

18. Fecal Incontinence

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Introduction

- Fecal incontinence is a socially devastating condition, affecting between 1.4 and 18 % of the population and up to 50 % of all nursing home residents.
- It has been defined as “recurrent uncontrolled passage of fecal material for at least 1 month,” while partial incontinence is typically described as inability to control the passage of flatus and fecal soiling.
- Populations at risk for fecal incontinence include: parous females, patients with cognitive impairment, neurologic disorders, and nursing home residents.
- Fecal incontinence is the second leading reason for admission to nursing homes.

Etiology

- It is important to realize that fecal incontinence is not a diagnosis, but a symptom of which there are multiple causes.
- Normal bowel continence requires a complex integration of function between the anal sphincters, pelvic floor, stool volume/consistency, rectal compliance, and neurologic function.

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- It is first necessary to determine if the patient is having true fecal incontinence.
 - Pseudo-incontinence can be caused by a variety of anorectal conditions including hemorrhoidal prolapse, incomplete evacuation, poor hygiene, fistula-in-ano, dermatologic conditions, anorectal sexually transmitted diseases (STDs), and anorectal neoplasms.
- Fecal urgency from a noncompliant rectum can also cause incontinence. Consideration should be given to other disease states such as inflammatory bowel disease and radiation proctitis.
- The diagnosis of overflow incontinence from incomplete rectal evacuation should also be entertained in patients whose history indicates this condition.
- Various systemic disease states can affect continence. In the appropriate patient, central nervous system pathology including spinal cord injury and neoplasm should be part of the differential diagnosis.
- Autonomic neuropathies such as diabetes can also cause derangements in continence.
- Perhaps the more common etiologies of incontinence treated by the colorectal surgeon are those that pertain to abnormal pelvic floor function.
 - Anal sphincter injury can be the result of obstetric injury, direct trauma, neoplasm, or rectal prolapse.
 - Obstetric injury is a common occurrence with occult tears of the anal sphincter reported in 25–35 % of women after vaginal delivery.
 - Factors that affect the risk for developing obstetric tears are use of forceps, mediolateral episiotomy, and primiparity.
- Denervation injuries to the pelvic floor are also common sequelae of childbirth; 60 % of patients with an obstetric tear also have evidence of pudendal nerve damage.
 - The mechanism of pelvic floor denervation appears to be a result of compression or traction injury to the pudendal nerves during vaginal delivery, particularly when it is prolonged or requires forceps assistance.
 - High birth weight is also a risk factor for compression injury. The end stage of denervation injury is pelvic floor failure and descending perineum syndrome.
- Iatrogenic injury to the anal sphincter musculature is also a cause of fecal incontinence. Incontinence after surgery for fissure with lateral internal sphincterotomy is not uncommon.
- Fistulotomy is also associated with seepage and soiling and incontinence rates reported as high as 35–45 %.
- Patients who have suffered from congenital malformations including spina bifida, imperforate anus, and myelomeningocele often have severe alterations of continence and evacuatory function. The difficulty is related not only to the function of the pelvic floor musculature but also to the proprioceptive response of the rectum.
- Radiation therapy can result in fecal incontinence from both a direct damage to the anal sphincter and through its effect on the compliance of the rectum.

Diagnosis

History

- A thorough patient history is the first step. Patients with fecal incontinence are often embarrassed and reluctant to provide details of the problem unless specifically asked. It is important to create a comfortable environment for the patient during the history and physical examination. The onset of the symptoms can provide useful insight into the etiology of the problem. Changes in bowel consistency are a common cause of fecal incontinence, which can be overlooked by many physicians. Any cause of diarrhea should be explored as a potential etiology of the patients' symptoms especially if there is a temporal relationship.
- After appropriate questioning, the physician will often be able to determine if the patient has active or passive incontinence.
 - Active (urge) incontinence, or the loss of stool despite the patients' best efforts to control it, will lead the physician to consider etiologies which involve an intact sensory mechanism with a derangement in the external anal sphincter function.
 - Passive incontinence, or the loss of stool without the patient's awareness, will lead the examiner to consider internal anal sphincter pathology or neurologic etiologies.
 - It is helpful to quantify the degree of the fecal incontinence. Numerous scoring systems have been used to evaluate incontinence. The Cleveland Clinic Florida Fecal Incontinence Score (CCF-FIS) is an independently validated tool, which has the benefit of ease of use combined with incorporation of a quality of life component (Table 18.1).
 - An often overlooked component of the history of the patient suffering from fecal incontinence is the presence of other pelvic floor complaints. Physicians should be sure to inquire about the presence of any form of rectal prolapse as well as the presence of urinary incontinence or genital organ prolapse. There is significant overlap of symptoms in this complex patient population.

Table 18.1 Cleveland Clinic Florida Fecal Incontinence Score (CCF-FIS)

Type of incontinence	Never	Rarely	Frequency		
			Sometimes	Usually	Always
Solid	0	1	2	3	4
Liquid	0	1	2	3	4
Gas	0	1	2	3	4
Pad usage	0	1	2	3	4
Lifestyle impact	0	1	2	3	4

0=perfect continence, 20=complete incontinence, never=0, rarely=<1/month, sometimes=>1/month, <1/week, usually=>1/week, <1/day, always =>1/day

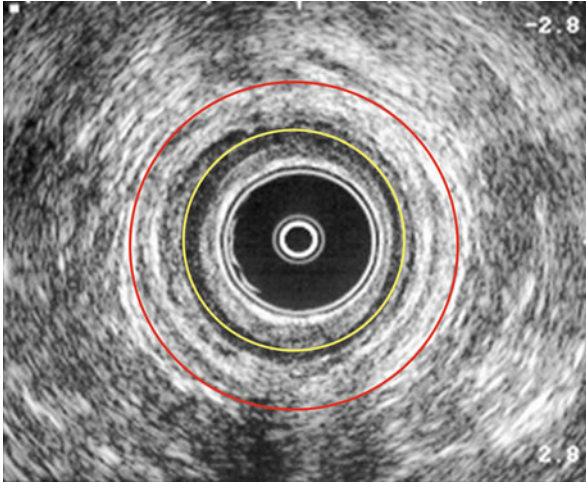


Fig. 18.1 Normal endoanal ultrasound. The *red line* illustrates the lateral border of the external anal sphincter (hyperechoic) while the *yellow depicts* the lateral border of the internal anal sphincter (hypoechoic)

Physical Examination

- A complete physical examination will include inspection of the perianal skin for scars from prior surgeries, trauma or birthing injuries, fistulae, excoriation from chronic soiling, or large prolapsing hemorrhoids.
- A specific evaluation of the perineal body in parous females should include palpation to determine if it is thinned.
- At rest, the anal canal should be well approximated, not patulous. A patulous anus suggests a possible rectal prolapse, which is best reproduced by asking the patient to Valsalva while sitting on a toilet or squatting. Checking the perianal sensation to pinprick as well as the anocutaneous “wink” reflex will serve as a simple assessment of neurologic function.
- Digital rectal examination can reveal masses or a fecal impaction. It also provides a gross assessment of both resting tone and voluntary squeeze.
- Lastly, anoscopy or potentially a rigid vs. flexible proctosigmoidoscopy may reveal inflammatory bowel disease, infectious proctitis, or neoplastic process if suspected.

Diagnostic Studies

Endoanal Ultrasound

- Endosonography has become the diagnostic cornerstone of the anorectal physiologic evaluation of fecal incontinence.
 - The ultrasound provides excellent imaging of the internal anal sphincter, which appears hypoechoic (Fig. 18.1).
 - The external sphincter is hyperechoic, and scar tissue often has a mixed echogenicity appearance.

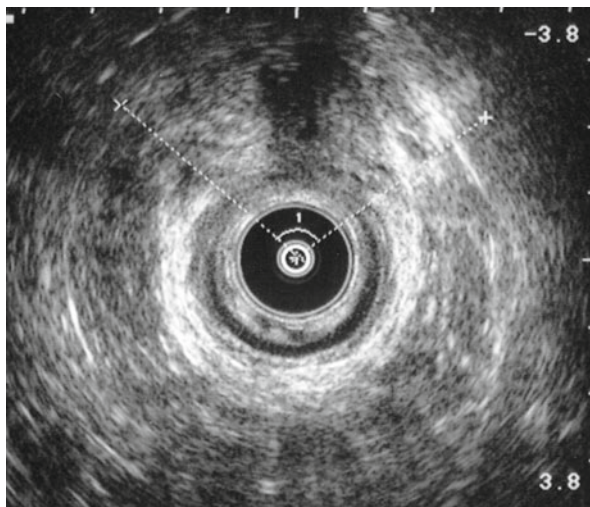


Fig. 18.2 Endoanal ultrasound with anterior sphincter defect (internal and external)

- The most important parameter is to determine if the musculature is intact or if there are traumatic defects present. When present, defects in the musculature should be measured.
- Additionally, the perineal body thickness (PBT) should be measured. PBT less than 10 mm is considered abnormal, and those patients with PBT greater than 12 mm are considered unlikely to have a sphincter defect in the absence of prior reconstructive surgery (Fig. 18.2).

Anorectal Manometry

- Anorectal manometry provides important information about the functional status of the anal sphincters and distal rectum. There is no standardized method of manometric evaluation. Several methods have been described.
 - Microtransducers can be used in the anal canal and are well tolerated by patients. Multichannel water-perfused catheters are perhaps the most common tool used to perform anal manometry.
- The resistance of flow of fluid from the catheter determines pressure measurements.
- Measurements can be taken in a continuous fashion (continuous pull-through) or at set levels within the anal canal (station pull-through).

Measurements

- *Resting Pressure.* The mean resting pressure in healthy volunteers ranges from 40 to 70 mmHg. The internal anal sphincter generates the majority of the resting pressure. This smooth muscle is in a continuous state of maximal contraction accounting for 55–60 % of resting tone.

- *Squeeze Pressure.* The maximal squeeze pressure in healthy individuals is two to three times the baseline resting value. The external anal sphincter is the main contributor to the generation of these pressures. Traumatic defects of the external anal sphincter, whether from obstetric or surgery, often result in decreased squeeze pressures.
- *High-Pressure Zone.* The high-pressure zone is defined as the length of the internal anal sphincter, through which pressures are greater than half of the maximal resting pressure. The high-pressure zone is approximately 2–3 cm in women and 2.5–3.5 cm in men.
- *Rectoanal Inhibitory Reflex.* The rectoanal inhibitory reflex (RAIR) is thought to play a role in the fine adjustments of continence. Rectal distension, usually with small volumes (10–30 mL), causes a contraction of the external anal sphincter followed by a pronounced internal anal sphincter relaxation. This reflex enables the sensory mucosa of the anal canal to “sample” the contents of the distal rectum and the patient to distinguish between gas, liquid, and solid stool. This reflex is absent or abnormal in patients with Hirschsprung’s disease, Chagas’ disease, dermatomyositis, and scleroderma.
- *Rectal Sensation.* Alterations in rectal sensation can lead to decreased fecal continence. Rectal sensation is measured with an intrarectal balloon and incremental instillation of known volumes of air. Sensation is generally achieved with 40 mL air. Overflow incontinence can result from a decrease in rectal sensation and subsequent fecal impaction.
- *Rectal Compliance.* Compliance is determined by the change in pressure associated with a change in volume ($C=V/P$). This is calculated by subtracting the volume of first sensation from the maximum tolerable volume and dividing by the change in pressure at these two points. A non-compliant rectum can contribute to fecal incontinence as the patient is not able to accommodate the amount of stool presented to the rectum. This is common in conditions, which cause proctitis.

Pudendal Nerve Terminal Motor Latency (PNTML)

- Pudendal neuropathy has been implicated in the etiology of fecal and urinary incontinence. Assessment of the PNTML is an important component to the evaluation of the patient with fecal incontinence. A disposable electrode is attached to the examiner’s finger, which is then directed toward the ischial spine, and electrical impulses are delivered to the pudendal nerve. The time for response at the level of the external anal sphincter is measured. Normal response is within 2.0 ± 0.2 ms.

Electromyography

- Anal electromyography (EMG) relies on the use of a concentric needle electrode to record electrical activity generated by the anal sphincter muscle fibers. Sequential recordings of the motor unit potentials are taken circumferentially around the anal canal.

Defecography

- Defecography is the radiological visualization of the act of defecation. It provides a picture of the successive phases of defecation and gives a dynamic impression of pelvic floor activity during these actions. Changes in the rectal configuration and the anorectal angle become visible, and the degree of evacuation can be studied.

Colonoscopy

- Endoscopic evaluation of the colon and rectum should be considered in the evaluation of patients with fecal incontinence to exclude a mucosal lesion or inflammatory condition, which could cause a change in the stool consistency or rectal compliance.

Treatment

Nonoperative Management

Medical Therapies

- There are a variety of pharmacotherapies available for the medical management of fecal incontinence, but ultimately the number of randomized, placebo-controlled trials is limited. In fact, the Cochrane Database systemic review on the subject stated “there is little evidence with which to assess the use of drug therapies for the management of fecal incontinence.”
- Medical management therapies are broadly broken down into the following categories: bulking agents, constipating agents, and laxative regimen with scheduled disimpactions.

Bulking Agents

- Fiber, both natural and synthetic, has long been a staple in treatment of minor fecal incontinence. It has the benefit of adding bulk and has the ability to absorb additional fluid, providing a more solid stool in the face of mild chronic diarrhea.

Constipating Agents

- In patients with diarrhea-predominant irritable bowel syndrome, it is estimated that 20 % have associated fecal incontinence.
 - It therefore stands to reason that use of constipation-inducing drugs, such as loperamide, codeine, diphenoxylate plus atropine, difenoxin plus atropine, and amitriptyline, is of utility for this group of patients. Loperamide is a synthetic opioid, which inhibits small and large intestinal peristalsis via the m (Mu) receptors in the gut. It has also been shown to increase anal resting sphincter pressure, improve

rectal sensation, and retention of fluid load, as well as increase the RAIR. Amitriptyline has also been suggested as therapy based on its anticholinergic properties leading to a reduction in the frequency and amplitude of rectal motor complexes.

Laxative Regimen with Scheduled Disimpactions

- In contrast to patients with diarrhea, patients with constipation and fecal impaction experience fecal incontinence secondary to overflow incontinence. Chassagne et al. compared a regimen of 30 g lactulose daily to 30 g of lactulose daily with the addition of a daily glycerin suppository and a weekly tap water enema in 206 institutionalized elderly patients with a history of prior fecal impaction and at least weekly episodes of fecal incontinence. The patients receiving the suppositories and weekly enemas in addition to the lactulose had a 35 % reduction in fecal incontinence episodes and a 42 % reduction in soiled laundry.

Biofeedback

- The goal of biofeedback is to use visual, auditory, or other forms of sensory information to improve a patient's ability to sense rectal distention and reinforce appropriate sphincter contraction.
- Published studies typically demonstrate improvement in continence for both adults and children as a result of biofeedback in over 70 % of the patients.
- Current described methods are widely variable and include weekly or biweekly sessions of 30 or 60 min, use of home practice machines, EMG, manometry, and even ultrasound. Long-term, the benefits of biofeedback are less clear, with many authorities suggesting an attenuation of results and the need for "refresher" training sessions. Regardless, a trial of biofeedback is considered an important noninvasive, first-line therapeutic option for highly motivated patients who have failed medical management.

Secca[®] Procedure

- The Secca[®] procedure involves the use of radiofrequency delivered as an alternating current at high frequency leading to frictional movement of ions and generation of heat or thermal energy. As a result of the delivered thermal energy, there is immediate contraction of collagen fibers, which are then permanently shortened via remodeling resulting in a tightening of the muscle.
- In Secca[®], the radiofrequency is delivered to the anal sphincter under constant monitoring of the temperature and tissue impedance while simultaneously cooling the probes at the surface to minimize mucosal damage.
- The Secca[®] procedure is typically performed in an outpatient, ambulatory setting under intravenous sedation with local anesthetic. Prophylactic

antibiotics are given. The patient is positioned in either prone jackknife or lithotomy, following which, the handpiece is inserted into the anal canal and lined up, so the four needle electrodes will be deployed at the level of the dentate line.

- The patients selected are generally those with mild to moderate complaints of fecal incontinence who have failed conservative measures including dietary modification, pharmacotherapy and biofeedback, and do not have a demonstrable sphincter defect.
- To date, the studies have been limited by either small sample size or length of follow-up.

Injectables

- Injection of a biocompatible bulking agent has been adapted from its initial reported successful application in the treatment of urinary incontinence. Its chief application is for the treatment of minor fecal incontinence due to internal anal sphincter dysfunction.
- This option gains significance because surgical repair of the internal anal sphincter has not been shown to be effective, whereas more aggressive operations and their attendant complications are typically out of proportion to the complaints of this specific patient population. Proponents of this therapy cite the fact that it is a safe, minimally invasive therapy, typically administered on an outpatient basis, in some instances in an office setting with minimal complications under local anesthetic alone or with intravenous sedation.
- The technique involves injection of a bulking agent either into the anal submucosal or intersphincteric space.
- Currently the two most studied materials are silicone biomaterial and carbon-coated microbeads.
 - The mechanism of action is not fully understood, but Davis et al. suggested an increase in anal resting pressure secondary to augmentation of the anal cushions and restoration of anal canal symmetry. Other proposed mechanisms include bulking of the anal canal providing increased resistance to the passage of stool, allowing for improved sensation and that fibrosis over time contributes to increased sphincter muscle volume.
- Typically, the maximal improvement in fecal continence is observed within the first 1–6 months and appears durable up to 1–2 years later.
- Because of concerns of absorption and migration of the bulking agent, further long-term data are still needed.
- Additionally, the ideal number and location of injections, utility of ultrasound guidance for said localization, and which materials and volume are most suitable for injection have yet to be definitively determined.
- Table 18.2 summarizes the results of the use of injectables for the treatment of fecal incontinence.

Table 18.2 Injectable anal sphincter bulking agents for treatment of minor fecal incontinence

Author (year)	<i>N</i>	Bulking agent	Significant improvement of fecal incontinence	Mean follow-up (months)
Shafik (1995)	14	Autologous fat	Yes ^a	18.6
Kumar et al. (1998)	17	GAX collagen	<i>P</i> value not reported	8
Kenefick et al. (2002)	6	Silicone	Yes <i>P</i> =0.04	18
Weiss et al. (2002)	10	Carbon-coated microbeads	Yes (<i>P</i> =0.012) FIS 13–10	6
Davis (2003)	18	Carbon-coated microbeads	Yes (<i>P</i> =0.003) FIS 11.89–8.07	28.5
Tjiandra et al. (2004)	82	Silicone	Yes (<i>P</i> <0.001)	6
Van der Hagen (2007)		Silicone	Yes (<i>P</i> <0.001)	12
Altomare (2008)	33	Carbon-coated microbeads	Yes (<i>P</i> <0.001) FIS 12–8	20.8
Aigner (2009)	11	Carbon-coated microbeads	Yes (<i>P</i> =0.003) FIS 12.27±0.97–4.91±0.87	26.1
Tjiandra (2009)	20	Silicone	Yes <i>P</i> <0.0001 at 6 months	12
	20	Carbon-coated microbeads	Yes <i>P</i> <0.0001 at 6 months	12
Danielson (2009)		Hyaluronic acid	Yes (<i>P</i> =0.004)	

^aAll patients had complete continence at 2–3 months – following which all but three had deterioration of their results

Table 18.3 Long-term results of anterior overlapping sphincteroplasty

Year	Author	<i>N</i>	Months follow-up	Results
2000	Karoui et al.	74	40	45 % continent to solid and liquid
2002	Halverson and Hull	49	69	4 stomas 46 % continent to solid and liquid
2006	Barisic et al.	65	60	48 % “good or excellent”
2009	Oom et al.	120	69	37 % “good or excellent”

Operative Procedures

Anterior Overlapping Sphincteroplasty

- Anterior overlapping sphincteroplasty is the mainstay surgical treatment for patients suffering from severe fecal incontinence in conjunction with an external sphincter defect (Table 18.3 and Fig. 18.3).
- The details of the procedure are described in the ASCRS textbook.
 - Lateral dissection allows for identification of the normal ends of the external anal sphincter musculature.
 - Care should be taken not to proceed too far posterior due to the potential for injury to the nerves entering in this location.
 - Preservation of the scar tissue in this location is important for the ensuing repair as it is helpful in holding the sutures.

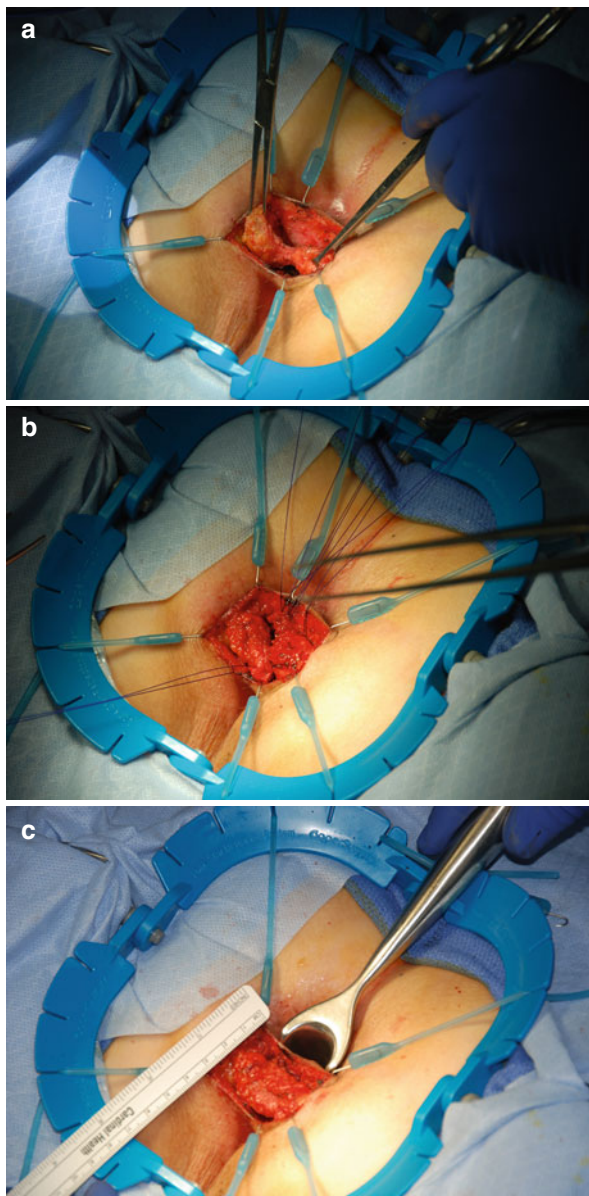


Fig. 18.3 (a) Anterior overlapping sphincteroplasty. Overlapping and suturing of the external anal sphincter in the *midline*; (b) anterior overlapping sphincteroplasty. (c) Final repair with recreation of the perineal body

- There has been suggestion that the presence of overlapped scar tissue correlates with improved short-term outcome as well.
- Outcome after end-to-end repair is somewhat inferior to overlapping repair, whereas overlapping repair might be associated with more evacuation difficulties.

- The initial results of anterior sphincteroplasty are promising; however, numerous authors have noted diminishing efficacy over time with disappointing long-term continence.

Parks Posterior Anal Repair

- The Parks posterior anal repair has been described for the treatment of neurogenic fecal incontinence in those patients without a sphincter defect.
- The initial premise was that it lengthened the anal canal and corrected the anorectal angle.
- This operation is rarely performed and has not gained widespread support in the USA, possibly because of the published poor long-term results with continence rates of only 33 % at 5 years. Details of the procedure are in the ASCRS Textbook.

Sacral Nerve Stimulation

- Sacral nerve stimulation (SNS) or neuromodulation was initially developed for the management of urinary incontinence. It was subsequently noted that in patients with fecal incontinence treated with SNS for urinary incontinence the fecal incontinence also improved.
- This procedure has the most promising results for selected patients with fecal incontinence.
- Unlike other therapeutic modalities, SNS is a staged procedure.
 - The first stage is the percutaneous nerve evaluation (PNE), which serves as feasibility trial period lasting 2 weeks.
 - Patients who experience an improvement of 50 % or greater decrease in the number of incontinence episodes progress to the final stage and are offered placement of a permanent stimulator.
- The electrode placement is performed under sterile conditions with fluoroscopic guidance. Stimulation of the S2, S3, and S4 nerve roots via their sacral foramina is tested. The goal is to elicit contraction of the levator ani and external anal sphincter with plantar flexion of the first two toes, seen with stimulation of S3. The purpose of direct stimulation of the sacral nerves is to recruit additional inactive motor units to improve muscle strength, resulting in an increase in resting anal pressure. Additionally, SNS has been shown to improve the rectal sensory threshold and balloon expulsion time.
- Both the initial PNE and subsequent placement of the permanent stimulator are performed on an outpatient basis. Complications are rare and have all been minor with lead migration being most typical.
- The obvious benefit of sacral nerve stimulation is that it avoids creation of an incision around or near the anal canal, which decreases the risk of infection.
- Recently, the results of the largest prospective randomized trial of the use of sacral nerve stimulation have been published.

- Sixteen centers in North America and Australia participated in the trial, which included 129 patients who underwent the subchronic stimulation phase. Of the 129 patients, 120 qualified for permanent implantation by achieving a decrease in the incontinent episodes by at least 50 % during the test phase. The mean follow-up period was 28 months. Persistent benefits of a 50 % decrease in the weekly incontinence episodes, incontinent days, and urgent incontinent episodes were noted in over 75 % of the patients at all follow-up periods up to 36 months, with most of interval measurements over 80 % success. There was also a consistent improvement in quality of life throughout the study period.
- This device is currently Food and Drug Administration (FDA) approved and shows promising results in the treatment of fecal incontinence.
- Promising short- and long-term success has been reported with significant and sustained decreases in the CCF-FIS. The results of sacral nerve stimulation and summarized in Table 18.4.

Artificial Bowel Sphincter

- The artificial bowel sphincter was first reported in 1987. The procedure involves creating a subcutaneous tunnel around the anus, typically through a transverse perineal incision. The cuff is situated around the anus. The pump is tunneled through a pfannenstiel incision down to either the labia or scrotum, while the reservoir is placed in the space of Retzius (Fig. 18.4a, b). All of the tubing is tunneled subcutaneously. The device provides continence by keeping the perianal cuff full in the resting state. When the patient needs to evacuate, he/she needs to actively pump fluid from the cuff to the reservoir. The cuff will then passively refill. When considering a patient for artificial bowel sphincter, it is important to ensure that there is not a significant soft tissue loss on the perineum, which could preclude adequate coverage and guarantee erosion. It is also imperative to ensure that the patient will have the manual dexterity to activate the device.
- Infection and erosion of the artificial sphincter with the subsequent need for explantation and revisional surgery have been the greatest challenge for patients and surgeons utilizing the artificial bowel sphincter.
 - The results of a multicenter trial were published by Wong et al. in 2002; 112 patients were implanted. There were 384 device-related adverse events in 99 patients. Two hundred and forty-six required either no or noninvasive intervention. Seventy-three revisional operations were performed in 51 (46 %) patients. Twenty-five percent of patients developed infection requiring surgical revision, and 41(37 %) patients had devices completely explanted. While the intention to treat success rate was low at 53 %, 85 % of patients with a functional device had a successful outcome.
 - Recent reports of the long-term outcome for patients with the artificial bowel sphincter have been published.

Table 18.4 Results of sacral neuromodulation

Author (year)	Patients (N)	Patients with permanent implant (N)	Fecal incontinence episodes/week		Cleveland Clinic Fecal Incontinence Score		Follow-up (months)	
			Baseline	Follow-up	Baseline	Follow-up		
Leroi (2001)	11	6	3	0.5			6	
Rosen (2001)	20	16	2	0.67			15	
Uljudağ (2002)	44	34	8.66	0.67			11	
Matzel (2003)	16	16	40 % of movements	0 % of movements	17	5	32.5	
Jarrett (2004)	59	46	7.5	1	14	6	12	
Hetzer (2007)	44	37			16	5	13	
Holzer (2007)	36	29	2.33	0.67				
Tjandra (2008)	60	53	9.5	3.1	16	1.2	12	
Altomare (2009)	94	60	3.5	0.7	15	5	74	
Wexner (2010)	129	120	87 % of patients decreased incontinent episodes per week by 50 %					28

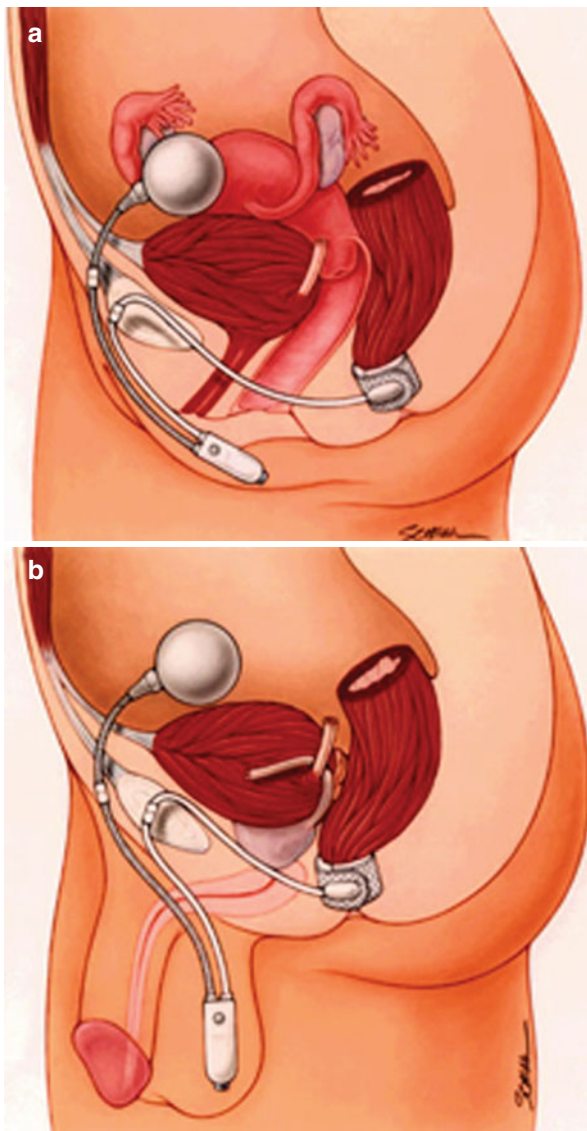


Fig. 18.4 Artificial bowel sphincter. Artificial bowel sphincter implanted in the (a) female and (b) male patient (With permission from Acticon®, American Medical Systems®, Inc., Minnetonka, MN, <http://www.AmericanMedicalSystems.com>)

All of the patients had some complication and 65 % required at least one reoperation. There was a 41 % infection rate noted in the series of 51 implantations, of these, 35 % were early and 6 % late.

- The major challenge of this treatment for fecal incontinence continues to be infection followed by late device-related complications.

Muscle Transposition

- The concept of substituting the anal sphincter was first reported by Chetwood in 1902 using the gluteus maximus. The ideal muscle for substitution of the sphincter complex should have a negligible role in movement and posture, yet it should be able to provide sufficient bulk. The muscle itself must have a reliable neurovascular bundle, so that it will not be damaged in the process of dissection.
- The advantages of the gluteus maximus muscle are that it has a location in close proximity to the anal canal and provides excellent strength and bulk to the anal canal; however, its use poses significant functional impairment to the patient while standing or climbing stairs.
- The majority of data are case series.
- The procedure is rarely performed today. The major technical difficulty of this procedure is obtaining sufficient length to adequately encircle the anal canal.

Gracilis Muscle Transposition

- Gracilis muscle transposition was first reported by Pickrell in 1952 for the treatment of children with fecal incontinence due to neurologic and congenital anomalies.
- It is generally a treatment option best for those patients whose incontinence results from either trauma or congenital anomaly, where the additional muscle bulk can supplement deficient native tissue.
- The essence of the operation is mobilization of the gracilis muscle followed by transposition of the muscle around the anus and fixation to the contralateral ischial tuberosity. Details about the procedure are in the ASCRS textbook.
- A randomized, controlled trial comparing unstimulated to stimulated graciloplasty has not been done.
- With the use of sacral nerve stimulation and the lack of FDA approval for gracilis stimulated myoplasty in the United States, the procedure is rarely performed. It remains a viable option for a highly selected group of patients in other countries.

Fecal Diversion

- Creation of a colostomy or ileostomy is typically the therapeutic option of last resort, when all other reasonable options have been exhausted.
- The majority of patients will be best served with an end sigmoid colostomy, but some patients with chronic constipation and slow transit may be best served with an ileostomy.
- Predictably, strong resistance even in the face of severe and debilitating incontinence is common. Patient education in the form of a visit with an enterostomal therapist and perhaps a patient already living with an ostomy can greatly ease anxiety.
- It is important to emphasize that there is no time limit for the decision to convert an uncontrolled perineal stoma to a more easily managed abdominal one.

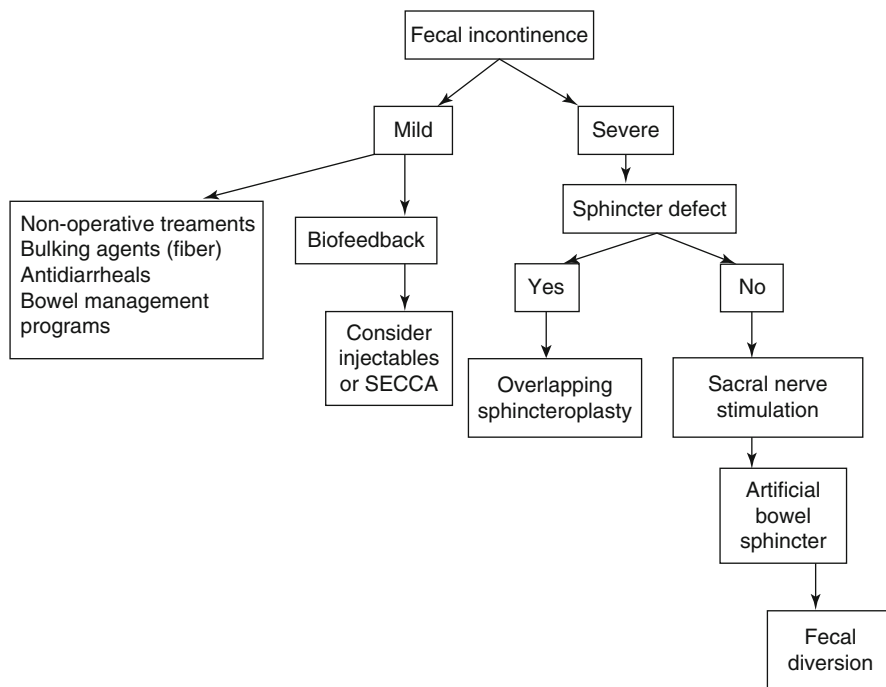


Fig. 18.5 Algorithm for the management of fecal incontinence

Conclusion

- Fecal incontinence is a socially devastating condition, which is extremely common and under reported.
- There are many options available for patients who can treat or significantly improve their symptoms.
 - The first step for the physician is to diagnose the problem. This will often not take place until the examiner specifically asks the patients as they will often not offer the information. Through a detailed history, the physician can formulate a differential diagnosis.
 - Anorectal physiologic testing can add specific information with regard to the functional status to the sphincter musculature. Many patients quality of life can be improved with noninvasive modalities focused on improving stool consistency and strengthening of the musculature with biofeedback.
- If there is a significant impact on quality of life and the patient is a candidate for invasive therapy, surgical intervention should be considered.
 - The overlapping sphincteroplasty remains the mainstay of surgical treatment when a sphincter defect is present. Sacral nerve stimulation has an increasing role in the treatment of fecal incontinence. For less severe forms of incontinence, injectables and SECCA may be of benefit. Figure 18.5 provides a generalized algorithm for the management of fecal incontinence.

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