Recent developments in the treatment of faecal incontinence

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Many patients with faecal incontinence can be cured using a simple anal sphincter repair. Some patients are unsuitable for this either because the sphincter is absent, too extensively damaged or anal sphincter repair has failed. In these patients novel treatments have been introduced to augment, replace and stimulate the anal sphincter.

The majority of patients with faecal incontinence resulting from simple defects of the external sphincter will gain a satisfactory result from an overlapping sphincter repair (70–80%) (Christiansen and Pedersen, 1987). If the sphincter defect is associated with a pudendal neuropathy, satisfactory results decrease to less than 50%. The results of anal sphincter repair deteriorate with time and results of repeat repairs following anal sphincter repair failure are poor.

New methods have been developed in recent years for treating patients with faecal incontinence who are either unsuitable for or have failed with traditional treatments such as sphincter repair, biofeedback and drug therapy. Some of these new treatments have arisen from experience of the treatment of urinary incontinence.

Some groups of patients are unsuitable for traditional sphincter repair. These include those with isolated internal sphincter defects, those with normal sphincter structure but a neurological defect (e.g. spinal cord injury, pudendal neuropathy), those with weak but intact sphincters, those with idiopathic incontinence and those with an absence of sphincters either congenital or following surgical removal.

ANATOMICALLY INTACT, FUNCTIONALLY POOR ANAL SPHINCTERS

Patients with idiopathic faecal incontinence have this as a result of progressive degeneration of anal musculature with subsequent weakness of the internal anal sphincter and/or weakness of the external anal sphincter.

Post-anal repair

The traditional treatment for this group of patients has been by post-anal repair. The short-term results of this surgical treatment are good with 83% improvement, but in the long-term this declines to 28% and continence levels are less than 21% (Engel et al, 1994). Overall the results are no better than physiotherapy alone. Internal anal sphincter plication has been added to post-anal repair but imparts no benefit (Deen et al, 1995). The addition of anterior sphincter repair and/or levatorplasty (total pelvic floor reconstruction) may improve results (Deen et al, 1993).

Sacral nerve stimulation

An alternative treatment for weak but intact sphincters, particularly in patients with evidence of pudendal nerve damage, is sacral nerve stimulation. This technique has been in use in urinary incontinence for 20 years and has been tried in patients with faecal incontinence. Initially a trial is undertaken with a temporary nerve stimulator. This stimulator uses percutaneous electrodes placed through one of the sacral foramina, usually S3. This is used for several days and if there is a significant improvement in continence a permanent stimulator can be implanted. The stimulator is implanted in the anterior abdominal wall and the leads from the electrodes are tunnelled subcutaneously from the sacrum to the stimulator. Matzel et al (1995) reported a study involving a small series of patients, which showed an improvement in continence and external anal sphincter pressures. A clinical trial of this technique is now underway at St Mark's Hospital in Harrow.

THE IRREPARABLY DAMAGED ANAL SPHINCTER

These patients fall into two main groups. The first of these is those with isolated internal sphincter damage leading to passive inconti-

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nence and the second group are those who have complete disruption of the sphincter and are either unsuitable for or who have had failed sphincter repairs.

Isolated internal sphincter defects

There are a number of reports describing the use of various materials for augmentation of the internal sphincter. This technique was first introduced in urinary incontinence, with injection of the urinary sphincter with collagen. The technique was first reported in anal incontinence by Kumar et al (1998). In this series glutaraldehyde cross-linked collagen was injected submucosally into the anal canal to create adequate symmetrical anal cushions. Seventeen patients with surgically incorrectable faecal incontinence as a result of internal anal sphincter dysfunction were thus treated. The treatment was well tolerated and 11 of 17 patients showed marked symptomatic improvement, a further 3 patients showed some improvement and the rest were symptomatically unchanged. An injectable silicon biomaterial has been used with good results in a small series of patients (5 out of 6 patients showing significant improvement) (Kenefick et al, 2001).

A second study using carbon-coated Duraspheres, also injected into the anal canal, reported poorer results with less than half of those studied (4 of 11 patients) showing improvement in continence; in only 3 patients was this improvement sustained (Davis et al, 2001).

The disrupted anal sphincter

Some patients have disrupted anal sphincters that are unsuitable for or have already failed anal sphincter repair. A second group of patients have either had the sphincter removed or have congenital defects that are unsuitable for anal sphincter repair. Sphincter reconstruction either using native muscle (gracilis from the thigh) or a completely artificial anal sphincter has been used to salvage continence in these patients.

Dynamic graciloplasty: Graciloplasty is not a new technique, having originally been introduced in 1952 (Pickrell et al, 1956). The conventional operation failed as the gracilis muscle, which is transposed from the thigh to encircle the anus, naturally contains type II fatigue prone muscle fibres, which are unable to maintain sustained contraction.

The addition by Baeten et al (1995) of an electrical stimulator (identical to that used for sacral nerve stimulation — Interstim Medtronic, Minneapolis) led to a transformation of the type II muscle fibres to type I muscle fibres that resist fatigue and can produce sustained contraction. The technique, which is now known as dynamic graciloplasty, consists of transposition of the gracilis muscle from the thigh via subcutaneous tunnel to encircle the anal canal. The nerve and vascular supply to the muscle is carefully maintained, the electrodes are placed on or adjacent to the nerve supply. The stimulator is placed in the abdominal wall subcutaneously. The device can be programmed remotely and activated and deactivated using a handheld device. Satisfactory continence has been reported in 50–70% of patients who have been treated with this technique (Devesa et al, 1997; Christiansen et al, 1998). Cavina (1996) has reported results with the use of dynamic graciloplasty in 81 patients undergoing abdominoperineal resection for rectal cancer — continence is achieved in 90% of patients but serious complications occurred in 37% of the group.

Artificial anal sphincters: The artificial anal sphincter developed from work with artificial urinary sphincters and indeed the first devices implanted were urinary devices. The size and pressure profile of these urinary artificial sphincters was not ideally suited to the anal canal and a number of devices were removed as they had eroded into the anal canal. American Medical Systems subsequently developed a device specifically for use in anal incontinence. This device is shown in *Figure 1*.

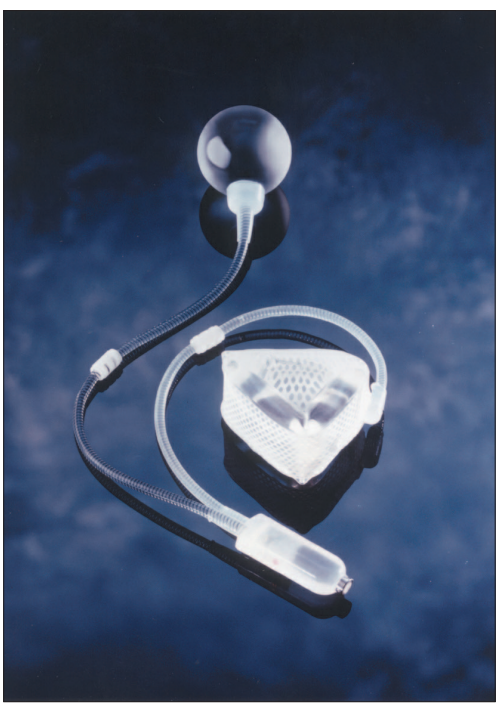
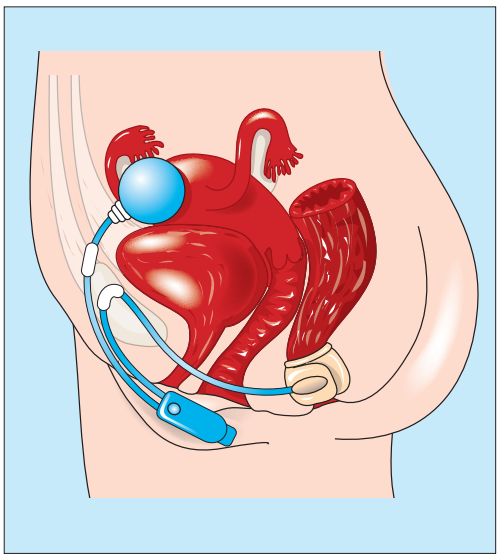


Figure 1. Acticon artificial sphincter.

The device consists of a cuff that is wrapped around the anal canal, which can be inflated with water. The device has a reservoir containing water and a chamber that can be pumped to empty the cuff and allow defaecation. The cuff is placed subcutaneously around the anal canal and the tubing is passed through a subcutaneous tunnel to an incision in the abdominal wall. The tubing is then connected to the fluid reservoir and the valved pump. The reservoir is inserted through the rectus muscle to lie adjacent to the bladder. The valved pump is placed in either the labia or the scrotum. A diagrammatic representation of the device in place is shown in *Figure 2*. When activated the device has the anal cuff closed until it is pumped empty using the valved pump. The cuff will then refill automatically over 4–5 minutes.

Satisfactory continence can be achieved with this device in up to 75% of patients (Lehur et al, 1996; Wong et al, 1996). The principal reasons for failure and explantation are infection and mechanical malfunction.

Figure 2. Diagram of artificial sphincter in situ.



CONCLUSION

The improvements in anal sphincter imaging and physiology have led to a much greater understanding of the mechanisms of faecal incontinence and with this new knowledge techniques have been developed to help patients avoid permanent colostomies. A number of these techniques are still in their development phase and are only available in specialist centres but they offer considerable promise for patients with the socially ostracising condition of faecal incontinence. HM

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Conflict of interest: none.

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KEY POINTS

- Overlapping anal sphincter repair works in 70–80% of cases.
- The long-term results of post-anal repair for idiopathic incontinence are poor.
- Sacral nerve stimulation may offer a satisfactory alternative to post-anal repair.
- Passive incontinence resulting from internal anal sphincter dysfunction can be improved by injecting collagen or silicone locally.
- Dynamic graciloplasty and artificial anal sphincters can restore continence even when the anal sphincter is extensively damaged.