

## A Practical Guide to the Diagnosis and Management of Fecal Incontinence

WILLIAM RUDOLPH, MD, AND SUSAN GALANDIUK, MD, FACS

Many physicians are unaware that fecal incontinence is often correctable. With appropriate and relevant diagnostic tests, medical treatment and/or surgical correction often leads to good functional results. General guidelines for diagnosis, evaluation, and management of fecal incontinence are provided. There are many causes of fecal incontinence, with obstetrical trauma being one of the most frequent. A detailed history, documentation of sphincter injury, and thorough physical examination will identify the cause of the problem in most patients. Management

involves the use of antidiarrheal medication and fiber products, biofeedback, or enemas. A qualified surgeon should be consulted during the course of the patient's evaluation, particularly when medical therapy is unsuccessful. Knowledge of the appropriate diagnosis, evaluation, and management of fecal incontinence may result in more patients seeking medical attention and thus improving their quality of life.

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Many physicians are unaware that fecal incontinence is often correctable. Because of embarrassment, patients with fecal incontinence generally do not report this condition to a physician until the symptoms are psychologically and physically incapacitating. In the elderly population, incontinence is the second most common cause of institutionalization, and millions are affected.<sup>1,2</sup> Economic costs associated with managing and treating incontinence are substantial.<sup>3</sup> The increasing number of physicians familiar with the evaluation and management of fecal incontinence will encourage more patients to seek medical attention. General guidelines for diagnosis, evaluation, and management of fecal incontinence are provided.

### ETIOLOGY

Several mechanisms, either alone or in combination with each other, produce symptoms of fecal incontinence.

### Injury to Anal Sphincters

The most frequent causes of fecal incontinence result from either child-bearing injuries or prior anorectal surgery. Perineal tearing associated with forceps deliveries, high birth-weight babies, first-time pregnancies, or trauma from an episiotomy can cause damage to the anal sphincter. In addition, prolonged labor or even years of excessive straining associated with constipation may result in a stretch injury to the pudendal nerve, resulting in a neuropa-

thy. Incontinence may manifest many years after vaginal delivery. Anorectal procedures, such as fistulotomy or hemorrhoidectomy, can cause incontinence due to iatrogenic sphincter injury. Full-thickness rectal prolapse and protrusion of large internal hemorrhoids can anatomically prevent anal sphincter closure. Chronic rectal prolapse may also result in incontinence due to stretch injury to the anal sphincter.

### Neurologic Factors

Both motor and sensory function must be intact to maintain continence. Patients must be able to distinguish between gas, liquid, and solid stool in the rectal vault and be able to control the anal sphincter musculature. Demyelinating diseases, spinal cord trauma, and diabetic neuropathy can interfere with this. Patients with diminished intelligence or mentation may also have control problems.

### Consistency and Amount of Stool

Profuse amounts of stool, as associated with viral gastroenteritis or infectious colitis, may overwhelm the sphincter mechanism and lead to incontinence. A chronic diarrheal state makes it more difficult for patients to maintain continence with liquid compared with solid stool. Conversely, incomplete emptying of the rectum can lead to overflow incontinence as liquid stool passes by the inspissated fecal mass. For this reason, the clinician must inquire about a history of constipation.

### Colorectal Mucosal Damage

Patients with ulcerative colitis, Crohn colitis, or radiation-induced proctitis may have extreme urgency due to inflammation of the rectal mucosa. Such patients must move their bowels soon after they feel the urge to defecate

From the Department of Surgery, University of Louisville School of Medicine, Louisville, Ky.

A question-and-answer section appears at the end of this article.

Address reprint requests and correspondence to Susan Galandiuk, MD, Department of Surgery, University of Louisville, Louisville, KY 40292 (e-mail: s0gala01@gwise.louisville.edu).

or they will experience incontinence. In these patients, incontinence is related to urgency from the underlying colitis rather than to a sphincter defect or dysfunction.

### SYMPTOMS

Fecal incontinence can be classified as either complete incontinence, a loss of control of both solid and liquid feces, or partial incontinence, a loss of control of liquid stool or flatus. Patients may have symptoms ranging from staining of their underwear to an inability to control solid bowel movements. The type of incontinence combined with the number of episodes of incontinence per week or per day and stool consistency should be documented to ascertain the severity of the problem. Patients may complain of an inability to sense stool or flatus in the rectal vault. Lack of rectal sensation differs from symptoms of urgency and helps the clinician to determine the etiology of the problem. Moisture in the perianal area from chronic soiling often leads to skin maceration and pruritus ani. Rectal or hemorrhoidal prolapse may be associated with bleeding and passage of mucus per rectum as well as incontinence. The psychological effects of this problem are often underappreciated by the clinician. Fecal incontinence may result in dramatic behavioral and personality changes, with patients becoming socially withdrawn and reluctant to leave their homes.

### DIAGNOSIS AND EVALUATION

#### Physical Examination

The perianal area is best examined with the patient in the prone jackknife position. This position provides good exposure, even in obese patients. The perineal skin should be inspected for changes associated with chronic incontinence (ie, maceration, erythema, monilial infection). The perianal area and anal canal should be inspected for signs of prior surgery or trauma (ie, episiotomy or fistulotomy scars). The buttocks should be gently spread apart to determine whether the anal sphincter gapes, exposing rectal mucosa, an indication of a substantial degree of sphincter injury. Sphincter tone can be assessed by digital examination. Resting tone generally reflects internal anal sphincter activity. Voluntary contraction of the sphincter (squeeze) muscles allows evaluation of external anal sphincter strength. On bimanual examination, the distal rectovaginal septum may be attenuated, occasionally with loss of the perineal body, particularly in patients with obstetrical injury.

Of importance, patients should be examined when they are straining while upright. With the patient sitting on a commode, he or she is asked to strain and lean forward, allowing inspection of the anal area. This maneuver will reveal whether the patient has prolapsed internal hemor-

rhoids or full-thickness rectal prolapse. Straining while upright is essential because in all but the most severe cases prolapsed hemorrhoids and full-thickness rectal prolapse will not be visible with the patient supine or in left lateral position. Rectal prolapse is distinguished from prolapsed internal hemorrhoids by the presence of concentric rings of rectal mucosa, rather than the discrete clusters or groups of prolapsed internal hemorrhoids.

#### Stool Cultures

In patients with diarrhea and fecal incontinence, a stool specimen should be obtained for culture and sensitivity as well as for determination of ova and parasites. Stool specimens should also be examined for *Clostridium difficile* toxin if the patient has taken antibiotics within the preceding 6 months.

#### Mucosal Evaluation

Rigid or flexible proctosigmoidoscopy can be performed in the office setting and will identify mucosal changes characteristic of inflammatory conditions such as inflammatory bowel disease or bandlike erythematous mucosa of the mid rectum suggestive of rectal prolapse. The remaining colon should be evaluated by either barium enema or colonoscopy to exclude proximal contributory pathology. Of importance, partially obstructing colorectal cancers may result in a change in bowel habit and incontinence secondary to partial obstruction.

#### Anorectal Manometry

Anorectal manometry quantifies the impact of sphincter injury on sphincter function. This painless 10-minute outpatient examination requires no bowel preparation and measures both resting anal sphincter canal tone (internal anal sphincter activity) and squeeze pressure (external sphincter activity) in 4 quadrants (anterior, right, left, and posterior). Anorectal manometry is particularly useful in evaluating sphincter trauma (eg, anterior injury to the external anal sphincter due to obstetrical trauma). It is available in many hospital endoscopy departments, and findings are usually interpreted by a gastroenterologist or colorectal surgeon.

#### Endoanal Ultrasonography

Endoanal ultrasonography has been used with increasing frequency to examine anal sphincter integrity non-invasively. It is a relatively comfortable procedure for the patient and is capable of accurately identifying sphincter defects. A small 10-MHz transducer that rotates 360° is inserted into the anal canal and withdrawn while images of both the internal and the external anal sphincters are obtained. The internal anal sphincter appears as a hypo-

echoic area with the external anal sphincter appearing as a more heterogeneous hyperechoic area (Figure 1). Both endoanal ultrasonography and anorectal manometry should be used because not all sphincter defects are clinically important.

### Anorectal Electromyography

Anorectal electromyography (EMG) can be used to assess pudendal nerve damage (ie, stretch injury due to prolonged labor). It measures the ability of the anal sphincter to be stimulated by an electrical impulse. This procedure may be uncomfortable for the patient because transcutaneous EMG needle electrodes may be used. Many clinicians reserve EMG for patients in whom the nature of injury or the cause of incontinence is unclear. If the pudendal nerve has been injured (during delivery or repeated straining), as manifested by alterations of the pudendal nerve terminal motor latency, results of surgical sphincter repair are poor.<sup>2</sup> The utility of information obtained from an EMG is unclear, and ordering an EMG is best left to the discretion of the evaluating gastroenterologist or surgeon.

## MANAGEMENT

### Antidiarrheal Medication and Fiber Products

Psyllium products or synthetic analogues (such as Metamucil, Citracel, or Konsyl) may increase the bulk of bowel movements and thereby improve continence (Table 1). Many clinicians believe that these products are more effective in patients with fecal incontinence when they are consumed with a limited amount of water. For patients with incontinence who have liquid bowel movements, oral antidiarrheal agents such as loperamide or diphenoxylate, which increase stool consistency and decrease stool frequency, can be helpful. Loperamide may be preferable because it has also been shown to increase internal anal sphincter tone<sup>3</sup>; however, since it is available over the counter, it is frequently not reimbursed by insurance carriers.

### Biofeedback

Biofeedback is supervised by specially trained biofeedback technicians. A pressure-sensitive or sponge EMG probe is inserted into the anal canal, and the pressure or muscle activity of the anal sphincter contracting around this device is registered on a scale with a deflecting needle, digital, or computer readout. Patients can practice sphincter contractions by using this visual aid. Some investigators also use "sensation retraining" in the management of these patients.<sup>4</sup> Biofeedback may be successful in many patients, especially those who have developed incontinence of solid stool after prior anorectal procedures.<sup>5</sup> Biofeed-

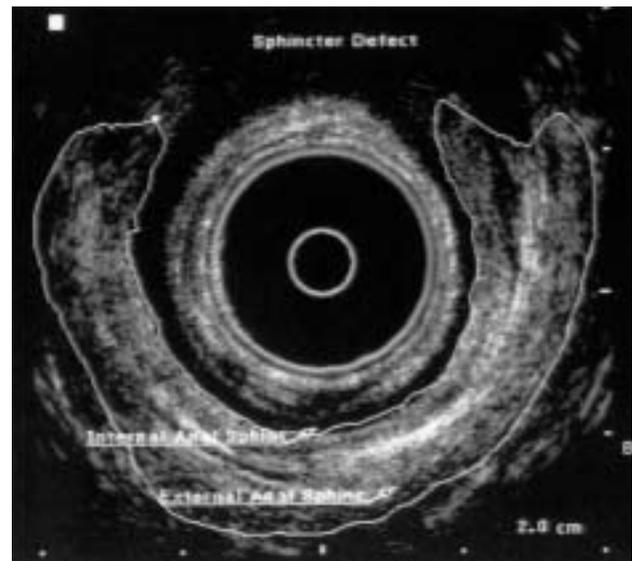


Figure 1. Endoanal ultrasound study with use of 10-MHz probe. Orientation shows vagina at the top of the figure and coccyx at the bottom of the figure. Note the complete disruption of the external anal sphincter anteriorly due to prior obstetrical injury (sphincter defect). The internal anal sphincter appears as a hyperechoic ring, whereas the external anal sphincter is a more heterogeneous hyperechoic area. The center black area represents the ultrasound transducer.

back can be effective, but frequently it is not reimbursed by insurance carriers and requires patient motivation to succeed.

### Colonic Enemas or Suppositories

Colonic enemas or suppositories are an alternative treatment for patients who do not have an abnormally rapid intestinal transit time. Patients give themselves a suppository or a tap water enema every morning to cleanse the rectum and distal colon of feces. Such patients can often function for the remainder of the day without appreciable incontinence or soiling. However, colonic enemas are time-consuming and do not appeal to most patients. Enema retention may also be especially difficult in the patient with fecal incontinence.

## SURGICAL TREATMENT

A surgeon knowledgeable about fecal incontinence should be consulted in the course of evaluation of patients with fecal incontinence, particularly when medical therapy is unsuccessful and symptoms remain disabling. Surgery for fecal incontinence can be divided into 4 categories: sphincteroplasty, operations to treat rectal or hemorrhoidal prolapse, procedures that create a new sphincter, and surgical fecal diversion.

Table 1. **Diagnosis and Management of Fecal Incontinence**

History	
	Number of prior vaginal deliveries and episiotomies
	Prior anorectal surgery
	Medical condition (diabetes mellitus, multiple sclerosis, etc)
	Constipation or straining
Physical examination	
	Spread buttocks apart (gaping anal canal)
	Examine rectovaginal septum in women to determine degree of anterior injury
	Assess resting tone/squeeze tone
	Examine patients while they are straining in the upright position to exclude hemorrhoidal or rectal prolapse
Diagnostic tests	
	Stool culture and sensitivity, ova and parasites, <i>Clostridium difficile</i> toxin
	Proctosigmoidoscopy to exclude inflammatory conditions (proctitis, ulcerative colitis)
	Barium enema or colonoscopy to exclude proximal colon pathology; biopsy in patients with diarrhea to exclude the presence of microscopic colitis
	Anorectal manometry to assess sphincter function
	Endoanal ultrasonography to identify sphincter defects
Management	
	Treat any underlying infections or inflammatory disorder as indicated
	Add fiber to diet to increase bulk of stool to improve control
	Administer antidiarrheal medication to decrease frequency
	Provide pelvic floor biofeedback
	Perform surgery if symptoms do not resolve with above conservative treatment

### Sphincteroplasty or Direct Sphincter Repair

Sphincteroplasty is effective for patients who have a single site of anal sphincter injury. The ends of the sphincter at the site of the defect (ie, episiotomy or fistulotomy site) are identified, mobilized, and sewn together in an overlapping fashion with use of interrupted suture. Sphincteroplasty is the most common procedure used to repair sphincter injury. In some series, success rates as high as 80% have been reported. However, if the patient has pudendal nerve injury, long-term success may be much lower (50%-60%).<sup>6,7</sup> Depending on the medical community, this procedure is typically performed by colon and rectal surgeons or gynecologic surgeons.

### Surgery for Rectal or Hemorrhoidal Prolapse

Prolapsed internal hemorrhoids may prevent complete seal or closure of the anal sphincter, leading to mucus seepage and/or stool soiling. This is easily corrected by conventional hemorrhoidectomy.

Long-standing rectal prolapse weakens the anal sphincters because of stretch injury. Thus, rectal prolapse should be corrected surgically soon after it has been diagnosed. In up to 50% of patients, continence improves after prolapse repair. In patients with long-standing rectal prolapse, cor-

rection of the rectal prolapse without some type of sphincter repair may result in fecal incontinence.<sup>8,9</sup> Rectal prolapse repair can be performed either abdominally or transanally (perineally). The former is generally performed in younger patients and the latter reserved for older, more frail patients. Operations to correct prolapse may occasionally be associated with difficulties in defecation.<sup>9</sup>

### Sphincter Replacement

**Gracilisplasty.**—If no usable sphincter is present, one of the gracilis muscles can be mobilized, divided distally in the tendinous portion, tunneled under the perianal skin around the anus, and sutured to the contralateral ischial tuberosity. This “gracilisplasty” acts as a mechanical sling, but by itself, the muscle is incapable of constant voluntary contraction or relaxation. Implantable intramuscular electrodes can be used to maintain continuous contraction and anal continence. For defecation, the stimulator can be deactivated with use of a magnet.<sup>10</sup> Gracilisplasty has been approved in Europe; however, it is not approved by the Food and Drug Administration and should be performed only at specialized centers.<sup>11</sup>

**Artificial Sphincter Replacement.**—An artificial anal sphincter, similar to the artificial urinary sphincter, has been approved for humanitarian use in the treatment of fecal incontinence refractory to standard therapy. The currently available device consists of an inflatable silicone cuff implanted around the upper anal canal. This cuff is connected via tubing to a pressure-regulating balloon that is implanted suprapubically in the prevesical space and to a control pump placed in the scrotum in men or labia majora in women. The pressure-regulating balloon contains radiopaque fluid that keeps the cuff inflated at rest and maintains continence. To defecate, the patient activates the pump, moving dye from the perianal cuff into the prevesical balloon. Over the next several minutes, the cuff gradually reinflates. Although the follow-up of patients with this device thus far has been relatively brief, most patients show improvement in continence.<sup>12,13</sup> Because of implantation of a silicone device in the perianal area, the perioperative infection rate is high, and device removal due to infection may be necessary.<sup>14</sup> Additionally, the sphincter may need replacement as often as every 5 years because of device wear.

**Sacral Nerve Root Stimulation.**—Direct electrical stimulation of the sacral nerve roots has been shown to be effective in the treatment of urinary incontinence. The advantage of this procedure is that testing can be done to assess efficacy before permanent implantation of the pulse generator. Additionally, sacral nerve root stimulation has been shown to be effective at improving symptoms of fecal incontinence.<sup>15</sup>

## Fecal Diversion

In many patients, an end colostomy may be the easiest and best procedure to correct fecal incontinence, particularly in elderly patients. This can often be performed laparoscopically. Although fecal diversion eliminates fecal incontinence, patients may still be incontinent for mucus produced in the rectum and sigmoid colon.

## CONCLUSION

Fecal incontinence has many causes. A detailed history, documentation of sphincter injury, and thorough physical examination will identify the cause of the problem in many patients. With appropriate diagnostic tests and referral to a qualified surgeon, surgical correction for patients who are not responding to conservative treatment often leads to good functional results and a dramatic improvement in the patient's quality of life.

## REFERENCES

- Musk LC. Dynamic imaging of defaecation—the video proctogram. *Radiogr Today*. 1989;55(624):20-23.
- Laurberg S, Swash M, Henry MM. Delayed external sphincter repair for obstetric tear. *Br J Surg*. 1988;75:786-788.
- Bannister JJ, Read NW, Donnelly TC, Sun WM. External and internal anal sphincter responses to rectal distension in normal subjects and in patients with idiopathic faecal incontinence. *Br J Surg*. 1989;76:617-621.
- Miner PB, Donnelly TC, Read NW. Investigation of mode of action of biofeedback in treatment of fecal incontinence. *Dig Dis Sci*. 1990;35:1291-1298.
- Enck P. Biofeedback training in disordered defecation: a critical review. *Dig Dis Sci*. 1993;38:1953-1960.
- Sangalli MR, Marti MC. Results of sphincter repair in post-obstetric fecal incontinence. *J Am Coll Surg*. 1994;179:583-586.
- Gibbs DH, Hooks VH III. Overlapping sphincteroplasty for acquired anal incontinence. *South Med J*. 1993;86:1376-1380.
- Schultz I, Mellgren A, Dolk A, Johansson C, Holmstrom B. Long-term results and functional outcome after Ripstein rectopexy. *Dis Colon Rectum*. 2000;43:35-43.
- Ramanujam PS, Venkatesh KS, Fietz MJ. Perineal excision of rectal proctodientia in elderly high-risk patients: a ten-year experience. *Dis Colon Rectum*. 1994;37:1027-1030.
- Hallan RI, George B, Williams NS. Anal sphincter function: fecal incontinence and its treatment. *Surg Annu*. 1993;25(pt 2):85-115.
- Mander BJ, Wexner SD, Williams NS, et al. Preliminary results of a multicentre trial of the electrically stimulated gracilis neoanal sphincter. *Br J Surg*. 1999;86:1543-1548.
- O'Brien PE, Skinner S. Restoring control: the Acticon Neosphincter artificial bowel sphincter in the treatment of anal incontinence. *Dis Colon Rectum*. 2000;43:1213-1216.
- Lehur PA, Roig JV, Duinslaeger M. Artificial anal sphincter: prospective clinical and manometric evaluation. *Dis Colon Rectum*. 2000;43:1100-1106.
- Lehur P-A, Michot F, Denis P, et al. Results of artificial sphincter in severe anal incontinence: report of 14 consecutive implantations. *Dis Colon Rectum*. 1996;39:1352-1355.
- Rosen HR, Urbarz C, Holzer B, Novi G, Schiessel R. Sacral nerve stimulation as a treatment for fecal incontinence. *Gastroenterology*. 2001;121:536-541.

## Questions About Fecal Incontinence

- Which one of the following is the most common cause of fecal incontinence?
  - Injury to anal sphincters
  - Large prolapsed hemorrhoids
  - Gastroenteritis
  - Neurologic disease
  - Inflammatory bowel disease
- Which one of the following is the best patient position in which to examine the perianal area?
  - Prone jackknife
  - Lateral decubitus
  - Dorsal lithotomy
  - Standing bent over table
  - Standing upright
- Which one of the following is not used to treat fecal incontinence?
  - Loperamide
  - Enemas
  - Psyllium
  - Biofeedback
  - Trial of tetracycline
- Which one of the following is the most common type of surgical repair for fecal incontinence?
  - Anterior sphincteroplasty
  - Gracilisplasty
  - Artificial anal sphincter placement
  - Ileostomy
  - Postanal repair
- Which one of the following is not included in the initial evaluation of the patient with fecal incontinence?
  - Examining the patient in the upright position while straining
  - Obtaining a stool culture
  - Performing colonoscopy
  - Administering a trial of antidiarrheal medications
  - Measuring anal resting and squeeze tone

Correct answers:

1. a, 2. a, 3. e, 4. a, 5. d