowel cleanout and elimination maintenance program with little risk.

### **Qualification for Bowel Management Trial:**

Patients who answer NO to the first 4 questions, AND have 3 of the 8 listed signs/symptoms qualify for a trial of a bowel management protocol prior to further evaluation.

#### **Questions** (must answer NO to all):

1. Is your child losing weight?
2. Is your child vomiting daily?
3. Is there significant rectal bleeding with blood mixed into (not on the side of) the stool?
4. Does the abdominal pain routinely wake your child from deep sleep?

#### **Signs/Symptoms associated with Stool Retention Disorders** (must have 3 of these):

1. Hard, pebble-like, or fragmented stools.
2. Difficulty passing stools, long time in bathroom or incomplete elimination.
3. Leaking/soiling/accidents of stool.
4. Intermittent, sharp, cramping abdominal pain near the belly button or lower left or right side, usually occurring during waking hours, often 10-30 minutes after eating or with exercise.
5. Abdominal pain associated with urgency to have a bowel movement and/or relief after the bowel movement.
6. Fills up fast (early satiety), sense of bloating, prefers to snack rather than have full meal.
7. Nausea
8. School absence >7 days.

### **Selection of Age-Appropriate Bowel Management Program:**

These Programs can be accessed via the [following links](#). Spanish language versions are also available. They should be followed with approval and supervision by the primary care MD, NP, or PA. All of the medications mentioned can be obtained without prescription. Dose recommendations should not be exceeded: Polyethylene Glycol 3350 (PEG) dosage per weight range for cleanout and maintenance are listed below and are incorporated into the age appropriate Bowel Management Programs:

### **I. Cleanout or Evacuation Step:**

PEG Dosage= 1 –1.5 mg/kg/day

Youssef NN et al. Dose response of PEG 3350 for the treatment of childhood fecal impaction. J Pediatr 2002; 141: 410-4

### **II. Maintenance or Daily Elimination Step:**

PEG Dosage= 0.5 gram/kg/day divided in 2-3 doses

Age range:	PEG grams mean (range):	Approx. volume:
6 - 12 mos	3.75 (2.5 - 5)	— - 1 teaspoon
13 mos – 3 years	6 (4 – 7.4)	1 – 2 teaspoon
4 – 7 years	11.7 (7 – 16)	— - 1 capful
8 – 15 years	16 (16 – 24)	1 –1.5 capful

Dupont C, et al. A dose determination study of polyethylene glycol 4000 in constipated children: factors influencing the maintenance state. J Pediatr Gastroenterol Nutr 2006; 42:178-85

PEG : H2O ratio is 17 g (1 heaping tablespoon) : 8 oz (240cc) liquid  
1 teaspoon : 2.5 oz liquid

**The PEG fluid volume should be in addition to the child's normal daily fluid intake.**

Author: Daniel Jackson, MD 2007