Supplementary Table 1. Anorectal Factors Maintaining Continence

Factor (Method of Assessment)[a]	Physiologic Functions	Pathophysiology and Test Performance
Internal anal sphincter function (anal manometry)	• Smooth muscle responsible for maintaining ~70% resting anal tone. • Resting tone is maintained by myogenic factors and tonic sympathetic excitation.	• Compare pressures with age- and gender-matched normal values. • Resting and squeeze pressures are often ↓ in women with fecal incontinence. • Conversely, ↑ sphincter pressures have been implicated to hinder evacuation, predisposing to fecal incontinence in some men.
External anal sphincter functional [anal manometry, *anal EMG (for neural integrity)*]	• Tonically active striated muscle which predominantly contains type I (slow-twitch) fibers in humans. • Maintains ~30% of resting anal tone and relaxes during defecation. • Voluntary or reflex contraction (ie, "squeeze" response) closes the anal canal, preserving continence.	• Internal and external sphincter weakness is often caused by sphincter trauma. • Obstetric or iatrogenic injuries are common causes of sphincter trauma. • Diseases affecting upper or lower motor neuron pathways can also weaken the external sphincter.
Anal sphincter integrity (ultrasound or MRI)	• As above.	• Sphincter injury is often clinically unrecognized and/or amenable to surgical repair. • Anal ultrasound and MRI are probably equivalent for identifying internal sphincter injury. MRI is better for imaging the external sphincter, particularly for external sphincter atrophy.
Puborectalis (evacuation proctography, *dynamic pelvic MRI*)	• Maintains a relatively acute anorectal angle at rest. • Contracts further to preserve continence during "squeeze."	• MRI reveals puborectalis atrophy and/or impaired function in a subset of incontinent patients.
Rectal compliance (*barostat testing*)	• By relaxing (ie, accommodating), the rectum can hold more stool until defecation is convenient.	• Rectal compliance is ↓ in ulcerative and ischemic proctitis. • Rectal capacity is ↓ in "idiopathic" fecal incontinence.
Rectal sensation (perception of balloon distention, *barostat testing*)	• Rectal distention evokes the desire to defecate and is also critical for initiating the squeeze response when continence is threatened.	• ↓ Rectal sensation occurs in fecal incontinence, may impair evacuation and continence, and can be ameliorated by biofeedback therapy. • ↑ Rectal sensation may contribute to the symptom of urgency in fecal incontinence.

[a]Italicized tests are used in research studies, but not widely available, nor used in clinical practice. ↓ = reduced; ↑ = increased.

Supplementary Table 2. Management of Fecal Incontinence

Intervention	Side Effects	Comments	Mechanism of Action
Incontinence pads[a]	Skin irritation	Disposable products provide superior skin protection than nondisposable products; underpad products were slightly cheaper than body-worn products	Provide skin protection and prevent soiling of linen; polymers conduct moisture away from the skin.
Antidiarrheal agents[a] Loperamide (Imodium) up to 16 mg/d in divided doses Diphenoxylate—5 mg qid	Constipation	Titrate dose; administer before meals and social events	↑ Fecal consistency, ↓ urgency; ↑ anal sphincter tone
Enemas[b]	Inconvenient; side effects of specific preparations		Rectal evacuation decreases likelihood of fecal incontinence
Biofeedback therapy using anal canal pressure or surface EMG sensors[a]; Rectal balloon for modulating sensation		Prerequisites for success include motivation, intact cognition, absence of depression, and some rectal sensation	Improved rectal sensation and coordinated external sphincter contraction; ± ↑ anal sphincter tone
Sphincteroplasty for sphincter defects[b]	Wound infection; recurrent fecal incontinence (delayed)	Beneficial effects wane over time. Restricted to isolated sphincter defects without denervation.	Restore sphincter integrity
Sacral nerve stimulation[b]	Infection; lead fracture or migration	Relatively safe	Unclear; no consistent effects on anal pressures or rectal sensation
Artificial sphincter Gracilis transposition[b]	Device erosion, failure, and infection	High morbidity; seldom used	Restore anal barrier

NOTE. Grades A or B are supported by ≥1 randomized controlled trial or 1 high-quality study of nonrandomized cohorts. Grade C recommendations are expert opinions generally derived from basic research, applied physiologic evidence or first principles, but not necessarily on controlled or randomized trials.

Adapted from chapter on GI dysmotility and sphincter dysfunction in: Neurological Therapeutics: Principles and Practice, John H. Noseworthy, ed. London: Martin Dunitz Ltd. (in press).

[a]Grade A, [b]Grade B.