

# Encopresis

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**Objectives** After completing this article, readers should be able to:

1. Discuss the causes of encopresis.
2. Distinguish among encopresis, Hirschsprung disease, and other organic causes of fecal soiling.
3. Describe the symptoms of stool withholding during toilet training.
4. Explain the physiologic effect of stool retention.
5. Describe the approach that results in the greatest success in the treatment of encopresis.

## The Problem

*My son keeps having accidents in his underwear. He's 6 years old. Shouldn't he be old enough to know better by now?*

Often, parents bring in a child with statements of this sort, accompanied by frustration and misunderstanding. Children who have encopresis commonly are embarrassed and ostracized because of their symptoms. Most families are surprised to hear that they are not the only ones dealing with encopresis; the nature of the symptom complex does not lend itself to casual conversation. Some parents think their child is just difficult or lazy; others are concerned that there is something seriously wrong. Is the child experiencing functional encopresis or is there something physically or neurologically pathologic that needs to be addressed? Most importantly, how does the clinician differentiate between functional and organic encopresis, and how can encopresis be treated?

## Definition

Functional encopresis is defined as repeated involuntary fecal soiling in the underpants that is not caused by organic defect or illness. The soiling can involve passage of variable amounts of stool, from a smear to (rarely) a normal-size bowel movement. The term was introduced in 1926 by Weissenberg to describe the fecal equivalent of enuresis. The most common reason for functional encopresis is retentive constipation with overflow incontinence.

Children should attain fecal continence by the age of 4 years. Psychologists define encopresis as the passage of normal-size bowel movements in inappropriate places after age 4 years and distinguish this occurrence from fecal soiling, which is the involuntary leakage of stool into underclothing. Rarely, however, does a pediatrician see a nonconstipated child who has no significant psychological disturbance and passes normal-size bowel movements into underclothing. The psychological definition, therefore, distinguishes encopresis as a behavioral condition in contrast to involuntary leakage of stool. However, clinicians should recognize that although functional encopresis results from actual changes in anorectal anatomy and function, the genesis of the condition in many cases involves psychological factors, and psychological problems, both primary and secondary, commonly are associated with encopresis.

## Demographics

Encopresis affects 3% of 4-year-old and 1.6% of 10-year-old children. It occurs more commonly in the 5- to 10-year-old group and less frequently in adolescence. It rarely occurs before 3 years of age. In 75 affected patients seen at James Whitcomb Riley Hospital

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in Indianapolis in 1992, the median age was 9 years (unpublished data from personal experience). It is more common in boys than in girls, with three to six boys affected for every girl. There is no correlation with socioeconomic status, family size, child's position in family, or parental age. The time of symptom onset to the time of diagnosis ranges from 1 to 5 years.

### Functional Encopresis

Ninety percent of chronic encopresis is functional. When stool enters the rectum, the internal anal sphincter relaxes to allow stool into the anal canal. Relaxation or contraction of the external anal sphincter is voluntary. By contracting the external anal sphincter, passage of feces is delayed and the stool returns to the rectosigmoid colon. Stools usually contain 75% water, and total colonic transit time is around 45 hours. The longer stool remains in the rectum or colon, the more water is absorbed, the harder the stool becomes, and the more difficult it is to defecate.

Children who have functional encopresis withhold feces by contracting their gluteal muscles, stiffening their legs together, and tightening their external anal sphincter. Parents may be able to describe this behavior in detail. Chronic withholding stretches the rectal walls, and over time, nerves lose sensation and the child no longer has the ability to defecate normally. Patients may be able to go without bowel movements for more than 1 week, and they develop seepage of stool around an impacted fecal mass in the rectum or they have partial bowel movements, of which they are unaware. Parents may mistake the liquid leakage as diarrhea.

Functional encopresis may be triggered by an event such as passage of a painful stool that causes fear of defecation and leads to withholding behaviors. Other children may have had difficulty with toilet training. Parents may have pushed children who were not ready to toilet train. Negative toilet training practices can cause children to associate using the potty with punishment. Some patients have unsubstantiated fears, such as being afraid that they will fall into the potty or be flushed away.

Children may struggle with parents and use noncompliance with toilet training as a tool. Nonretentive encopresis is voluntary complete or partial stooling into clothes or diapers. This is a behavioral problem. Some children simply refuse to use the toilet and go in their underwear. They may use the encopresis as a method of control or they simply want to continue to use diapers. It is important under these circumstances to ensure that fecal soiling is not due to abnormal anorectal innervation

or a spinal cord lesion. There is no association of non-retentive encopresis with other behavioral disorders.

Many children (and adults) are shy about using public toilets. Children can be teased at school for "pooping" or "farting" in the toilet. Some children may find the sanitary conditions of public toilets unacceptable. There are restrictions at school as to when and for how long students are allowed to use bathrooms. All of these factors may contribute to fecal withholding and, subsequently, to functional encopresis.

Patients may not notice the smell of their fecal soiling due to desensitization of their olfactory centers. This odor can have devastating effects on school and social interactions. Many parents and children feel isolated and do not know of anyone else who has functional encopresis. Parental perceptions on encopresis have changed little in the last 20 years. A tertiary referral center examined trends in patients referred to them from 1980 to 1999. (1) Approximately one third of parents believed that their children had organic problems, and a similar number believed the issue to be emotional. Many parents felt that carelessness, attention-seeking, stubbornness, and laziness contributed to their children's problem. In the years 1982 to 1986, 12% of children and 24% of parents knew of another child who had encopresis. In the 1996 to 1999 subgroup, 14% of children and 33% of parents knew of others who had similar problems. These figures indicate how little progress has been made to educate parents on the subject and how frequently patients feel isolated about their disorder.

A recent study in Australia of randomly selected elementary school children showed encopresis to be an independent risk factor for urinary tract infections. (2) The increased risk is due to a combination of factors. Fecal soiling, with the feces remaining in the underwear in close proximity to the urethra, allows for cross-contamination, especially in girls. Chronically contracting the pelvic floor muscles to withhold stools may cause dysfunction in urinary patterns, leading to stasis. Patients who have chronic constipation are also prone to enuresis, with up to 40% affected. The mass effect in the rectum places external pressure on the bladder, leading to uncontrolled voiding. For patients who have both encopresis and daytime enuresis, it is important to exclude a spinal cord lesion.

### Organic Encopresis

Organic fecal incontinence accounts for 5% to 10% of patients who have constipation. Organic causes can be anatomic, neurologic, metabolic, or iatrogenic.

Anatomic causes initially may have been corrected,

but the patient still has a poorly functioning anorectum. Patients may have a history of corrected imperforate anus, ectopic anus, or anal stenosis. Patients who have had segments of bowel removed, with or without temporary colostomy, due to perforation, necrotizing enterocolitis, Hirschsprung disease, carcinoma, inflammatory bowel disease, or strictures also may have residual chronic constipation or encopresis due to disruption of the normal neuronal pathways or manipulation of the anorectum.

Neurologic causes of encopresis include ultrashort segment Hirschsprung disease, neuronal intestinal dysplasia, and Chagas disease. Spinal cord damage due to spinal dysraphisms, tumors, or trauma also can result in encopresis. Visceral myopathy and visceral neuropathy are rare, and patients have other obstructive symptoms.

Hypothyroidism and hypoparathyroidism are listed in the differential diagnosis for chronic constipation, but there have been no reports of these conditions leading to encopresis. Long-standing diabetes can lead to intestinal pseudo-obstruction, but this outcome does not occur in the pediatric population. Endocrine tumors, including pheochromocytoma, cause diarrhea, which may result in nonretentive encopresis. Patients who have celiac disease may have diarrhea and potentially can soil their underwear.

A multitude of medications cause diarrhea, leading to nonretentive fecal soiling. Laxative abuse can cause severe diarrhea and fecal incontinence. Tricyclic antidepressants, diuretics, narcotics, calcium channel blockers, and iron are unlikely to cause constipation severe enough to lead to encopresis, but they can contribute to the problem.

## History

As with all patients presenting for evaluation, a history is essential to evaluate the cause of encopresis (Table 1). Has the child ever attained fecal continence in his or her lifetime? In primary encopresis, the child has never achieved stool continence. In secondary encopresis, the child had achieved fecal continence at some point but is having accidents again.

The clinician should ask the parents or the child to identify an approximate time of symptom onset. Was there a triggering factor such as passage of a hard painful stool? Is there a history of constipation, the onset of which may have correlated with transitional stages of feeding such as weaning from human milk, starting of solids, or transitioning to table foods or whole milk? Children often are embarrassed or have difficulty qualifying and quantifying their stooling habits, but a stool

Table 1. Important Questions

- Was fecal continence ever attained?
- Can you remember any triggering event?
- How often and where does your child stool?
- What is the size of the stool?
- Is there pain with defecation or blood on the stool?
- Is your child aware of the urge to defecate?
- How much stool is passed accidentally?
- Is there a history of trauma or abuse?
- Does your child have rectal prolapse?
- Was meconium passed within the first 48 hours after birth?
- Is there a history of surgery involving the bowel, perineum, or spine?

history can help determine if the encopresis is functional or organic. How often and where does the child stool? Many children are afraid or too shy to use public toilets and will hold stool in until they have access to acceptable facilities.

What is the size of the stool? Passing small, hard, pebblelike stools, even daily, might indicate incomplete evacuation of the rectum and constipation. Intermittent passage of large “toilet clogging” stools may indicate withholding. Is there pain with defecation or has there been blood in the stools? Pain or blood on the toilet paper can be associated with an anal fissure. Perianal abscesses or perianal streptococcal infections also can cause painful defecation, contributing to withholding behavior.

When the child soils, is he or she aware of the urge to defecate and of the actual event before sensing the stool in the underwear? Inability to recognize the urge to defecate or events while soiling may point toward neurologic dysfunction but also may be due to loss of sensation from a chronically dilated rectum. How much stool is passed accidentally? Is it an entire bowel movement or small amounts of liquid stool? Passage of an entire or partial stool in inappropriate places may indicate an underlying behavioral or psychiatric disorder.

Is there a history of trauma or abuse? This history may be difficult to elicit, but any suspicion of abuse always warrants contacting child protective services. Does the child have rectal prolapse? Rectal prolapse is associated with chronic constipation, but the clinician also should consider cystic fibrosis. Other symptoms associated with chronic constipation include early satiety, abdominal pain, enuresis, and urinary tract infections. Among the more worrisome signs are weight loss or poor weight

gain, vomiting, abdominal distention, and unexplained fever.

Review of past medical history always includes asking about the timing of meconium passage. Most children pass meconium within the first 48 hours of birth; failure to do so increases the suspicion of Hirschsprung disease. Although very rare in children born with classic Hirschsprung disease, encopresis may occur in children who have ultrashort segment Hirschsprung disease (or so-called anal achalasia). Some children have a genetic predisposition to constipation, which may start in infancy.

Children who have attention-deficit/hyperactivity disorder are more likely to have functional constipation and encopresis because they tend to be too distracted or preoccupied to use the bathroom. Laxative abuse may lead to nonretentive encopresis, and use of tricyclic medications can cause constipation and adynamic ileus and possibly nonretentive encopresis. Does the child have any past surgical history involving the bowel, perineum, or spine? A family history of Hirschsprung disease, hypothyroidism, or cystic fibrosis may raise enough suspicion to warrant additional investigation for an organic cause of constipation with encopresis.

### Physical Examination

Basic growth parameters can help differentiate between functional and organic encopresis. Abdominal examination may reveal a fecal mass in the left lower quadrant, which may extend proximally, depending on the stool burden. A rectal examination always should be a part of the assessment of encopresis. This evaluation allows the clinician to examine the perianal skin for any abnormalities, evaluate the tone of the anal sphincter, determine the size of the rectal vault, detect the presence of a fecal impaction (which is present in most children who have retentive encopresis), and exclude any masses. Does the anus have normal tone? Tone may be diminished by chronic dilation in withholding or there may be a neurogenic abnormality. Is the rectum dilated? Again, dilation may be due to chronic stool burden in the rectum. A narrowed rectum can occur in Hirschsprung disease.

Hard or pebbly stools may be present in patients who have constipation. Fissures can be seen in patients who have a history of passing large, hard stools. Perianal skin infections may provide a reason for functional stool retention. Hemorrhoids in children are rare but can result from chronic constipation. Lack of an anal wink, cremasteric reflexes, or deep tendon reflexes suggests neurologic deficits. The back should be examined for any clues suggesting spinal dysraphism, such as sacral dimples and hair tufts.

### Further Tests

Testing should be guided by the extent of clinical suspicion. Screening laboratory studies may be performed to rule out hypothyroidism and celiac disease if the patient has poor growth or a suggestive family history. A basic metabolic panel along with assessment of serum magnesium may be used to screen for laxative abuse. If the child has a history of enuresis or symptoms suggesting a urinary tract infection, a urinalysis and culture should be done.

Abdominal plain radiography can help evaluate stool volume and rectal dilation. However, fecal impaction is a clinical diagnosis characterized by hard stool palpated on rectal examination. Clinicians should consider spine imaging in children who show evidence of spinal dysraphism or neurologic deficits and in children experiencing both encopresis and daytime enuresis. Contrast enema defecography may be used to assess pelvic muscle function. Barium enemas can be used to evaluate for a transitional zone in those suspected of having Hirschsprung disease. A transitional zone occurs at the point where the normally innervated proximal colon is dilated and the distal colon is narrowed due to agangliosis.

Anorectal manometry (ARM) is available in specialized centers. ARM evaluates internal sphincter relaxation with rectal distention. This procedure may be performed with a water-perfused catheter, a strain gauge solid-state catheter, or a triple-balloon manometer connected to a transducer and a computer. Normal relaxation of the internal sphincter with rectal distention effectively rules out Hirschsprung disease.

Rectal suction biopsies may be obtained to rule out Hirschsprung disease or neuronal intestinal dysplasia. This suction device can be used in the office with a cooperative patient. The biopsies are evaluated for the presence of ganglion cells. ARM is a more sensitive tool to evaluate for Hirschsprung disease because biopsies may be obtained too proximally to rule out ultra-short segment disease.

Total colonic motility studies are reserved for patients suspected of having total colonic dysmotility or pseudo-obstruction. A specialized motility catheter is placed in a prepared colon endoscopically, and the patient's colon is monitored for normal peristalsis.

### Treatment

Treatment of functional encopresis starts with disimpaction, which can be achieved manually, with enemas, or with polyethylene glycol electrolyte (PEG) solution (Table 2). Treatment without initial disimpaction may cause additional overflow incontinence and discomfort. Encopresis

Table 2. Disimpaction Methods

Method	Dose
Manual Disimpaction	• N/A
Rectal Enemas	
• Mineral oil	• 2 to 11 years: 59 mL • >12 years: 118 mL
• Phosphate	• >2 years: 6 mL/kg up to 135 mL
Oral	
• Polyethylene glycol solution	• 100 mL/kg up to a maximum of 4 L; run at 25 mL/kg per hour via nasogastric tube (up to 1,000 mL/hr)
• Mineral oil	• >1 years: 15 to 30 mL per year of age; maximum 240 mL/day

mas give the advantage of home therapy but require cooperation of both the parents and the patient. PEG solution usually requires hospital administration with nasogastric tube placement because only the most motivated patients are able to drink the volume required. Manual disimpaction requires sedation. The benefits of manual disimpaction under sedation are that the outcomes are 100% effective and an ARM or rectal suction biopsy may be performed at the same time.

After disimpaction, the patient requires maintenance therapy, which involves a combination of medical therapy, behavioral modification, and counseling. Parents need to understand that there is no quick fix for functional encopresis and that the process will take months, with relapses being very common. Sixty-five percent of

patients are almost completely better in 6 months, and 30% show improvement. The recurrence rate is approximately 50%. Physiologically, months are required for the rectum to return to its normal caliber and to regain normal sensation.

Maintenance medical therapy is aimed at making bowel movements as easy to pass as possible (Table 3). Stool softeners and fluids increase the fluid content of the stools. Oral sodium phosphate agents have a black box warning by the United States Food and Drug Administration as of De-

cember 2008 because of reports of acute phosphate nephropathy due to calcium-phosphate crystal deposits in the renal tubules. Many of the reported patients had additional risk factors, but some had no increased risk. Due to this warning, it is advisable to use nonphosphate-containing agents for therapy. Mineral oil acts as a lubricant to ease passage. Bowel stimulants also can be used to help propel stool in a dilated bowel. Whatever treatment is chosen, it must be given consistently and not on an as-needed basis. The aim is for one to two soft bowel movements each day.

Behavior modification is integral to management of functional encopresis. The patient should sit on the toilet for 10 minutes after meals (2 to 3 times a day), making use of the gastrocolic reflex. The initial aim is not necessarily to produce a bowel movement but to give patients a consistent habit of using the toilet. A footstool may be used to help improve the Valsalva maneuver to increase intra-abdominal pressure. "Star" charts are an easy and effective incentive. The patient should get a sticker or star on his or her chart just for sitting on the toilet and another star for producing a bowel movement. The stars can be added up for non-monetary rewards such as a trip to the park or special activities with the family.

Weaning of medical therapy may be started when the child consistently is achieving one to two soft bowel movements daily, usually after 6 months. First, stimulant laxatives should be weaned slowly, followed by the lubricant or osmotic agents. Patients

Table 3. Encopresis Maintenance Therapy

Therapy	Dose
Osmotic Agents	
• Polyethylene glycol	• 1 g/kg per day
• Lactulose	• 1 to 3 mL/kg per day in divided doses
• Fiber	• Age +5=grams of fiber daily; maximum of 25 g
• Sorbitol	• 1 to 3 mL/kg per day in divided doses
• Magnesium citrate	• May use divided doses • <6 years: 1 to 3 mL/kg per day • 6 to 12 years: 100 to 150 mL/day • >12 years: 150 to 300 mL/day
• Magnesium hydroxide	• May use divided doses • 1 to 3 mL/kg per day of 400 mg/5 mL solution
Lubricants	
• Mineral oil	• 1 to 3 mL/kg per day
Stimulants	
• Senna	• 2 to 5 years: 2.5 to 7.5 mL at bedtime • 6 to 12 years: 5 to 15 mL at bedtime
• Bisacodyl	• 3 to 12 years: 5 mg/day • >12 years: 5 to 15 mg/day

should remain on a high-fiber diet. A recent double-blind, randomized, crossover study comparing fiber with placebo in children who had chronic constipation with or without encopresis documented a significant improvement in the number of bowel movements produced as well as decreased episodes of encopresis. (3) However, excessive fiber should be avoided until the child no longer is withholding stool because bulking the stool with fiber may lead to additional withholding in the child who is afraid to pass stool.

In a study of children who had functional constipation, a 10-year follow-up revealed that 46% remained constipated, 25% continued to have encopresis, and 56% still had recurrent abdominal pain. (4) Of the group who remained constipated, two thirds had a diagnosis of anorectal dyssynergia. Biofeedback with ARM can be used for select individuals who experience chronic withholding and anismus/anorectal dyssynergia, which is the paradoxical increase in external sphincter tone while trying to defecate. This diagnosis is made during ARM while the patient is awake. During biofeedback, the manometer is inserted and the balloon that simulates a fecal mass is inflated. A patient who has a chronically distended rectum may not notice the urge to defecate until the balloon reaches as much as 300 mL in volume; in healthy individuals, 30 mL or less is sensed. The balloon is inflated and the child is trained to relax the external sphincter while trying to push out the mass.

In extreme cases of encopresis, functional or organic, a Malone antegrade continence enema (MACE) procedure can be performed. The MACE procedure has been used to treat constipation or fecal incontinence in both adults and children. It involves moving the appendix to skin level and creating an appendicostomy. The appendicostomy usually is hidden within the umbilicus. If the appendix has been removed, a neoappendix can be formed by using a cecal flap or the terminal ileum. Once the appendicostomy is created, a catheter can be introduced to give enemas to wash out the colon, thereby preventing constipation and fecal incontinence. Enemas can be scheduled at times that are convenient for the patient; a bowel movement usually is achieved within minutes to an hour after administration.

### When to Refer to a Gastroenterologist

Most children who have encopresis can be treated effectively by a general pediatrician. If there are no “red flags” raised on history and examination, the most likely diagnosis is functional encopresis. As discussed previously, basic screenings include serum electrolytes, urinalysis and

culture, abdominal plain radiographs, or spine imaging, depending on the clinical presentation.

Treatment starting with disimpaction may begin in the office with enemas; up to three enemas may be given 12 hours apart for a full disimpaction. Oral disimpaction with PEG solution can be given at home, but hospital admission with nasogastric tube placement may be needed if the patient cannot handle the volume. If the patient fails such methods for disimpaction, consultation with a gastroenterologist or surgeon is warranted to attempt a manual disimpaction. Manual disimpactions in children are best attempted with sedation or anesthesia so as not to traumatize the patient, thereby worsening the withholding pattern.

Maintenance medical therapy with behavioral modification should be initiated once the patient is disimpacted. Patients who show no improvement after 6 months should be referred to gastroenterology for additional assessment. Of course, there is a 50% recurrence rate, and there is always a question of how compliant patients and families will be.

## Summary

- The most common cause of encopresis is functional constipation with overflow incontinence.
- Boys are affected more than girls, and usually there is an initiating event such as passage of a painful bowel movement, transition of food stages, or toilet training.
- Organic causes of encopresis usually can be ruled out based on history and physical examination findings.
- Enuresis and urinary tract infections are comorbidities that need to be addressed.
- Children and their families often feel isolated and ostracized due to the condition.
- Treatment involves a combination of medical therapy, behavioral modification, and counseling. Families need to understand that correction of encopresis is a long process and that relapses are common.

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### Suggested Reading

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## PIR Quiz

Quiz also available online at: <http://pedsinreview.aappublications.org>.

6. The *most* common cause of chronic encopresis is:
  - A. Deficiency of rectal ganglion cells.
  - B. Hyperparathyroidism.
  - C. Hypothyroidism.
  - D. Rectal stenosis.
  - E. Voluntary stool withholding.
7. A patient who has functional encopresis is *most* likely to have a history of:
  - A. Abnormally low linear growth velocity.
  - B. Delayed passage of meconium.
  - C. Large stools.
  - D. Poor weight gain.
  - E. Unexplained fever.
8. The *most* likely finding on examination of a patient who has functional encopresis is:
  - A. Absent anal wink.
  - B. Fecal impaction.
  - C. Increased anal sphincter tone.
  - D. Lipoma of midline lower lumbar spine.
  - E. Rectal stenosis.
9. The *most* helpful modality for diagnosing functional encopresis is:
  - A. Abdominal plain film.
  - B. Barium enema.
  - C. Colonic motility studies.
  - D. History and physical examination.
  - E. Magnetic resonance imaging.
10. The clinician's first choice of therapy for functional encopresis should be:
  - A. Behavior modification.
  - B. Disimpaction.
  - C. Increased dietary fiber.
  - D. Stimulant laxatives.
  - E. Stool softeners.