

## ACPWH CONFERENCE 2009

# From the bottom up: a colorectal surgeon's perspective of the pelvic floor

A. D. Clarke

Poole Hospital NHS Foundation Trust, Poole, Dorset, UK

### Abstract

A deficient or dyssynergistic pelvic floor may initially be addressed by a physiotherapist with a special interest in this field. The majority of cases improve to the point of requiring no further treatment and never need an operation. For the minority that remain symptomatic, assessment through radiology and possibly anorectal physiology is then necessary to help tailor treatment. The two main topics discussed in this paper are faecal incontinence and constipation since these are two of the most prevalent pelvic floor problems encountered in our joint clinics. Rectal bleeding is also addressed since this is also a common symptom volunteered by our patients.

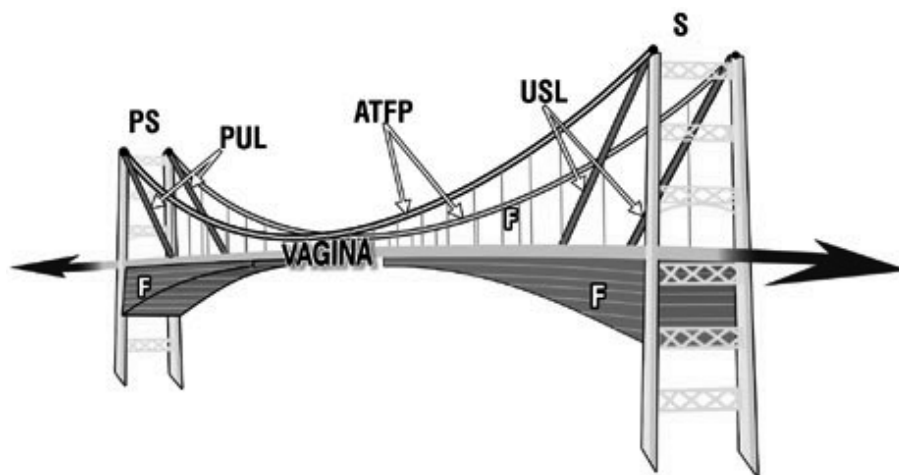
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### Introduction

The structure of the pelvic floor bears a striking similarity to that of an articular joint (Fig. 1):

*Correspondence:* Mr Andrew D. Clarke BSc FRCS (Gen Surg) MD, Consultant General and Colorectal Surgeon, Poole Hospital NHS Foundation Trust, Longfleet Road, Poole, Dorset BH15 2JB, UK (e-mail: a.a.d.clarke@btinternet.com).

both have opposing bony surfaces, muscle and supportive tendons (Papa Petros 2006). In the same way that a weakened joint may be treated first by an orthopaedic physiotherapist, so too a deficient or dyssynergistic pelvic floor may initially be addressed by a physiotherapist with a special interest in that field. Indeed, the majority of cases improve to the point of requiring no



**Figure 1.** Structure of the anatomy of the female pelvic floor: the suspension bridge analogy. This comparison illustrates the interdependence of the pelvic structures. In a suspension bridge, strength is maintained through tensioning of suspensory steel wires (arrows). Weakening any one part of the structure may disturb the equilibrium, strength and function of the whole. The vagina and bladder are suspended from the bony pelvis by the pubourethral ligament (PUL), the uterosacral ligament (USL), the arcus tendineus fascia pelvis (ATFP) and the fascia (F). The structural dimension develops when these are stretched by muscle forces (arrows): (PS) pubic symphysis; and (S) sacrum. (Reproduced with the permission of the publisher from *The Female Pelvic Floor: Function, Dysfunction and Management According to the Integral Theory*, 2nd edn; Papa Petros 2006.)

further treatment without ever needing an operation. For the minority that remain symptomatic, assessment through radiology and possibly anorectal physiology is then necessary to help tailor treatment. The present author's unit at Poole Hospital NHS Foundation Trust, Poole, UK, like many others, is aspiring to provide a joint clinic in which physiotherapists and surgeons collaborate to ensure that physiotherapy is initiated early on in treatment ([www.southern-rectalsurgery.co.uk](http://www.southern-rectalsurgery.co.uk)), and patients are only subject to investigation and possible surgery when all non-invasive therapies have been exhausted.

The two main topics discussed in the present paper are faecal incontinence (FI) and constipation since these are two of the most prevalent pelvic floor problems encountered in these clinics. Rectal bleeding is also addressed since this is also a common symptom volunteered by our patients.

### **Faecal incontinence**

The vast majority of individuals who are affected by FI are women and the problem usually originates from previous obstetric trauma. There is a wealth of evidence suggesting that accurate assessment and careful repair of perineal trauma immediately after delivery minimizes the risk of patients suffering incontinence in later life (Yoshioka & Keighley 1989; Pretlove *et al.* 2004). The wide spectrum of symptom severity makes comparative assessment of FI problematic and its incidence is difficult to define. Nevertheless, the incidence of FI does increase with age and the condition has been reported in approximately 6% of the population aged over 65 years (Kamm 1998). The obstetric injury responsible for the problem can occur many years before incontinence manifests itself and the process of decompensation that occurs in the interim period is poorly understood.

#### *Surgical treatment of faecal incontinence*

In the event that physiotherapy fails to achieve the desired improvement in continence, careful assessment is mandatory. If a focal injury in the sphincter muscle is depicted by endoanal ultrasound and mirrored by anorectal physiotherapy, then an overlapping sphincter repair may be an option. This involves meticulous dissection of the sphincter muscles, which are then plicated. The levator ani muscles can be tightened during the procedure (levatorplasty) in order to reconstitute the anorectal angle. Careful wound

management is required since infection is commonplace. The results of the treatment are variable, but early improvement is likely in the majority of individuals and postoperative physiotherapy undoubtedly improves function. Sadly, the progress is often not sustained and some units have reported maintenance of full continence in only approximately 20% of patients 5 years after surgery (Malouf *et al.* 2000).

When the sphincter is deficient and overlap not achievable, it may be possible to reconstruct the sphincter by wrapping a tunnelled gracilis muscle around the anal canal in a gamma configuration. This technique is an attractive alternative to a colostomy, but it involves major surgery, and wound-related morbidity in both the anal canal and the donor site is common (Matzel *et al.* 2001). An alternative is to create a mechanical sphincter using an expansible silastic cuff, although infection and device erosion can be problems associated with this approach (O'Brien *et al.* 2004).

#### *Sacral neuromodulation*

One of the most promising surgical innovations in the treatment of FI has been the development of an implantable nerve stimulator (Melenhorst *et al.* 2007). This device provides low-voltage continuous stimulation through the S3 nerve root. Involving only a floppy wire placed in the nerve root foramen, sacral neuromodulation precludes the need for invasive surgery. Although the precise mode of action of the nerve stimulator has not yet been defined, it undoubtedly acts on a variety of sites, not only in the pelvic floor, but also at the higher centres and possibly at a central level (Sheldon *et al.* 2005). The device acts on bladder function as well, and is an attractive option in the treatment of dual bladder and bowel dysfunction.

This treatment involves two day-case procedures. The first is an evaluatory phase that involves using a hollow needle to intubate the S3 foramen and then passing a wire through it before removing the needle. The wires are then attached to a stimulator worn on a belt. The wires are removed approximately 2 weeks later. A continence diary is kept by the patient both on and off test. A significant improvement in continence is achieved in around 80–90% of cases. Meta-analyses of studies indicate that an average weekly incontinence rate of 15 episodes is reduced to around 2.5, which is approximately a 75% improvement ( $P < 0.0001$ ) (Edden & Wexner

2009). If the efficacy of the nerve stimulator is proven, then the procedure may be repeated with the insertion of a permanent device under the skin. The patient is provided with a remote programmer to alternate between settings to ensure that the maximum effect is produced. Thus, an effective surgical solution that improves both continence and quality of life is achievable through day-case surgery and without the need to resort to more invasive procedures.

### **Constipation**

Constipation is as common a condition as incontinence and can be equally distressing. The cost to the economy in terms of laxative requirement is huge (BBC News 2001). It is important to distinguish patients whose colonic transit may be slow, i.e. those who suffer from true constipation, from those who simply cannot expel a stool once it has reached the pelvis, i.e. those who have obstructive defecation syndrome (ODS). The sensation of incomplete evacuation, excessive straining and the requirement to digitize, i.e. to use a finger to help with stool expulsion, is characteristic of the latter.

#### *Obstructive defecation syndrome*

Ineffective expulsion of stool has two causes. The anatomy of the rectum may distort with straining, creating abnormal pockets that act as a barrier to emptying, which is a mechanical or anatomical deformity. Alternatively, the barrier may be a result of pelvic floor muscle incoordination, which can cause the muscles to contract instead of relaxing and thus create a functional obstruction. This is an important distinction because physiotherapy is the optimum treatment for pelvic floor dyssynergy, whereas anatomical deformity is best corrected surgically. Even if anatomical deformity is suspected, physiotherapy is frequently the first-line treatment in cases of ODS since many patients have a combination of functional and mechanical components to their disorder: improving the former may be enough to achieve satisfactory performance without ever having to resort to surgery.

When non-surgical treatments have been exhausted, then careful assessment is mandatory. It is essential to use dynamic radiology to characterize a patient's anatomical configuration during straining (Fig. 2).

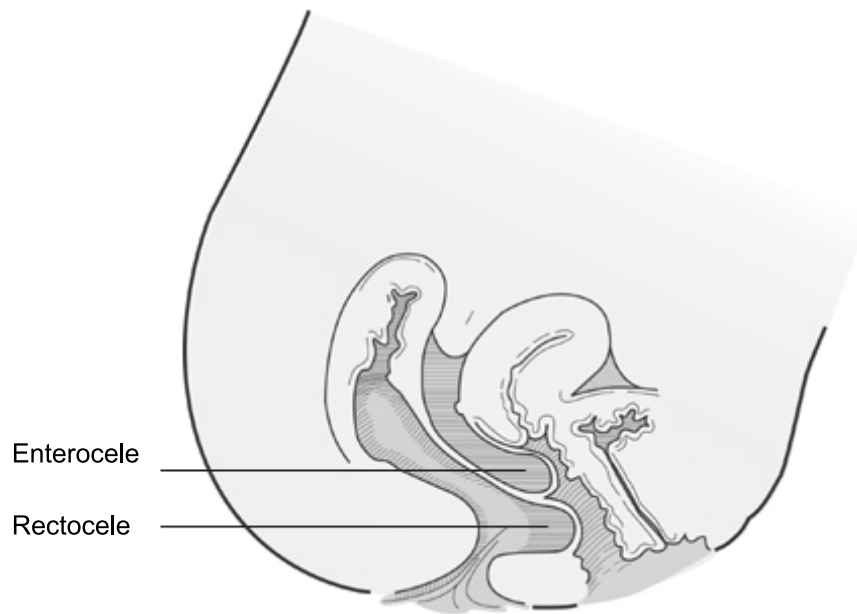
Stapled transanal rectal resection (STARR) is the treatment of choice for patients with ODS in whom a rectocele and rectal intussusception can



**Figure 2.** X-ray image (defecating proctogram) of the anatomical configuration during straining to pass stool.

be demonstrated to be causing a blockage (Lehur *et al.* 2008; Hetzer & Senagore 2009; for more information, see [www.starrinfo.com](http://www.starrinfo.com)). In this procedure, a staple gun is used to resect full-thickness segments of the anterior and then the posterior rectum. The result is a less-capacious rectum with the obstructive deformity removed. The operation has recently been modified by the use of a circular stapler, which allows more of the rectum to be removed (trans-STARR) and may be preferable to the standard double-stapled resection in individuals with a higher grade of intussusception (Renzi *et al.* 2008; Lenisa *et al.* 2009). The feeling of urgency is common after such surgery, but this is generally short-lived: the patient quickly becomes used to the new dynamics of her bottom.

When an enterocele is diagnosed as the cause of ineffective rectal evacuation, the STARR procedure is contraindicated on two grounds (Lehur *et al.* 2008). First, the repair of a rectocele in the presence of an enterocele is unlikely to achieve satisfactory rectal emptying (Fig. 3). Secondly, the small bowel could potentially be damaged through inadvertent entrapment in the housing of the staple gun entering an enterocele. In the present author's unit, surgical correction of an enterocele responsible for ODS is achieved with laparoscopic anterior mesh rectopexy in preference to a transvaginal approach. The rectovaginal septum is dissected down to the perineal body and then recreated by sandwiching a segment of Prolene mesh sutured so as to re-oppose the two structures. The mesh is then anchored to the sacral promontory using a staple gun and then the peritoneum is closed over the repair



**Figure 3.** Relationship of an enterocele and a rectocele in the rectovaginal septum.

with a running stitch. Patients require only one or two nights in hospital following the surgery, and functional recovery is swift since the posterior rectal dissection involved in a traditional rectopexy is avoided.

### Rectal bleeding

Rectal bleeding is commonly encountered in patients with pelvic floor dysfunction. Although the problem is most frequently caused by benign diseases such as fissures or haemorrhoids, the clinician must be alert to any symptom pattern that may be suggestive of a more serious underlying pathology. 'Red flag' symptoms that may suggest bowel cancer, especially those present in individuals over 65 years of age, include one or more combinations of the following (ACPGBI 2007):

- a change in bowel habit with an emphasis on increased frequency of defecation;
- rectal bleeding;
- an iron deficiency (anaemia); and
- a palpable abdominal mass.

Investigation, usually involving endoscopy, is advised if there is any doubt. Bowel cancer is stage-dependent (Ness *et al.* 1999) and a delayed diagnosis will have an adverse effect on outcome.

The main treatment for colorectal cancer is surgery. The resection of the affected bowel must encompass lymph gland removal in the same way that breast cancer necessitates axillary dissection (Mitchell *et al.* 2009). Since the lym-

phatics follow the arterial supply, the vascular pedicle usually requires ligation and removal with the specimen. The wedge of intestine must then be removed along with its blood supply. If an anastomosis is to be fashioned, then the colon must be mobilized and freed from its attachments in order to enable apposition of the separated ends. Large incisions during open surgery are required if these objectives are to be met and patient recovery is slow.

Keyhole surgery enables intracorporeal vessel ligation and bowel mobilization, and only the smallest of incisions is required to retrieve the specimen. Patient recovery is swift: the stay in hospital is reduced from around 12 days to approximately 3 ([www.bristolsurgery.com](http://www.bristolsurgery.com)). Now that the safety of laparoscopic surgery has been confirmed in terms of both morbidity and mortality, and oncological clearance (Laurent *et al.* 2009), it is set to become the gold standard in the surgical treatment of bowel cancer.

### Haemorrhoids

When other pathologies of the bowel have been excluded, haemorrhoids are often found to be a cause of rectal bleeding in adults. Haemorrhoids, or piles, are cushions of blood vessels that originate at the junction of bowel and skin in the upper anal canal (BHC 2009a). If these become engorged, then they may prolapse and become painful.

Minor blood loss may require nothing other than dietary and toileting advice (BHC 2009b), but if bleeding and prolapse become sufficiently



bothersome, then surgery may be required. Treatments that tackle the problem at source, i.e. above the dentate line, are much less painful since that part of the bowel is only sensitive to distention. For example, band therapy can be performed in the outpatient setting. In contrast, surgical excision that traumatizes the anal skin is much more painful since there is profuse sensory innervation in this area ([www.hemorrhoid.net/anatomy.php](http://www.hemorrhoid.net/anatomy.php)). Therefore, modern haemorrhoid therapies are usually directed internally.

Doppler-guided haemorrhoidectomy is a new technique that exploits this anatomical property (BHC 2009c; Conaghan & Farouk 2009). In this procedure, a proctoscope connected to a Doppler machine is used to identify the arterial inflow. A suture placed through the lumen of the scope ligates the vessel and the haemorrhoids subsequently shrink. Doppler-guided haemorrhoidectomy is relatively painless and can be performed on a day-case basis. It achieves approximately an 80% long-term cure in appropriately selected individuals. The procedure can be repeated if necessary.

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*Andrew Clarke qualified in 1988 from Manchester University and has worked in most of the major units in the North West. He developed an interest in pelvic floor surgery after being awarded a fellowship to work in America during his training.*

*Andrew was a consultant and honorary senior lecturer at Manchester Royal Infirmary for 3*

*years before moving to Poole in 2004. He was a member of a pelvic floor group developing a tertiary referral unit for the North West.*

*Currently, Andrew's National Health Service practice is based in Poole, and he has private practices at the Harbour Hospital, Poole, and the Bournemouth Nuffield Hospital. He is a member of the Association of Coloproctology of Great Britain and Ireland, and the Association of Laparoscopic Surgeons.*

*His website can be found at: [www.mrandrew-clarke.co.uk](http://www.mrandrew-clarke.co.uk)*