Investigation of faecal incontinence

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Most patients with faecal incontinence require only a full history (information about other predisposing causes) and examination (assessment for faecal impaction and evaluation of sphincter function and structure). When necessary, anorectal physiological studies, endoanal ultrasound and magnetic resonance imaging allow accurate characterization of sphincter function and structure.

Faecal incontinence is common and can be socially disabling. Appropriate treatment depends on correct diagnosis, and the following techniques assist patient assessment when further investigation is indicated:

- History and examination
- Symptom diaries and continence questionnaire
- Digital rectal examination
- Endoanal ultrasound (*Figure 1*)
- Anorectal manometry and sensory testing.

CLINICAL FEATURES

The aetiology of faecal incontinence is complex (*Table 1*). An accurate history is imperative; assessment questionnaires and symptom diaries can aid documentation of frequency, nature and effect of faecal incontinence. Incontinence to solid or liquid stool should be differentiated from flatus incontinence. Passive incontinence (unwanted loss of stool without patient awareness), urge incontinence (unwanted loss of stool despite active attempts to inhibit defaecation) and post-defaecation soiling (stool loss post-voiding with normal continence) should be distinguished from one another, as they often have different aetiologies.

Urgency and urge faecal incontinence are most commonly associated with external anal sphincter pathology (*Figure 2*), or excessively strong bowel contractions in the presence of a normal sphincter. Passive faecal incontinence is usually associated with internal anal sphincter dysfunction (*Figure 3*) (Engel et al, 1995b).

Figure 1. Normal endoanal ultrasound showing (a) plastic cone, (b) subepithelial tissue, (c) internal anal sphincter, (d) longitudinal muscle, (e) external anal sphincter.

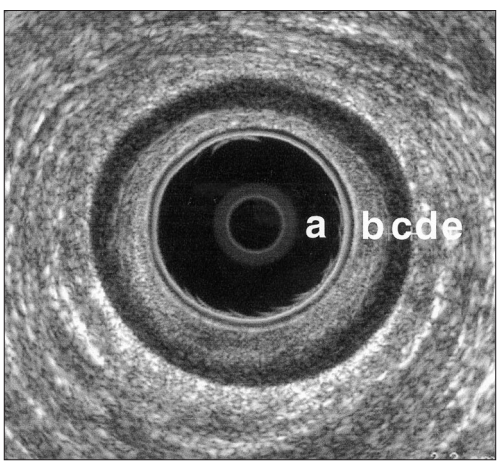

TABLE 1. Aetiology of faecal incontinence

Aetiological factor	Examples	
Trauma	Obstetric	Forceps delivery
		Large baby
	Surgical	Fistula surgery
		Haemorrhoidectomy
	Accidental	Pelvic fracture
Congenital	Spina bifida	
	Hirschsprung's disease	
	Anorectal malformations	
Myopathy	Primary internal sphincter degeneration	
	Systemic sclerosis	
Neurological	Cerebral	Dementia
	Spinal	Cord injury
	Peripheral	Pudendal neuropathy
Colorectal disease	Rectal prolapse	
	Haemorrhoids	
	Tumours	
	Inflammatory bowel disease	
Miscellaneous	Laxative abuse	
	Faecal impaction	
	Encopresis	

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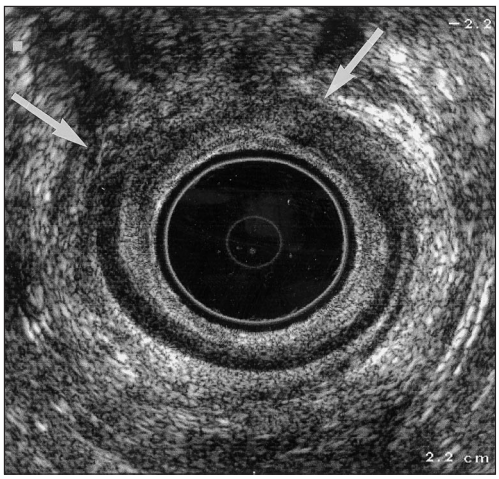
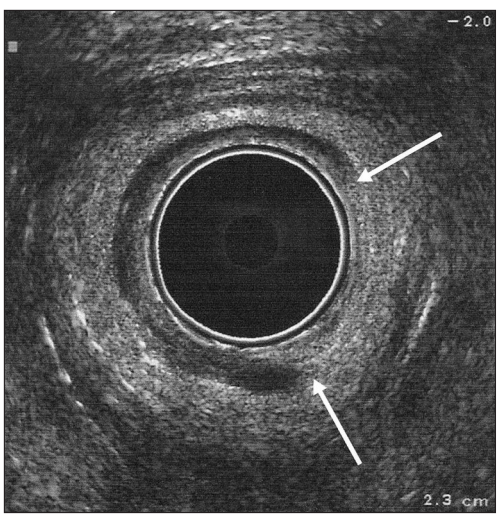


Figure 2. Endoanal ultrasound showing a combined internal and external anal sphincter defect between white arrows at 10 and 1 o'clock.

Post-defecatory soiling may reflect perianal conditions, such as haemorrhoids, or internal anal sphincter weakness. Eighty per cent of patients with rectal prolapse report some degree of incontinence associated with internal sphincter dysfunction.

Nocturnal faecal incontinence is most commonly associated with neurological disease. These patients may have abnormal sensation on examination and they may also report urinary incontinence. An alteration in bowel habit, or presence of blood or mucus may all indicate intercurrent colorectal pathology, such as malignancy or inflammatory bowel disease. However, even patients with idiopathic incontinence have increased bowel frequency (Talley et al, 1992), possibly related to an inability to inhibit defaecation.

Figure 3. Endoanal ultrasound demonstrating defect in internal anal sphincter between white arrows at 2 and 5 o'clock.



Although faecal impaction and sphincter atrophy are frequent causes of faecal incontinence in the community, anal sphincter damage predominates in the hospital setting, particularly in relation to traumatic vaginal delivery (Kamm, 1994). Use of forceps (Sultan et al, 1993a), prolonged delivery or large birthweight of baby often suggest underlying sphincter damage; many women relate the onset of symptoms to childbirth.

Incontinence can follow anorectal surgery, particularly haemorrhoidectomy, fistula surgery or lateral sphincterotomy for anal fissure. Anal dilatation can lead to fragmentation of the internal sphincter and passive faecal incontinence (Snooks et al, 1984). Colorectal resection can alter rectal compliance and reservoir volume, often leading to faecal urgency. Sphincter damage has been reported when patients present with incontinence following a history of sexual abuse or unwanted anal penetration (Engel et al, 1995a).

Many patients have commenced antidiarrhoeal medications like loperamide, although they may not have titrated the dose against symptoms. Patients may wear pads to gain further symptomatic relief, and this can yield important additional information about the extent of incontinence and its impact on lifestyle.

CONTINENCE SCORING SYSTEMS

Continence scoring helps assess the degree of faecal incontinence and its impact on an individual's quality of life. Original designation into major (solid stool) or minor (flatus or liquid stool) incontinence failed to take frequency of defaecation into account. Continence scoring systems have helped provide objective measurements about the severity of faecal incontinence, and they are also useful in monitoring patient response to therapy and auditing treatment.

Several scoring methods have been developed, although the Cleveland Clinic system is the most widely adopted (Jorge and Wexner, 1993). This method provides a reproducible assessment of the degree of faecal incontinence, although it does not take account of the effect on lifestyle. A prospective study (Vaizey et al, 1999) has addressed this issue by developing a new score, based on an extension of the Cleveland Clinic score, taking urgency of defaecation and the requirement for antidiarrhoeal medication or pads into account (*Table*

2). Urgency, with the need to stay close to toilet facilities to prevent incontinence, is often socially restrictive. This new score has demonstrated high clinical validity and utility pre- and postoperatively.

EXAMINATION

General and abdominal examinations may provide clues to the underlying aetiology. Perianal soiling or staining of underwear should be noted, and any use of pads or tissues confirmed. Perianal inspection may reveal scarring from previous surgery, childbirth damage or episiotomy. The perineal body may be absent or attenuated, and absent puckering anterior to the anus on squeezing may represent external sphincter disruption. Large haemorrhoids or skin tags are usually visible, but significant external rectal prolapse often needs evaluation while the patient strains seated on the toilet.

Patients rarely have a patulous anus at rest. Digital rectal examination can detect impaction, distal neoplasm and abnormalities of stool colour or consistency. Abnormalities in rectal sensation may be elicited. Assessment of anal sphincter tone can be made, although the correlation with manometrically derived resting and squeeze pressures is variable (Hallan et al, 1989). Sphincter defects are sometimes palpable, but a normal perineal examination does not exclude underlying muscle abnormalities (Frudinger et al, 1997). Proctosigmoidoscopy is mandatory to view any mucosal abnormality and detect haemorrhoids.

IMAGING IN FAECAL INCONTINENCE

Endoanal ultrasonography has revolutionized anal investigation in faecal incontinence. Initial experience was gained using a modified 7 MHz probe, originally designed for rectal imaging, and this technique superseded the more painful and time consuming concentric needle electromyography mapping (Law et al, 1990). Latterly, the 10 MHz probe has provided more accurate definition of the anal sphincters and can demonstrate specific defects in the internal and external anal sphincters, helping define the cause of incontinence and select which patients may benefit from surgical repair.

Endoanal ultrasonography is indicated in patients with suspected sphincter disruption, or where further investigation is needed when symptomatic relief of incontinence with simple measures has not been obtained. Endoanal ultrasonography can also be used to assess the integrity of previous sphincter repair. The technique, although simple, is operator dependent and requires both training and experience.

After first vaginal delivery, endoanal ultrasonography has demonstrated sphincter defects in 30% of women (Sultan et al, 1993b). One third of these women develop symptoms of anal incontinence or urgency. Endoanal ultrasonography should be undertaken in patients who have suffered obstetric damage, or where sphincter defects may have been caused by surgical (Snooks et al, 1984) or non-surgical trauma (Engel et al, 1994).

Endoanal ultrasonography facilitated recognition of primary degeneration of the internal sphincter (Vaizey et al, 1997), a common cause of passive incontinence in patients with intact sphincter muscles. Recent use of three-dimensional endoanal ultrasonography has highlighted the shorter external anal sphincter in women, with important implications in surgical management and childbirth (Gold et al, 1999).

Magnetic resonance imaging, using a dedicated high resolution endocoil, is complimen-

TABLE 2.
St Mark's continence scoring system

	Never*	Rarely*	Sometimes*	Weekly*	Daily*
Incontinence for solid stool	0	1	2	3	4
Incontinence for liquid stool	0	1	2	3	4
Incontinence for gas	0	1	2	3	4
Lifestyle alteration because of faecal incontinence	0	1	2	3	4
		No		Yes	
Need to wear pad/plug or change underwear because of soiling?		0		2	
Need to take constipating medicines?		0		2	
Inability to defer defecation for 15 minutes or less		0		4	

*Never = no episodes in the past 4 weeks; rarely = 1 episode in the past 4 weeks; sometimes = >1 episode in the past 4 weeks but <1 a week; weekly = 1 or more episodes a week but <1 a day; daily = 1 or more episodes a day. Add one score from each row: perfect continence = 0 = minimum score; totally incontinent = 24 = maximum score. From Vaizey et al (1999)

tary to endoanal ultrasonography and can demonstrate sphincter atrophy (Rociu et al, 1999) in patients with intact sphincters. This may play a role in causing faecal incontinence; magnetic resonance imaging may have a wider role in assessing the integrity and quality of the external sphincter. Despite these advantages, magnetic resonance imaging has shown much lower inter-observer reproducibility for detecting sphincter defects when compared with endoanal ultrasonography (Malouf et al, 2001).

ANORECTAL PHYSIOLOGICAL TESTING

Continence depends on several physiological mechanisms, and anorectal physiological tests can assist in characterizing functional abnormalities. They may also influence management.

Anal manometry can be used to define functional sphincter weakness and is complimentary to endoanal ultrasonography that defines structure. A station pull through method (measuring the pressure with a stationary manometry catheter at 0.5 cm intervals) is used to quantify the resting and voluntary contraction pressures exerted predominantly by the internal and external anal sphincters respectively. A reduced resting pressure on manometry correlates with internal anal sphincter abnormality on endoanal ultrasonography, whereas reduced voluntary contraction on manometry correlates with external anal sphincter damage on endoanal ultrasound (Engel et al, 1995b).

The fatigue rate of the external anal sphincter can be quantified and may be of significance when patients have symptoms of urgency leading to episodes of urge faecal incontinence. Manometry may help predict continence before stoma reversal. Improved squeeze correlates with anatomical external sphincter restoration and improved symptoms after anterior sphincter repair for obstetric damage.

Urgency is linked with increased sensitivity to rectal distension. Balloon distension in the rectum is associated with distinct sensations: the rectal sensory threshold (first detectable sensation), urge (urgency to defecate) and maximum tolerated volumes (sensation of pain). These volumes are often reduced in faecal incontinence, usually because of poor compliance or irritability. Increased volumes may indicate a dilated rectum or neurological disease. Sensation to an electrical stimulus may be helpful in detecting neurological disease affecting the bowel innervation (Kamm and Lennard-Jones, 1990). Anal canal sensation (Miller et al, 1989) can be assessed by electrically stimulating the anal canal mucosa using a bipolar ring electrode until the patient perceives a change in sensation. Impaired anal sensation may indicate neurological or post-surgical nerve impairment.

The recto-anal inhibitory reflex consists of reflex relaxation of the internal anal sphincter in response to rectal distension. There may be initial brief contraction of the external anal sphincter. Internal anal sphincter relaxation allows sampling of rectal contents by the anal canal, and this is followed by immediate contraction of the external sphincter when defaecation is inappropriate. This reflex is important in maintaining continence.

Prolonged pudendal nerve terminal motor latency may be associated with idiopathic faecal incontinence (Parks et al, 1966). This is thought to relate to stretching of the branches of the pudendal nerve. Terminal pudendal nerve function can be assessed by transrectal electrical stimulation of the motor nerve and measuring the time taken from stimulation to the first measurable contraction of the external anal sphincter. The prolonged pudendal nerve terminal motor latency, however, increases with age regardless of the continence status of the patient, and a damaged nerve often contains some fast conducting fibres that, if stimulated, give an inaccurate representation of overall status (Cheong et al, 1995). The test is also operator dependent and results should be interpreted with caution.

Adequate rectal compliance helps preserve faecal continence during filling and influences function by altering capacity and frequency of defaecation (Fleshman, 1993). Specific tests for compliance can be employed if sensory or threshold volume tests indicate that it may be altered. Compliance is most often reduced in inflammation (ulcerative colitis, Crohn's disease and radiation bowel disease), or in patients with an ileoanal pouch. Anxiety can also reduce compliance.

Infusion of saline or porridge into the rectum is designed to test the anal sphincters, and this may be useful when sphincters are structurally intact, yet there is persistent faecal incontinence. The clinical value of this test is as yet undetermined (Diamant et al, 1999).

VALIDITY OF PHYSIOLOGICAL TESTS

Although anorectal investigations are in widespread use, their clinical value has sometimes been doubted. Recent work has highlighted their benefits in benign anorectal disorders, in particular in patients with faecal incontinence.

Anorectal investigations have been demonstrated to have a direct impact on subsequent management (Vaizey and Kamm, 2000) and should be used to help guide future treatment when symptomatic relief has not been obtained with simple measures.

CONCLUSIONS

Faecal incontinence is increasingly common in an ageing population. The aetiology is complex, but most patients can achieve symptomatic benefits from simple measures. When simple measures have failed, or when a careful history and examination indicate major underlying structural damage, further investigation should be undertaken.

Endoanal ultrasound provides a gold standard in diagnosis, and in combination with continence assessment and anorectal physiological testing, appropriate therapeutic regimens can usually be determined. Three-dimensional endoanal ultrasound may prove useful in further assessing sphincter trauma. Future development of high-resolution endoprobes for endoanal ultrasound or magnetic resonance imaging may provide more detailed information about sphincter pathologies, and broader use of continence assessments will help gain a larger understanding about patient responses to treatment. These measures should further enhance the future management of faecal incontinence. HM

Conflict of interest: none.

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KEY POINTS

- Faecal incontinence affects 2% of all adults.
- History taking and examination are essential.
- Digital examination can detect impaction and assess sphincter function.
- Endoanal ultrasound is simple, reliable and accurate for diagnosing sphincter defects.
- Anorectal manometry and sensory testing help define functional abnormalities.