Anal fistulae: an ancient problem; a challenge today

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Fistula-in-ano (anal fistula) is a common proctological condition that has been recognised since ancient times. Symptomatic treatment and infection control are relatively straightforward, but surgical treatment has variable outcomes. This article describes the anatomy, classification and treatment options for men with this common but potentially embarrassing condition.

A fistula is an abnormal communication between two epithelial surfaces. A fistula-in-ano is a ‘tunnel’ or ‘tract-like’ communication between the perianal skin (external opening) and anorectal canal (internal opening) (see Figure 1).

History
Treatment of fistula-in-ano can be traced back to Hippocrates. Horse hair sutures were inserted into fistulae and tightened intermittently. This facilitated slow cutting of the fistula through the sphincter, creating a trail of fibrosis, thus maintaining sphincter integrity.

The medieval ‘Treatises of Fistulae’ by John of Ardene (1307–92) describes the use of sutures (setons) to treat complex fistulae. Although more modern materials are currently used for setons, treatment strategy remains the same.

More recently, techniques using novel approaches have been described, with variable rates of success.

What is the extent of the problem in men?
The true prevalence of anal fistulae is not known. The mean incidence of fistula-in-ano was reported as 12.3/100,000 in men, with male to female ratio of 1.8:1. In England, 2017–8 hospital admission data recorded 11,719 cases for fistula-in-ano treatment (68% male, 32% female). The exact reasons as to why males are more commonly afflicted are unknown, but increased testosterone, differential sweat gland activity or coarser hair types may play a role.

Clinical presentation
Most patients present at age 20–60 years (mean age 40 years in both sexes). Fistulae-in-ano in children is infrequent. However, small series describing fistulae in children have been reported, again with male predominance. The common clinical presentations of fistula-in-ano are shown in Box 1.

Anatomy and diagnostic issues
The anal canal extends from the anorectal junction to the anal verge. Embryologically it is made up of both endoderm and ectoderm, separated by the dentate line. The anal sphincter is described as two concentric cylinders made up of the internal and external sphincters. The internal
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sphincter contributes about 85% of resting anal tone, with longitudinal muscle fibres. The transverse external sphincter fibres contribute the remaining resting tone but mainly supply voluntary control.

The external anal sphincter is longer in males than females and is also longer posteriorly than anteriorly in both sexes. It is important to be aware of this when planning treatment. Men have the good fortune to be unaffected by obstetric issues involving the anal sphincter complex, but may suffer sphincter trauma from accidents, assault or anoreceptive intercourse.

Successful identification of the anatomy of a fistula-in-ano is essential but can help surgeons in locating the course of a fistula (see Figure 2).

Magnetic resonance imaging (MRI) (see Figure 3) and endoanal ultrasound (EUS) (see Figure 4) are useful imaging techniques for defining fistula anatomy. Both imaging modalities negate the need for ionising radiation imaging. While EUS is user dependent and has a limited field of view, it is cheaper than MRI. However, MRI is considered the gold standard due to its high quality imaging of the complete anatomy of the anorectum and surrounding soft tissue.

Box 1. Common clinical presentations and symptoms of fistula-in-ano

<table>
<thead>
<tr>
<th>Clinical presentation</th>
<th>Patient symptoms</th>
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</thead>
<tbody>
<tr>
<td>● Perianal abscess</td>
<td>● Anal or perianal bleeding</td>
</tr>
<tr>
<td>● Perianal cellulitis</td>
<td>● Anal or perianal discharge</td>
</tr>
<tr>
<td>● Perianal discharging lesion or opening</td>
<td>● Anal pain</td>
</tr>
<tr>
<td>● Visible perianal pit</td>
<td>● Fever</td>
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Pathophysiology of fistulae-in-ano

The majority of anal fistulae are idiopathic in aetiology. However, there are a minority that have an identifiable underlying cause (see Box 2) towards which treatment may need to be directed.

The cryptoglandular theory has been proposed to account for the ‘idiopathic’ fistulae. Infection is thought to originate either in the anal glands of the perianal skin (for superficial fistulae) or glands in the intersphincteric space (for fistulae crossing the internal or external sphincters). As infection builds in the confined structure of the anal gland it may perforate in different directions and thus develop into a fistula.

Classification of fistula-in-ano

The most widely accepted classification system is that of Parks (see Figure 1 and Table 1). Park’s classification does not include the most common type of fistula – the superficial type that runs from the perianal skin to anal mucosa without involving the sphincter complex. However, classification systems have additional use for more complex fistulae where treatment may be challenging.

Primary care management

A fistula-in-ano should be considered in a patient presenting with acute or recurrent perianal abscesses, sepsis or discharge. A patient’s history of previous perianal sepsis, surgery, radiotherapy or trauma should be explored. The patient or their family’s history of inflammatory bowel disease should also be assessed.

Figure 2. Goodsall’s rule

Figure 3. MRI imaging demonstrating low-lying transphincteric fistula-in-ano (arrowed). Left = T2-weighted axial view; right = T2-weighted sagittal view. Patient consent obtained
Examination of the abdomen is often unremarkable, but it is important to exclude important pathological intrabdominal signs. Examination of the ano-perineal skin is important to assess for external sinus openings, pits, induration, ulceration, scars or abnormal granulation tissue. Documentation of these findings in relation to the anal verge is made using a clock face system to communicate description, with 12 o’clock being anatomically anterior toward the perineal body and 6 o’clock posterior toward the coccyx.

Digital ano-rectal examination should be performed, if possible, and may demonstrate either a palpable tract or area of induration from the external skin abnormality toward the anal canal, indicating the possible location for the internal opening. Alternatively, palpation of a fluctuant or boggy swelling within the anal canal may indicate ongoing undrained sepsis.

Control of sepsis is the crucial first step in treatment. Acute sepsis or signs of a collection (abscess) should be treated with antibiotics and either admission or urgent referral for surgical drainage. Chronic recurring problems should be referred to the surgical outpatient clinic for strategic evaluation and management to prevent recurrence.

**Secondary and tertiary care surgical procedures**

Most superficial fistulae can be laid open (see ‘Fistulotomy’ section below). Low intersphincteric fistulae can be also laid open, providing:

- The fistula does not extend above the dentate line;
- The fistula is not in the midline;
- The patient has normal continence preoperatively and has consented for a 10% risk of incontinence to flatus and 1% risk of incontinence to faeces.

The treatment of higher intersphincteric and most transphincteric fistulae is more debatable. Many procedures have been described to attempt to treat these fistulae-in-ano, with none accepted as gold standard. The desired outcomes of management are summarised in Box 3.

Surgeons must take into account the anatomy of the fistulae, proportion of sphincter complex involved, a patient’s pre-existing level of continence, and whether underlying disease is present (see Box 2) before embarking on treatment.

In summary, more conservative approaches have better rates of continence preservation but a higher fistula recurrence rate; while more aggressive surgical approaches are likely to eradicate the fistulae, but risk permanent impairment of continence.

**Traditional surgical approaches**

**Loose or ‘draining’ seton**

A stitch (seton) may be placed loosely through the fistula to ensure the fistula tract is kept open and draining,
### Box 2. Underlying pathology causing anal fistulae

| Inflammatory:  | Crohn’s disease |
|               | Pelvic radiotherapy |
|               | Hidradenitis suppurativa |
| Infectious:   | Fournier’s gangrene |
|               | Tuberculosis |
|               | Actinomycosis |
| Traumatic:    | Previous perianal/rectal surgery |
|               | Anal trauma |
| Malignant:    | Anal/rectal cancer |

- **Inflammatory:**
  - Crohn’s disease
  - Pelvic radiotherapy
  - Hidradenitis suppurativa

- **Infectious:**
  - Fournier’s gangrene
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  - Actinomycosis

- **Traumatic:**
  - Previous perianal/rectal surgery
  - Anal trauma

- **Malignant:**
  - Anal/rectal cancer

To prevent abscess recurrence. This is usually a short-term measure to allow time for treatment of sepsis, reduction in inflammation, radiological imaging and assessment of continence. A draining seton can be used as a bridge to definitive management, or in some circumstances (for example, a large transphincteric fistula in a patient with ongoing underlying active disease) can be used as a definitive measure long-term.

**Fistulotomy or ‘lay open of fistula’**
The fistula is laid-open and allowed to heal by secondary intention. This technique can be safely used for superficial fistulae as well as for some low-lying interphincteric and transphincteric fistulae.

Understanding that cutting through significant amounts of sphincter muscle with this technique will affect continence is paramount and should be undertaken with caution. As males tend to have a longer anal sphincter complex there is more scope to lay open a low intersphincteric or transphincteric fistula, while preserving faecal continence.

**Cutting seton**
The cutting seton has been accepted as a successful technique for fistulae for hundreds of years. It is commonly used to treat transphincteric fistulae, which are too high to lay open. Although a slower treatment, it serves to maintain patient continence. The seton stitch is placed and routinely tightened at intervals of 4–12 weeks. The seton works its way through, causing fibrosis of the fistula tract and avoids a sudden disruption of sphincter integrity. There is no gold standard seton material and individual surgeons will have their own preferences. The materials commonly used include nylon, Ethibond or rubber slings.

**Chemical seton**
This technique is fundamentally similar to a cutting seton, but a chemical caustic is added to a cotton-based seton to stimulate cutting and fibrosis of the fistula tract. It has been used for centuries, particularly in the East, but rarely in modern Western practice.

**Advancement flap**
This technique involves closure of the internal fistula opening by mobilising a flap of rectal wall, thereby converting the fistula into a sinus. The remaining sinus tract can then either be excised by fistulectomy or curetted. The defect heals while maintaining sphincter continence.

**Bioprosthetic plug**
A biosynthetic mesh plug is inserted into the fistula tract. The biological mesh is designed to stimulate regrowth of cells and fibrosis to close the fistula tract. This is a one-stop treatment with relatively minimal morbidity, but recurrence is reported in approximately 60% of cases.

### Box 3. Intended outcomes of fistula treatment

- Eradicating extant and preventing future perianal sepsis
- Anal fistula eradication
- Preservation of sphincter function and continence
- Prevention of recurrence

**Stomas**
In extreme cases, where sepsis has been difficult to control, a diverting temporary or permanent stoma may be appropriate. Usually, patients have complex fistula tracts, immunosuppression, continence impairment, a history of multiple procedures or a combination of the above.

**Newer techniques in fistula management**

**Ligation of intersphincteric fistula tract (LIFT)**
The LIFT procedure for the treatment of transphincteric fistulae-in-ano has recently become popular. The fistula tract is identified, dissected and exposed in the intersphincteric space. The fistula is then ligated, and the intersphincteric fistula segment excised with openings oversewn on either side to the internal and external sphincters. The remaining external tract is cleared using a curette or alternatively cored out. Although short-term results are excellent and the risk of incontinence appears significantly lower, long-term results have shown recurrence rates of 40%.

**Fibrin and collagen glue**
There are several biological glues on the market designed to be used to attempt to close fistulae. While there...
The sex of the patient, pre-existing continence and surgeon preference. Minimising the damage or disruption to the sphincter is critical to preserving continence and providing a successful outcome.

**Declaration of interests:** none declared.

**References**