REVIEW ARTICLE

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Management of fecal incontinence: what specialists need to know?

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INTRODUCTION

According to the International Urogynecology Association (IUGA) and the International Continence Society (ICS), anal incontinence is the involuntary loss of feces and/or flatus, while fecal incontinence is the involuntary loss of feces[1]. The Rome IV criteria use the definition "recurrent uncontrolled passage of fecal material for at least 3 months[2]."

Fecal incontinence is very common, but due to the associated embarrassment, the condition is underreported and its actual prevalence is difficult to determine. The prevalence of FI is estimated to be 0.4–18% in the overall population[3] and 8.3% of non-institutionalized adults in the USA. About one-quarter of women have some involuntary loss of flatus or feces (anal incontinence) in late pregnancy, and one-fifth leak flatus or feces 1 year after giving birth[4]. So, the objective of our review was to describe the challenges and limitations of fecal incontinence management and describe the current options for treatment.

A MEDLINE and PubMed search were performed over the last 6 years. Keyword combinations include "fecal incontinence"; rehabilitation/biofeedback"; "sphincteroplasty"; or "sacral nerve stimulation". Direct searches of the embedded references were performed, and the authors reviewed the evidence-based update for the management and current options for the treatment of fecal incontinence.

ETIOLOGY AND PATHOPHYSIOLOGY

Fecal control is achieved by a combination of factors, such as intact anal sphincter muscles and pelvic muscles, intact neurological function, stool consistency, and preserved rectal sensitivity and compliance[4].

Since few women seek medical care for FI, physicians should actively inquire about symptoms. Recognizing common risk factors helps identify high-risk patients and epidemiological studies have identified a number of such factors (Table 1). In women, obstetric injury is particularly relevant owing to the risk of damage to the pelvic floor, anal sphincters, and pudendal nerves during the second stage of labor. In men, iatrogenic injury to the sphincter complex secondary to anal surgery is a factor in up to 59% of those presenting for assessment[5].

Table 1. Risk factors for fecal incontinence.

Variable	Categories
Age	
Abnormal stool consistency	Diarrhea, loose stool, fecal impaction
Pregnancy, parity	
Birth trauma	Operative Vaginal delivery , high degree laceration, episiotomy
Perianal surgery or trauma	Sphincterotomy, fistulotomy, hemorrhoidectomy, anal dilation
Neurologic cause	Dementia, stroke, spina bifida, spinal cord lesions, neuropathy, multiples sclerosis, cauda equina
Inflammation	Inflammatory bowel disease, fistula, radiation
Hemorrhoids	
Prolapso	Pelvic organ prolapsed, rectal prolapse
Congenital anorectal abnormality	
obesity	
Bariatric surgery	
Limited mobility	
Urinary incontinence	

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The etiology and pathophysiology of FI and evacuation disorders are usually multifactorial. Table 2 shows the most common causes of FI, organized by category.

ASSESSMENT

A complete medical history is necessary to rule out underlying organic pathologies. The physician should also investigate bowel habits to ensure diarrhea and overflow constipation are not the causes of the loss of feces.

Symptom severity should be graded using a scoring system (Wexner/CCF Incontinence Score, St. Marks Incontinence Score), along with the patient's QOL (Quality of Life/FIQL score, Fecal Incontinence Severity Index/FISI) and urgency. The patient should be asked about bowel movements and frequency and about stool type to help identify triggers or events potentially aggravating symptoms and determine the time to onset of symptoms, previous treatments, and outcomes[6].

To identify risk factors, additional information may be collected, such as obstetrical stretch injury, abscess formation, surgery, radiation, and systemic factors like chemotherapy and diabetes. Obstetric anal sphincter injury, a form of major permanent maternal birth trauma, is likely to be underestimated because of missed diagnoses and occult tears[7].

Table 2. Etiology and pathophysiology of fecal incontinence.

Categories	Details/Definition
Acquired structural abnormalities	Obstetric injury (vaginal delivery)
	Anorectal surgery (sphincterotomy, fistulotomy, and hemorrhoidectomy)
	Rectal intussusceptions, prolapsed
	Sphincter-sparing bowel resection
	Trauma (pelvic fracture, anal impalement)
Functional disorders	Chronic diarrhea
	Irritable bowel disease
	Inflammatory bowel disease
	Radiation proctitis
	Malabsorption
	Hypersecretory tumors
	Fecal impaction (paradoxical diarrhea)
	Physical disabilities
	Psychiatric disorder
Neurological disorders	Pudendal neuropathy (radiation, diabetes, chemotherapy)
	Spinal surgery
	Multiples sclerosis
	Dementia
	Disorders of the central neurological system: stroke, trauma , tumor , infection, spina bifida

Physical examination should include a visual inspection at rest and at the maximum strain in order to assess the anal canal, perineal body, and urogenital area. Perianal surgery, trauma, and scars should be identified. This may be followed by a digital rectal evaluation of sphincter integrity, sphincter tone, compensatory auxiliary muscle contraction, anal canal length, posterior and anterior vaginal wall prolapse, rectocele, and palpable masses.

Physiology studies have attempted to correlate complaints, symptom severity, and clinical findings. Endoanal ultrasonography is currently the first-line imaging modality for FI, allowing to distinguish between intact and damaged anal sphincters (defects, scarring, thinning, thickening, and atrophy). The scan can show if the lesion involves the internal anal sphincter (IAS) or the external anal sphincter (EAS), or both. The number of defects and their circumferential extension (radial angle in degrees or clock hours) and longitudinal extension (proximal, distal, or full length) should be registered as well. In addition, 3D technologies allow for multiplanar measurements of length, thickness, area, and volume of sphincter damage[8].

Levator ani muscle trauma affects 15–55% of women after vaginal childbirth. A transvaginal approach is employed to visualize the anatomic integrity of the muscles and measure the levator hiatus area. Scanning will detect unilateral or bilateral detachment (discontinuity) of the levator ani muscles from their insertion on the pubic ramus on each side. Studies have shown that the severity of FI symptoms is significantly associated with the score of the defect on 3D ultrasonography[9].

An anorectal manometry is a useful tool in the assessment of the neuromuscular function of the rectum and anal canal, objectively evaluating the integrity of the anal sphincter muscles (IAS and EAS) and the neuromuscular motor and sensory innervations[10]. The technology also allows for continuous and dynamic spatiotemporal mapping of anorectal pressure, with easy and detailed data interpretation[11,12].

Patients with other clinical symptoms and findings may benefit from dynamic scanning modalities like dynamic ultrasonography, dynamic pelvic MRI, proctography, and urodynamics[13].

TREATMENT

The management of FI may be conservative or surgical. Dietary and lifestyle changes, medication, pelvic floor muscle

exercises, and physical therapy/biofeedback are recommended as first-line therapies.

Some dietary factors, such as excessive coffee consumption, can increase anal seepage, often in association with pruritus ani. A simple dietary exclusion of the offending food or drink for 1–2 weeks will clarify the contribution of these foods to the seepage. Perianal skin cleanliness without excessive rubbing with tissue paper also helps decrease secondary injury to the skin from rubbing and scratching and keeps seepage at a minimum[10].

Dietary fiber has been shown to help in the treatment of FI associated with loose stool (recommendation grade A). Patients with such symptoms should also refrain from ingesting alcohol or food that could loosen the stool (recommendation grade B). Instructions in bowel habits and skin care are useful in preventing FI-associated dermatitis (recommendation grade B).

Antidiarrheals, cholestyramine, and/or fiber supplements to bulk up stools can lead to improvement in a significant portion of patients. FI episodes may be reduced by bowel management in the form of enemas or suppositories for rectal stool volume reduction[13]. More recently, an anal irrigation system (Peristeen™) used in adults with low anterior resection syndrome has been shown to improve symptoms and quality of life[14]. The device consists of a rectal balloon, a pump, a pressure control unit, and a water container. Patients are instructed to irrigate the colon with up to 1.5 L of water a few times a week.

Pelvic floor exercise (biofeedback) is a first-line therapy for FI patients, although some studies have found no significant advantage of biofeedback over advice and reeducation[15]. Biofeedback therapy can improve rectal sensation and may enhance coordination between the perception of rectal distention and external sphincter contraction in patients with reduced rectal sensation. In a study involving 124 patients, Regadas et al.[16] found a 50% reduction in FI scores in approximately 50% of the patients. Patients with CCF-FI scores≥10, previous vaginal delivery, history of anorectal and/or colorectal surgery, and inability to maintain a squeezing effort were less likely to respond to biofeedback therapy.

SURGICAL MANAGEMENT OPTIONS

Correction of anatomy

Sphincteroplasty

Surgical correction is recommended for symptomatic patients with clearly defined anal sphincter muscle defects, such as a cloaca disrupting the normal circumferential anatomy. Direct repair may be by apposition or overlapping (the latter is preferred when adequate sphincters are present). Sphincteroplasty is performed to restore sphincter integrity. The technique is associated with good-to-excellent short-term results, but the effects tend to deteriorate over time, although some authors have reported sustained improvement[17].

No specific factors, like repeat repair, are predictors of treatment failure. Thus, women developing incontinence symptoms many years after obstetric trauma (especially with incomplete sphincter defects) may benefit from alternative treatment modalities like sacral nerve stimulation.

Defective anal sphincters may be treated with dynamic graciloplasty or replaced with artificial bowel sphincters (ABS)[17].

Injection of bulking agents

The ideal bulking agent would be a biocompatible compound small enough to inject yet large enough to minimize migration. Several implant materials have been proposed (autologous fat, synthetic bovine dermal collagen, Teflon, silicone [PTQ], carbon beads, and stabilized hyaluronic acid), and different injection sites (submucosal vs. intersphincteric space) and techniques (ultrasonography-guided vs. blind) have been tested, but no consistently significant differences have been observed with regard to the number of FI episodes, symptom severity, and quality of life. Minor adverse events, such as pain at the injection site and bleeding, may occur with the use of injectable bulking agents[2], but further studies are needed to clarify the issue.

Sacral neuromodulation

Studies have shown that fecal and urinary incontinence, low anterior resection syndrome (LARS), and constipation/obstructed defecation syndromes refractive to conservative management may be treated with sacral neuromodulation (SNM). The technique is reported to improve not only symptoms but also patient satisfaction and quality of life. Less invasive than conventional surgery, SNM consists of inserting electrodes through the S3 foramen to modulate the sacral neural pathway and thereby stimulate the pelvic floor. If symptoms improve by more than 50% within 2–3 weeks, the electrode is inserted permanently. SNM is indicated to treat FI in the following scenarios: (i) unsuccessful conservative treatment, (ii) sphincter defects up to 90 degrees, (iii) recovery from low anterior resection, (iv) cauda equina syndrome, and (v) congenital malformation. Relative contraindications for SNM include severe or rapidly progressive neurological disease and abnormal sacral anatomy. The proprietary SureScan™ system, a newly developed SNM technology, allows patients to have full-body MRI scans and uses a smart programmer to access all programs. Two systems

are available, namely, recharge-free (with a battery life of 6 years) and rechargeable (the neurostimulator needs recharging once a week for 30 min). SNM therapy is a safe and effective long-term treatment for patients with FI and patients with combined FI and LARS. The rate of complications is low, and if efficacy is lost, the organism usually responds to reprogramming and/or readjustment of the stimulator settings[18,19].

Stem cell injection

Most studies have focused on stem cell therapy in the treatment of anal sphincter incontinence in animal models. One recent review looked at heterogeneous techniques in which preparations are made of cells from skeletal muscle, bone marrow, and fat tissue, in that order of frequency. The characterization of the preparations was often incomplete, stemness was not always assessed, and distinct clinical situations (acute injury or healed injury with or without surgical reconstruction) were pooled. The authors acknowledged the need for further developments to establish indications, identify the ideal cell type, standardize cell preparation methods, and validate the route and number of cell delivery[20].

On the contrary, a randomized controlled study on a large sample of patients (n=288) of both sexes found a significant improvement in FI symptoms and quality of life in comparison to controls, although the physiological parameters remained unchanged. The current trend is to tailor the cell dose to individual needs for better outcomes[21].

Devices

A recent systematic review evaluated the clinical outcomes of treatment with a vaginal insert and three types of the anal inserts. The study reported improvements in continence and quality of life for patients who tolerated both anal and vaginal inserts. Adverse effects included discomfort, leakage, and slippage. Such devices appear to be useful, but the quality of the available evidence on their effectiveness is insufficient to make recommendations[22].

Fecal diversion (colostomy/ileostomy)

Fecal diversion is an effective and safe method to treat FI when all other options have failed. It is especially indicated in cases of severe neurogenic FI, a complete sphincter muscle defect refractory to surgical intervention, and severe radiation incontinence[17].

CONCLUSION

Fecal incontinence is a debilitating disorder that negatively impacts QOL. Patients are reluctant to seek care and report symptoms, and thus they feel overwhelmed. A complete assessment is needed to identify factors that might interfere with treatment. Treatment of FI can be challenging due to the multifactorial nature of the etiology. Management may be conservative or surgical. Nonsurgical management includes dietary changes and medication, while supportive measures include skin care and protective ointments. Pelvic floor rehabilitation/biofeedback is recommended as first-line therapy. Sacral neuromodulation may be considered a first-line surgical option for incontinent patients with and without sphincter defects.

AUTHORS' CONTRIBUTIONS

SMMR: Conceptualization, Data curation, Formal Analysis, Methodology, Validation, Writing – original draft, Writing – review & editing. **DLR:** Conceptualization, Data curation, Formal Analysis, Methodology, Validation, Writing – original draft, Writing – review & editing. **HSF:** Conceptualization, Data curation, Formal Analysis, Methodology, Validation, Writing – original draft, Writing – review & editing. **ALF:** Validation, Writing – original draft, Writing – review & editing.

REFERENCES

1. Haylen BT, Ridder D, Freeman RM, Swift SE, Berghmans B, Lee J, et al. An international urogynecological association (IUGA)/international continence society (ICS) joint report on the terminology for female pelvic floor dysfunction. Neurourol Urodyn. 2010;29(1):4-20. https://doi.org/10.1002/nau.20798
2. Assmann SL, Keszthelyi D, Kleijnen J, Anastasiou F, Bradshaw E, Brannigan AE, et al. Guideline for the diagnosis and treatment of faecal incontinence-A UEG/ESCP/ESNM/ESPCG collaboration. United European Gastroenterol J. 2022;10(3):251-86. https://doi.org/10.1002/ueg2.12213
3. Ruiz NS, Kaiser AM. Fecal incontinence - challenges and solutions. World J Gastroenterol. 2017;23(1):11-24. https://doi.org/10.3748/wjg.v23.i1.11
4. Woodley SJ, Lawrenson P, Boyle R, Cody JD, Mørkved S, Kernohan A, et al. Pelvic floor muscle training for preventing and treating urinary and faecal incontinence in antenatal and postnatal women. Cochrane Database Syst Rev. 2020;5(5):CD007471. https://doi.org/10.1002/14651858.CD007471.pub4
5. Kim T, Chae G, Chung SS, Sands DR, Speranza JR, Weiss EG, et al. Faecal incontinence in male patients. Colorectal Dis. 2008;10(2):124-30. https://doi.org/10.1111/j.1463-1318.2007.01266.x
6. Menees SB, Smith TM, Xu X, Chey WD, Saad RJ, Fenner DE. Factors associated with symptom severity in women presenting with fecal incontinence. Dis Colon Rectum. 2013;56(1):97-102. https://doi.org/10.1097/DCR.0b013e31826f8773
7. Turel FD, Langer S, Shek KL, Dietz HP. Medium- to long-term follow-up of obstetric anal sphincter injury. Dis Colon Rectum. 2019;62(3):348-56. https://doi.org/10.1097/DCR.0000000000001297

8. Kwok SPK, Wan OYK, Cheung RYK, Lee LL, Chung JPW, Chan SSC. Prevalence of obstetric anal sphincter injury following vaginal delivery in primiparous women: a retrospective analysis. Hong Kong Med J. 2019;25(4):271-8. https://doi.org/10.12809/hkmj197842
9. Murad-Regadas SM, Regadas FSP, Filho FSPR, Borges LB, Silva Vilarinho A, Veras LB, et al. Pubovisceral muscle and anal sphincter defects in women with fecal or urinary incontinence after vaginal delivery. Tech Coloproctol. 2019;23(2):117-28. https://doi.org/10.1007/s10151-018-1895-x
10. Lazarescu A, Turnbull GK, Vanner S. Investigating and treating fecal incontinence: when and how. Can J Gastroenterol. 2009;23(4):301-8. https://doi.org/10.1155/2009/905359
11. Sauter M, Heinrich H, Fox M, Misselwitz B, Halama M, Schwizer W, et al. Toward more accurate measurements of anorectal motor and sensory function in routine clinical practice: validation of high-resolution anorectal manometry and rapid barostat bag measurements of rectal function. Neurogastroenterol Motil. 2014;26(5):685-95. https://doi.org/10.1111/nmo.12317
12. Kang HR, Lee JE, Lee JS, Lee TH, Hong SJ, Kim JO, et al. Comparison of high-resolution anorectal manometry with water-perfused anorectal manometry. J Neurogastroenterol Motil. 2015;21(1):126-32. https://doi.org/10.5056/jnm14025
13. Maeda K, Mimura T, Yoshioka K, Seki M, Katsuno H, Takao Y, et al. Japanese practice guidelines for fecal incontinence part 2-examination and conservative treatment for fecal incontinence-english version. J Anus Rectum Colon. 2021;5(1):67-83. https://doi.org/10.23922/jarc.2020-079
14. Martellucci J, Sturiale A, Bergamini C, Boni L, Cianchi F, Coratti A, et al. Role of transanal irrigation in the treatment of anterior resection syndrome. Tech Coloproctol. 2018;22(7):519-27. https://doi.org/10.1007/s10151-018-1829-7
15. Vonthein R, Heimerl T, Schwandner T, Ziegler A. Electrical stimulation and biofeedback for the treatment of fecal incontinence: a systematic review. Int J Colorectal Dis. 2013;28(11):1567-77. https://doi.org/10.1007/s00384-013-1739-0
16. Murad-Regadas SM, Regadas FSP, Regadas Filho FSP, Mendonça Filho JJ, Andrade Filho RS, Vilarinho ADS. Predictors of unsuccessful of treatment for fecal incontinence biofeedback for fecal incontinence in female. Arq Gastroenterol. 2019;56(1):61-5. https://doi.org/10.1590/S0004-2803.201900000-17
17. Glasgow SC, Lowry AC. Long-term outcomes of anal sphincter repair for fecal incontinence: a systematic review. Dis Colon Rectum. 2012;55(4):482-90. https://doi.org/10.1097/DCR.0b013e3182468c22
18. Hidaka J, Lundby L, Laurberg S, Duelund-Jakobsen J. Comparison of long-term outcome of sacral nerve stimulation for constipation and faecal incontinence with focus on explantation rate, additional visits, and patient satisfaction. Tech Coloproctol. 2020;24(11):1189-95. https://doi.org/10.1007/s10151-020-02328-0
19. Meyere C, Nuytens F, Parmentier I, D'Hondt M. Five-year single center experience of sacral neuromodulation for isolated fecal incontinence or fecal incontinence combined with low anterior resection syndrome. Tech Coloproctol. 2020;24(9):947-58. https://doi.org/10.1007/s10151-020-02245-2
20. Balaphas A, Meyer J, Meier RPH, Liot E, Buchs NC, Roche B, et al. Cell therapy for anal sphincter incontinence: where do we stand? Cells. 2021;10(8):2086. https://doi.org/10.3390/cells10082086
21. Frudinger A, Gauruder-Burmester A, Graf W, Lehmann JP, Gunnarsson U, Mihov M, et al. Skeletal muscle-derived cell implantation for the treatment of fecal incontinence: a randomized, placebo-controlled study. Clin Gastroenterol Hepatol. 2023;21(2):476-86.e8. https://doi.org/10.1016/j.cgh.2022.07.039
22. How P, Trivedi PM, Bearn PE, Thomas GP. Insert devices for faecal incontinence. Tech Coloproctol. 2021;25(3):255-65. https://doi.org/10.1007/s10151-020-02317-3