Current management of fistula-in-ano

Anal fistulae management is a balance of effective healing and the risk of incontinence from sphincter division. This review examines the heterogeneity in the literature of treatment options and the difficulties this presents for surgical training and decision making.

A fistula is an abnormal connection between two epithelial surfaces. Anal fistulae (fistula-in-ano) occur between the anus and perianal skin, often preceded by perianal sepsis from an infected anal gland. It is a common problem in UK practice, with Hospital Episode Statistics for 2011–12 reporting over 24 000 episodes relating to fissures and fistulas of the ano-rectal region (Health and Social Care Information Centre, 2012).

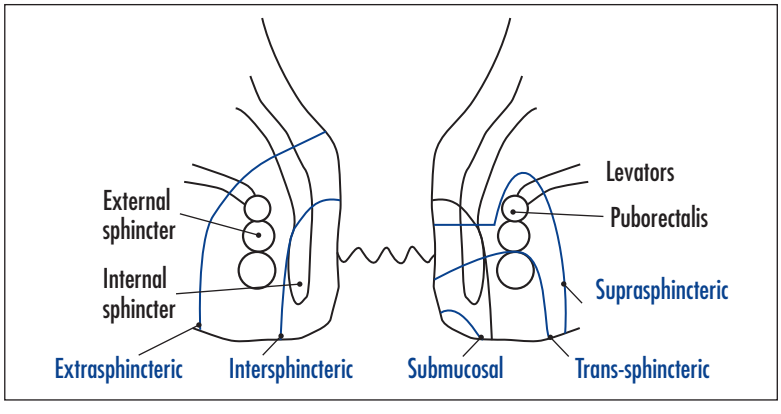
The literature lacks consensus in managing fistula-in-ano; a meta-analysis (Jacob et al, 2010) of surgical interventions for anorectal fistulas was unable to find enough high level evidence to recommend the best treatment option. This review looks at the current literature and comments upon the difficulties that this lack of evidence gives surgical trainees in their current and future practice.

Pathophysiology and anatomical considerations

The cryptoglandular theory hypothesizes that abscesses of anal glands positioned deep within sphincter muscles form fistulous tracts when the infected material takes a path of least resistance. While most fistulas are cryptoglandular, rarer aetiologies include iatrogenic injury, Crohn's disease and malignancy. Infection must be drained before the tract will heal, it can then be opened to heal by secondary intention or obliterated. The relation between the fistula and the anal sphincters must be appreciated when considering management options – these are classified as running intersphincteric, trans-sphincteric, suprasphincteric, extrasphincteric and submucosal (*Figure 1*).

The path of an idiopathic fistula (cryptoglandular) is usually determined by its relation to a transverse line imagined across the anus between three and nine o'clock with the patient in the lithotomy position; those anterior pass straight to an internal opening at the same point on the clock face, while those posterior horseshoe to a midline internal opening. This is known as Goodsall's rule (*Figure 2*).

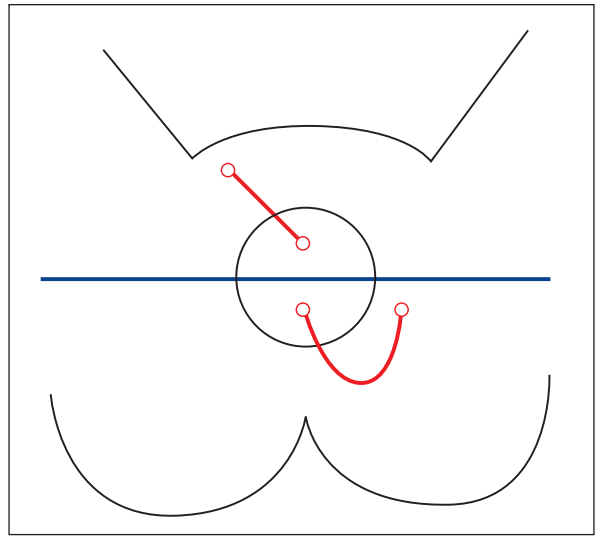
Figure 1. Classification of fistulous tracts.



The balance of healing and incontinence

When sphincters are divided there is a risk of incontinence, ranging from incontinence to flatus, liquid or solid stool. Operative management balances the chance of resolution against the risks of recurrence and incontinence. The choice of procedure involves the clinician's perception of these risks and patient priorities.

Figure 2. Goodsall's rule – fistulous tracts anterior to the transverse line have a radial tract, while those posterior horseshoe to the midline.



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The internal sphincter is most at risk (Sainio and Husa, 1985) with low resting pressures reported postoperatively, while voluntary squeeze pressures, indicative of external sphincter function, are less affected (Williams et al, 2007). Significant incontinence is risked with more than 30–50% division of the internal sphincter. Females have a shorter anal canal and risk obstetric-related sphincter injuries so caution is needed. The Association of Coloproctologists of Great Britain and Ireland recommend that in those who have risk factors for a previous, undetected sphincter injury (females, inflammatory bowel disease, irradiation and previous surgery) no more than 30% should be divided (Williams et al, 2007). Defining the length of the sphincter is difficult in practice; some use puborectalis as the upper limit, but determining a percentage is still subjective, even with preoperative imaging. Endo-anal ultrasound can be used intraoperatively, but the probe must be removed before any incision is made.

Varied definitions

High fistula classification differs across the literature, making it difficult to compare trial outcomes. Assessment methods are variable; clinical assessment risks interobserver variation, whereas radiological imaging is quantifiable and easier to standardize in trials. However, routine imaging is not always justifiable and may not be available for retrospective studies. As previously commented, the surgeon must still make a clinical judgement of length, even with imaging.

Parks and Stitz (1976) defined a high fistula as passing 'above the highest muscle of continence (the anorectal ring or puborectalis muscle)', while Marks and Ritchie (1977) define high fistulas as situated in the upper third of the anal canal, and those related to the anal crypts as low. The consensus statement by the Association of Coloproctologists of Great Britain and Ireland states that a high intersphincteric fistula 'passes deep to >50% of length of internal sphincter muscle' and a high transsphincteric fistula 'passes deep to >30% of external sphincter muscle' (Williams et al, 2007). This definition is similar to the American Society of Colon and Rectal Surgeons (Whiteford et al, 2005) with high trans-sphincteric, supra-sphincteric and extra-sphincteric defined as crossing >30–50% of the external anal sphincter.

Fistulae-in-ano are further defined by the American Society of Colon and Rectal Surgeons as 'complex' or 'simple'. Complex fistulas are high fistulas, or a fistula that is 'anterior in a female, has multiple tracks, is recurrent, or the patient has pre-existing incontinence, local irradiation, or Crohn's disease'. The Fistula-In-Ano Trial (FIAT) (International Standard Randomised Controlled Trial Number Register, 2009) defines a high transsphincteric fistula as 'involving greater than or equal to one third of the external anal sphincter muscle as assessed by clinical examination or radiological imaging'. The Cochrane meta-analysis (Jacob et al, 2010) analysed data using the definition of high as those passing through the levator ani and low as those that did not (*Figure 3*).

Aetiology

The assessment of an anal fistula includes history, examination and review of previous results such as microbiology of previous perianal abscesses. An obstetric history suggests potential subclinical sphincter injuries. Systemic diseases associated with anal fistulas such as Crohn's disease require quantification of the extent of the disease by colonoscopy. Sepsis must be drained and medical therapy instigated before definitive surgical intervention.

Investigations

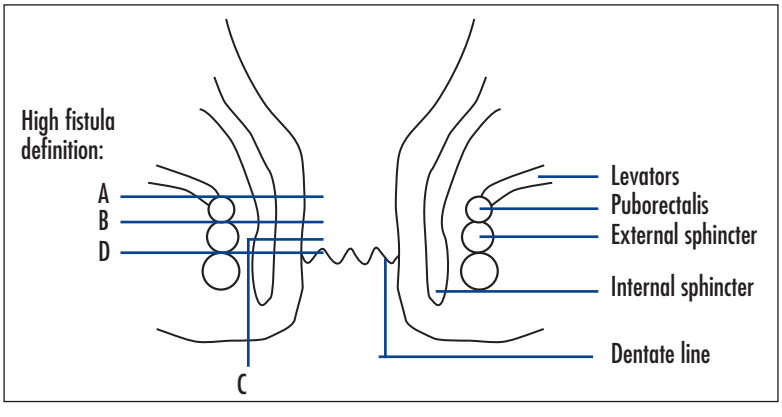
Endo-anal ultrasound, manometry and magnetic resonance imaging are used in high or complex fistulas or for suspected sphincter damage (Williams et al, 2007) and may help to define the fistula more than clinical assessment alone.

Management

Fistula treatments involve preserving or dividing sphincters. Fistulotomy lays open the fistula, dividing variable degrees of muscle. Fistulectomy 'cores out' the tract, increasing risk of sphincter damage (Williams et al, 2007). Sphincter-preserving techniques include a seton (a suture or elastic sling keeping the tract open and draining sepsis), advancement flap (mobilizing a flap of tissue to cover the internal opening), collagen plug, fibrin glue, or ligating the tract passing between the sphincters. In complex cases faeces can be diverted with a stoma. With poor sphincter function a preserving technique is preferable.

Evidence is scant in the literature leading to a lack of consensus as to best treatment. Jacob et al (2010) identified ten randomized controlled trials and eighteen non-randomized studies in their meta-analysis regarding surgical interventions for cryptoglandular fistulas, but could not conclude which method had the best outcome.

Figure 3. Varied definitions of high fistulas. A. Above puborectalis or through levators (Parks and Stitz, 1976; Jacob et al, 2010). B. Upper third of anal canal (Marks and Ritchie, 1977). C. High inter-sphincteric > 50% internal sphincter (Williams et al, 2007). D. High trans-sphincteric >30% external sphincter (Whiteford et al, 2005; Williams et al, 2007; International Standard Randomised Controlled Trial Number Register, 2009).



Recurrence was the primary outcome, with secondary outcomes of incontinence and quality of life. Some studies were not adequately powered and included patients with underlying disease processes such as Crohn's disease which affect outcome. Other methods were assessed which are not common or are unlicensed in the UK, such as radiofrequency ablation and chemical setons, so are not applicable to current practice.

Drainage of peri-anal sepsis and concurrent fistula treatment

A meta-analysis by Malik et al (2010) examined the initial treatment of perianal sepsis, and treating a fistula concurrently. Six randomized trials compared incising and draining an abscess, with simultaneous performance of a fistulotomy or fistulectomy. Primary outcomes were recurrence and incontinence. Some divided the sphincter muscle radically or included complex and high fistulas. The meta-analysis found less recurrence when the fistula was found at the index episode of sepsis, but varying degrees of incontinence dependent on the anatomy of the fistula and method of treatment. This variation in incontinence rates is felt most likely to be the result of variable sphincter involvement and treatment techniques, with only one study using manometry to provide objective quantitative data. It was concluded that definitive treatment of low fistulas at the initial operation reduced recurrence without significantly increasing incontinence. However, identifying a fistula associated with an abscess requires experience; a retrospective study of 147 patients (Malik et al, 2011) found that consultants were significantly better at identifying and treating fistulas in this situation than trainees. The priority when managing a perianal abscess must remain to drain sepsis, an inexperienced trainee could risk creating a false passage. The Association of Coloproctologists of Great Britain and Ireland (Williams et al, 2007) advises primary treatment solely for low intersphincteric or sub-mucosal fistulas.

Fistulotomy and fistulectomy

Fistulotomy may improve healing (Kronborg, 1985) but the amount of sphincter muscle cut affects continence. This randomized controlled trial comparing fistulotomy to fistulectomy in a small sample by Kronborg (1985) demonstrated that healing was significantly quicker for fistulotomy, while recurrence was similar at 1 year. The American Society of Colon and Rectal Surgeons guidelines (Whiteford et al, 2005) quote recurrence and incontinence rates from old retrospective studies with 2–9% recurrence after fistulotomy, and incontinence risk 0–17%.

Setons

Setons can be a definitive treatment or can be used to drain sepsis before another treatment and can be combined with a fistulotomy of the extra-sphincteric track. Some studies cut the internal sphincter at the time of seton placement (Parks and Stitz, 1976), or perform a fistulotomy later when the fistula tract is low. The Association of Coloproctologists of Great Britain and Ireland (Williams et al, 2007) cites the results of several small, single centre retrospective reviews of high fistulas treated by seton. However, all divided the internal sphincter or were a subgroup of a larger study including patients with Crohn's disease. The meta-analysis by Jacob et al (2010) found only a comparative study. This compared a cutting seton and a modified technique using a mucosal flap to repair the internal sphincter before creating an intersphincteric tract.

Using a loose seton combined with internal sphincter division is described by Parks and Stitz (1976) and Vasilevsky and Gordon (1984). Recurrence ranges from 16–80% and incontinence up to 22%. The aggressive division used by Parks and Stitz resulted in lower recurrence rates but higher rates of incontinence, while a staged conservative approach by Vasilevsky and Gordon (1984) resulted in less incontinence. Tight (cutting) setons are used less commonly. The Association of Coloproctologists of Great Britain and Ireland (Williams et al, 2007) cite recurrence risk as 0–18% and major incontinence 0–43%, while minor incontinence was up to 100% in one study. The range of incontinence rates reported is likely the result of the variety of materials used and the method or frequency of tightening. Setons can be combined with caustic alkaline solutions which cut through the tissue. These are traditional in Indian practice, but are unlicensed in the UK (Williams et al, 2007).

Simple closure

Simple closure of the internal opening of a fistula appears unsuccessful from the low levels of evidence. A retrospective single centre review by Thomson and Fowler (2004) of 40 patients found a 41% failure rate, mostly within 5 months; 81% of those treated successfully reported a 'normal' continence but were not formally assessed. A prospective single centre observational study by Athanasiadis et al (2004) found 18% recurrence, mainly from suture dehiscence. The technique is not mentioned by the American Society of Colon and Rectal Surgeons (Whiteford et al, 2005) or Association of Coloproctologists of Great Britain and Ireland (Williams et al, 2007).

Advancement flap

Closure of the internal fistula opening using a flap of anal mucosa or perianal skin is recommended by Williams et al (2007) when a fistulotomy would cause incontinence. Failure rates were increased for those who had had previous repairs, but not other aetiologies (Ozuner et al, 1996). Minor incontinence is reported up to 31% and recurrence up to 45% (Williams et al, 2007), likely because the thickness of the flap incorporated some internal sphincter fibres. A randomized controlled trial by Ortiz et al (2009) comparing collagen plugs with advance-

ment flaps was stopped early because there was 80% recurrence in the plug group, and only 13% for the flap (continence was not measured). The technique involved a 'full fistulectomy' before the flap, demonstrating the heterogeneity of trial data particularly with regard to techniques.

Ligation intersphincteric fistula tract

Ligation intersphincteric fistula tract is a new technique, which is not addressed in either consensus statement (Whiteford et al, 2005; Williams et al, 2007) and has no randomized controlled trial or meta-analysis. Short term, single centre reviews show recurrence or non-healing rates of up to 43% (Bleier et al, 2010) with little reported regarding incontinence. Inclusion criteria varies and long-term follow-up results are not yet published. A retrospective review and follow-up questionnaire of 93 patients undergoing ligation intersphincteric fistula tract (Wallin et al, 2012) for cryptoglandular fistulae found a failure rate of 60% at 19-week median follow up. There was no reported incontinence when assessed with a postoperative Wexner score. The studies demonstrate varied techniques and inclusion criteria; some close the internal opening, and some perform a partial sphincterotomy resulting in further data heterogeneity.

Fibrin glue and collagen plugs

Obliterating the tract by activating the clotting cascade and subsequently healing by fibroblasts (Whiteford et al, 2005) can be achieved with fibrin glue or collagen plugs. Infection must be resolved, often by seton. Fibrin glue can be used for any fistula (Williams et al, 2007) with no effect on continence, but a high risk of recurrence. Success varies from 14–60% (Whiteford et al, 2005). One randomized controlled trial of 42 patients comparing fibrin glue to fistulotomy (Lindsey et al, 2002) showed significant improvement in simple fistula healing, but complex fistulas were more likely to heal with fibrin glue than fistulotomy. Failure was 58% overall for fibrin glue at 12 weeks, with no differences in continence.

A systematic review (Hammond et al, 2004) found 16 studies, including two randomized controlled trials (one not included in the Cochrane review of 2010 by Jacob et al), with varied recurrence rates of 0–100%, no reported incontinence, and median follow up of 28 weeks. Outcome variation is likely to reflect the varied methods and inclusion criteria. The meta-analysis (Jacob et al, 2010) did not discuss collagen plugs, and Williams et al (2007) states insufficient evidence for efficacy. A randomized controlled trial comparing collagen plugs to advancement flaps stopped early as a result of an 80% recurrence rate at 1 year in the plug group (Ortiz et al, 2009), while a small retrospective review found a 76% success rate at 1 year (Ellis et al, 2010). Some patients in this study with clinical resolution were assessed radiologically, with 25% showing a fistula or residual fluid, raising the potential of late recurrence. A UK multicentre randomized control Fistula-In-Ano Trial (FIAT) is ongoing (International Standard Randomised Controlled Trial Number Register, 2009). This will compare outcomes (quality of life as assessed by faecal incontinence score) of the fistula plug *vs* advancement flap, fistulotomy or cutting seton as decided by the surgeon for high transsphincteric fistulas. As the primary outcome is quality of life, rather than recurrence and incontinence, comparison to other studies is restricted.

Current practice

Reviews of the practice of European units in the literature suggest the vast majority of patients have anal fistulas secondary to cryptoglandular disease, while the remainder are usually the result of inflammatory bowel disease (Sileri et al, 2011). The majority of cryptoglandular fistulas were treated with fistulotomy, while complex Crohn's fistulas often required setons. Complex fistulas were more likely to require repeat surgery (Sileri et al, 2011) including advancement flaps and ligation of intersphincteric tract.

Training issues

Anal fistulas form an index operation for colorectal trainees. However, the variety of treatment methods and lack of consensus make this difficult for trainee surgeons. A large proportion of colorectal work in the UK is the diagnosis or exclusion of malignancy, thus experience of benign proctology can be limited for trainees. Requirements to complete training have now been specified for UK trainees (Royal College of Surgeons of England, 2010; Joint Committee on Surgical Training, 2014).

Current training differs significantly from that of the older consultant cohort, impacted by changes to working hours and the organization of training. Logbook numbers have been affected, and in the UK significant proportions of fistula-in-ano procedures are performed by consultants (Malik et al, 2011). Considering that the management and assessment of fistulas is not straightforward, nor is there one best solution guided by evidence, fistula management remains a difficult area for the trainee and consultant alike.

Conclusions

While most fistulae-in-ano can be managed simply there are many procedures available. The heterogeneity of definition, aetiology and method of assessment makes evidence difficult to interpret for evidence-based management. Future consultants are limited by both available experience and a lack of clarity as to best management which could impact upon future practice. By standardizing definitions and methods of assessment comparative outcomes could be achieved. **BJHM**

Conflict of interest: none.

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KEY POINTS

- Fistulae-in-ano comprise an important element of benign coloproctology.
- Evidence is variable in nature, including definitions, inclusion criteria and outcome assessment.
- New techniques continue to be described, with limited evidence for long-term outcomes.
- The complex and varied nature of fistula-in-ano management is difficult to condense into the limited timescale of surgical training.