Fistulotomy and Lay Open Technique

9

Philip Tozer and Robin K.S. Phillips

Introduction

Fistulotomy involves laying open a fistula tract and allowing the resultant wound to heal by secondary intention. A fistula fully laid open is very unlikely to recur, but in cases of higher tracts where a significant proportion of the external sphincter would be divided, and therefore (and more importantly) little functioning sphincter would be left intact, there is a risk of lack of bowel control. Patient selection, counselling and consent are key.

Few worry about fistulotomy for low anal fistulas (submucosal, intersphincteric and low transsphincteric); most decry the technique in higher fistulas and reach for sphincter preserving albeit much less successful methods. Yet published series of carefully selected higher fistulas treated by fistulotomy reveal considerable success with good patient satisfaction and surprisingly little disturbance in bowel control.

High quality evidence is lacking across the board in anal fistula management. A Cochrane review of anal fistula surgery identified few studies comparing methods of fistula surgery and fewer still high quality randomised controlled trials ($n = 10$), suggesting that there remains significant scope for further research in this area [1]. Studies represent a mixed bag of all sorts of fistulas, not standardised for aetiology, the presence of horseshoeing or secondary extensions and with varied ascertainment of healing and follow-up. Ortiz et al. [1] argue 1 year follow-up is enough. They found that all 18 recurrences following fistulotomy or advancement flap repair ($n = 115$ and 91, respectively) arose within 1 year. No additional recurrences arose during the remaining median 42 months follow-up. Yet there clearly are cases who re-present much later [22]—but how rare are they? Is 1 year follow-up without MRI validation of the endpoint really sufficient?

P. Tozer, M.B.B.S, M.D. (Res.), M.R.C.S., M.C.E.M.
R.K.S. Phillips, M.B.B.S., M.S., F.R.C.S. (✉)
St. Mark's Fistula Research Unit, St. Mark's Hospital, Watford Road, Harrow, London, UK HA1 3UJ
e-mail: robin.phillips@nhs.net

Addressing the Compromise

Patients with anal fistulas are faced with a dilemma: any procedure they choose will have either a higher failure rate or a higher risk of functional impairment. Sphincter preserving techniques offer a lower risk of functional impairment but the risk of recurrence is higher than for laying open.

The degree of impairment depends on a number of factors, only one of which is the amount of good quality contracting external sphincter left intact following fistulotomy. Determining what matters most to the patient depends on how the question is posed. The fistula already renders the patient technically 'incontinent', with inadvertent leakage of pus, added to which are smell, pain and concern lest the fistula strike again at some inconvenient time in the future (when on holiday, travelling and so on). Ellis [2] has asked patients the question one way and unsurprisingly has arrived at an answer preferring recurrence over minor functional disturbance. Like with a referendum, choice of wording is crucial; slightly altered wording can result in opposite answers.

What Is Incontinence?

The term 'incontinence' is a very bad and misleading term, covering as it does every eventuality from a minor stain in the underwear through inadvertent breaking of wind to stool running down the legs in public. On hearing the word, patients worry about the latter, when in fact the former is more likely. It is true that even minor flatus incontinence or mucus leakage may be abhorrent to some patients for personal, social or cultural reasons, but it is equally true that the word can be used in a bully's sense; to browbeat, unfairly win an argument or frighten into acquiescence.

H. Abcarian (ed.), *Anal Fistula: Principles and Management*, DOI 10.1007/978-1-4614-9014-2_9,
© Springer Science+Business Media New York 2014

The word 'incontinence' is probably best not used when talking with patients, having as it does images of horses and colostomy bags. But discussing potential inadvertent escape of wind or the odd 'skid mark' in the underwear is very important so that the patient can make a fair and informed choice. To do this, the surgeon must estimate the risk and extent of any impairment of continence which may occur based on the anatomy of the fistula tract to be laid open and on pre-existing bowel function and the presence or absence of irritable bowel syndrome (IBS).

Incontinence Scoring

Several scoring systems for assessing continence exist and can be used to assess and describe the degree of impairment of continence a patient experiences. The Wexner [3] and Vaizey [4] (Table 9.1) incontinence grading systems, which latter was based on the former and included three modifications, attempt to objectify patient experience of continence impairment. But the utility of such scores not only in counselling patients but also in reporting outcomes may be limited. For example, daily incontinence to flatus and daily incontinence to solid stool are valued with an equal weight. Inadvertently breaking wind and seeing the odd daily 'skid mark' in the underwear if coupled with wearing a protective lining would score 12/20 on the Wexner score, which according to the description might be accepted to be minor functional disturbance yet through looking at the number appears pretty significant. Even so, these incontinence scores are widely used in publications, reviewers demanding them. Misleading clinically as they may be, the scoring systems do permit statistical analysis of changes in incontinence score pre- and post-surgery, for example. But when talking to patients and even when publishing results, more descriptive language adds clarity.

The Anatomy of Incontinence

Historically, Milligan and Morgan suggested the anorectal ring was key to continence following fistulotomy, indicating as long as a complete ring of muscle is left intact 'all the anal sphincter muscles below this ring may be divided […] without harmful loss of control' [5]; but social niceties were likely different in those days. Impairment of continence following fistulotomy is well recognised and factors affecting this impairment are increasingly understood.

Whereas the external sphincter was once considered the more important in maintaining continence, we have argued recently that internal sphincter division, seen when even low fistulas are laid open, determines most functional disturbance after either high or low fistulotomy—except where Milligan and Morgan's anorectal ring is cut, when frank and devastating incontinence will result. Others dispute this [6, 7].

Our two studies examined incontinence following fistulotomy in patients who underwent either internal sphincterotomy for intersphincteric tracts or internal and external sphincterotomy for transsphincteric tracts and demonstrated a similar level of minor continence disturbance [8, 9]. In addition, anal manometry following sphincterotomy was performed in the Lunniss et al. study which found that while all patients undergoing fistulotomy had a reduced maximum resting anal tone, there was no difference in this reduction after division of both sphincters when compared with IAS division alone [9]. Division of the EAS did lower squeeze pressures in the lower canal whereas IAS division alone did not, but without functional consequence. Combining the manometric and clinical data suggests that IAS division, which reduced maximum resting anal tone, was associated with a minor impairment of continence, whereas additional division of the EAS reduced the voluntary squeeze pressure but did not influence functional outcome. Complete division of the EAS was not performed in any patients. Higher thresholds of anal electrosensitivity in the area of the divided anoderm were also noted.

Similar findings in 148 patients who underwent fistulotomy for intersphincteric fistulas (and therefore IAS division alone) were published by Toyanaga et al. in 2007. They found that resting tone and length of the high pressure zone were reduced following fistulotomy but voluntary contraction was not affected and of the 30 patients (21 %) who suffered impairment of continence, only four suffered a higher degree than flatus incontinence [10]. Likewise Chang et al. found similar manometric results in a study of 45 patients who underwent fistulotomy for intersphincteric tracts in whom resting pressures were reduced but voluntary squeeze was unaffected [11].

Table 9.1 Vaizey incontinence score [4]

	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
Alteration in lifestyle	0	1	2	3	4
				No	Yes
Need to wear a pad or plug				0	2
Taking constipating medicines				0	2
Lack of ability to defer defecation for 15 min				0	4

Further support for the idea that IAS division is the main factor leading to minor disturbance in bowel control after fistulotomy comes from Kennedy et al. who described a technique to preserve the EAS by encircling it with a seton after laying open the fistula through the IAS [12]. Despite a completely preserved EAS, at least a third of patients developed minor incontinence.

Internal sphincterotomy for other conditions, such as fissure, also disturbs continence. Bennett and Goligher in 1962 found that 34 % of 127 patients undergoing internal sphincterotomy for fissure suffered flatus incontinence, although this rate diminished with longer follow-up [13]. In another study published in 1989, Khubchandani et al. found impairment of continence in as many as 35 % of patients who had undergone sphincterotomy for fissure [14]. Refinements to the technique, including the position and length of the sphincterotomy as well as more careful selection (given effective medical alternatives), have seen incontinence rates falling in recent reports, but the association between IAS injury and minor incontinence remains clear.

In a study of patterns of incontinence after anal surgery (including sphincterotomy, fistulotomy and others), Lindsey et al. examined 93 patients with incontinence and considered the nature of their sphincteric injuries [15]. Ninety-eight percent of the patients had an IAS injury on endoanal ultrasound, whereas only a third had an EAS injury. Most patients had defects in the high pressure zone of the anal canal which led to a reverse of the normal resting pressure gradient.

In addition to the quantity of muscle divided, Zbar has argued that specific factors, such as the rectoanal inhibitory reflex or a recognisable distal sphincter deficiency noted in some patients before surgery, as well as other measurable parameters from anal manometry or MR imaging, may all contribute to incontinence after surgery and that assessment of these factors may reduce predictable post-operative functional impairment summarised in [16], adding that preservation of the IAS is vital for pristine continence. However, without an evidence-based systematic approach to preoperative anal sphincter assessment, perhaps using manometry and imaging (but see below), and without an understanding of the influence of such an approach on the outcomes of surgery, the place of these techniques in preoperative decision making is unclear. What is more, for all its apparent objectivity anorectal physiology testing is not that objective: the same test repeated by the same operator on different occasions gives different results; the same test by different operators on the same occasion gives different results.

Assessment Before Fistulotomy

In the office/outpatient setting assessment of pre-existing bowel function and continence is important, along with a history of previous sphincter surgery or potential injury (e.g. complicated vaginal delivery). IBS is a relative contraindication to lay open.

The key is the ability to feel the internal opening in a conscious patient and to estimate the likely chance and degree of disturbance were that fistula to be laid open. This should then be put to the patient who can make an informed choice.

The internal opening feels like a small grain of sand or piece of rice and is slightly tender when pushed. As in all bodily systems, there is considerable redundancy: normal renal function with half of one kidney, the ability to resect more than half the liver or remove a lung; likewise with the anal sphincter quite a lot can be cut with little consequence. As a ball park figure, a consenting patient with normal bowel habit and without IBS could have 2 cm of cephalad anal sphincter left behind: two thirds would not notice continence disturbance, and one third would experience only inadvertent loss of flatus and occasional 'skid marks' on the underwear [8, 17]. In referral centres and with much experience of assessment that distance can be reduced to 1 cm and with some patients with a weekly bowel habit to 0.5 cm.

Any continence deficit noted at presentation is clearly also crucial. In a study of 84 patients, 50 of whom underwent fistulotomy and the rest permanent loose seton insertion, continence at referral was the only factor which predicted continence at discharge; 84 % of those continent at referral maintained full continence at discharge compared with 27 % of those with a continence impairment at referral ($P<0.001$) [17]. There may also be a defect in the EAS distal to the internal opening from previous fistulotomy, leading to a 'step-down' or 'keyhole' deformity, which enables further fistulotomy to this level with impunity.

Understanding the Potential Anatomy

The key anatomical features proposed by Goodsall and Miles include location of the internal and external openings, the course of the primary tract and the presence of secondary extensions. Difficult cases include those with high tracts, secondary extensions and anterior fistulas in women, as well as those with inflammatory bowel disease.

There is no accepted definition of what constitutes a high fistula. In practice the key determination is not how much sphincter will be cut, but how much contracting sphincter will be left behind (just as in liver surgery, it is not how much liver is removed, but how much is left behind). Perhaps the word 'complex' is better than 'high', as it takes into account secondary extensions and the presence of inflammatory bowel disease or previous failed surgery.

We have previously defined a low fistula as one with a primary tract which is subcutaneous, intersphincteric or low transsphincteric (involving no more than the most distal 1 cm of external anal sphincter), and high fistulas as those with higher transsphincteric, suprasphincteric or extrasphincteric

primary tracts [8]. By this definition, we would lay open many high fistulas as well as almost all low ones.

We would be cautious about anterior fistulas in women as the anterior sphincter can be very short.

Fistulotomy Technique

The surgeon needs a clear idea of bowel function and the patient's consent before starting. Where there is doubt about fistula anatomy, MRI scanning using well-described techniques will help plan the approach and give a strong indication as to the likely site of the internal opening and of the presence of any secondary extensions. Mechanical bowel preparation and antibiotic prophylaxis are not normally employed. Some surgeons prefer an enema shortly before surgery.

Light general anaesthesia is preferred. Local anaesthesia, spinal/epidural anaesthesia and deep general anaesthesia with endotracheal intubation all end up with a paralysed external anal sphincter muscle which can make intra-operative judgment difficult. Under light general anaesthesia the anaesthesia can be lightened further leading to minor struggling or coughing, all of which contract the external anal sphincter and permit easy intra-operative identification of what length of external anal sphincter would be left behind were the fistula to be laid open.

Patient positioning is up to an individual surgeon's preference. The authors prefer the lithotomy position with the ischial tuberosities on the end of the operating table and 120° of flexion at the hip (where possible). Illustrations used have adopted that orientation.

First, the area between the anus and the external opening is firmly palpated with a lubricated finger (Fig. 9.1). A superficial tract is easily felt, giving a clue as to where in the anus to find the internal opening. With a deep tract, nothing will be felt.

The internal opening will usually be found at the dentate line and Goodsall's rule usually applies. Injection of hydrogen peroxide (or a variety of other agents) may facilitate its identification, but is not fool proof, failing to demonstrate the internal opening when there is an epithelialised internal opening.

Supralevator induration takes experience to identify. The levator muscle should feel soft, like a fillet steak, but when there is sepsis in the vicinity it feels hard, like bone. The problem is that bone is expected when performing rectal examination—the sacrum, ischial tuberosities, coccyx and so on, so induration may be overlooked. It helps to compare the 'softness/boniness' of mirror images on the clock face of the anus (Fig. 9.2). Thus 4 o'clock with 8 o'clock, 1 o'clock with 11 o'clock. Prior MRI in such cases is extremely useful.

If supralevator induration is found having already palpated a more superficial tract, this heralds a secondary extension. On the other hand, having failed to palpate a superficial tract (Fig. 9.1), induration at the anorectal junction would be expected, denoting a high tract in the roof of the ischioanal fossa, as seen in most horseshoe fistulas.

The set of instruments needed are shown in the figure (Fig. 9.3). The partially curved Lockhart–Mummery fistula probe is perhaps the most useful. All probes must be handled gently, guided by knowledge already gained as to the site of the internal opening and a finger in the anus at that point. As with negotiating a bend at colonoscopy, slight pull-back while negotiating a bend prevents the tip impacting in the fistula wall and creating a false passage.

Some fistula tracts are very narrow or tend towards an hourglass shape, such that the portion passing through the sphincter complex is not sufficiently wide to accept the probe (Fig. 9.4). In these cases hydrogen peroxide injected from the external opening may not exit the internal opening. A lacrimal probe will often negotiate such a tract. Once the probe has been passed through the tract and has entered the anal canal a further assessment can be made of the level

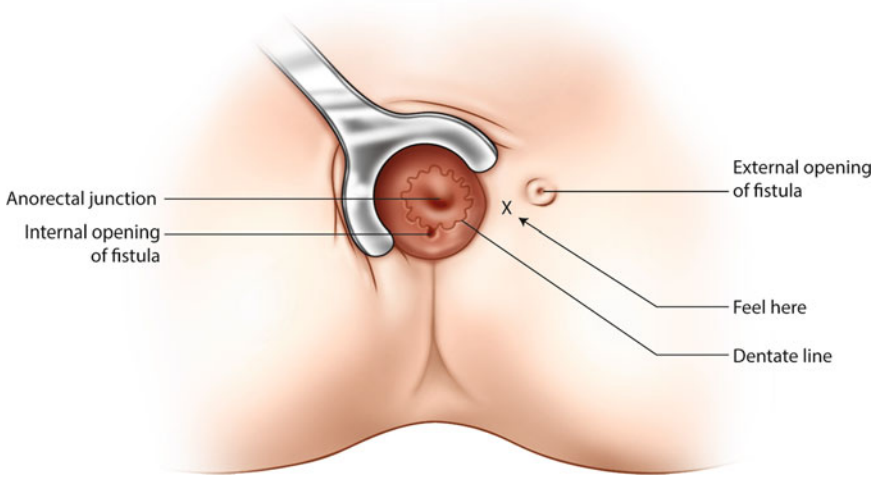

Fig. 9.1 Superficial palpation to detect the depth and direction of the fistula tract

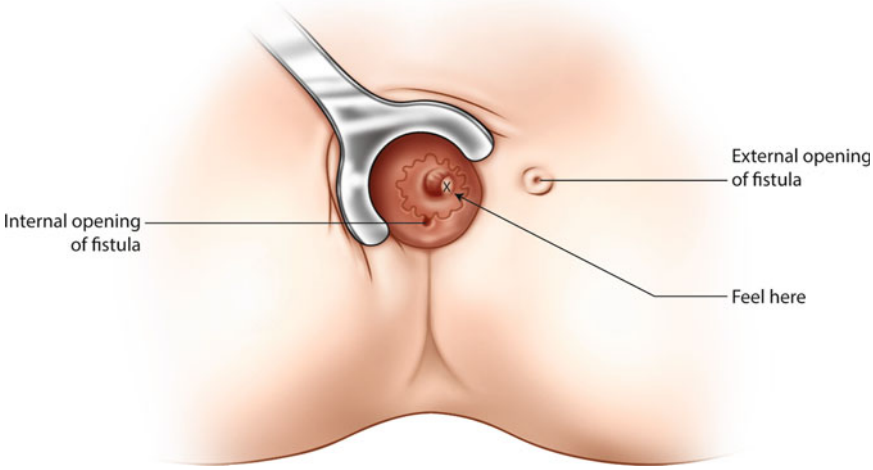

Fig. 9.2 Palpation of the supralevator area to detect induration indicative of a high primary tract or secondary extension

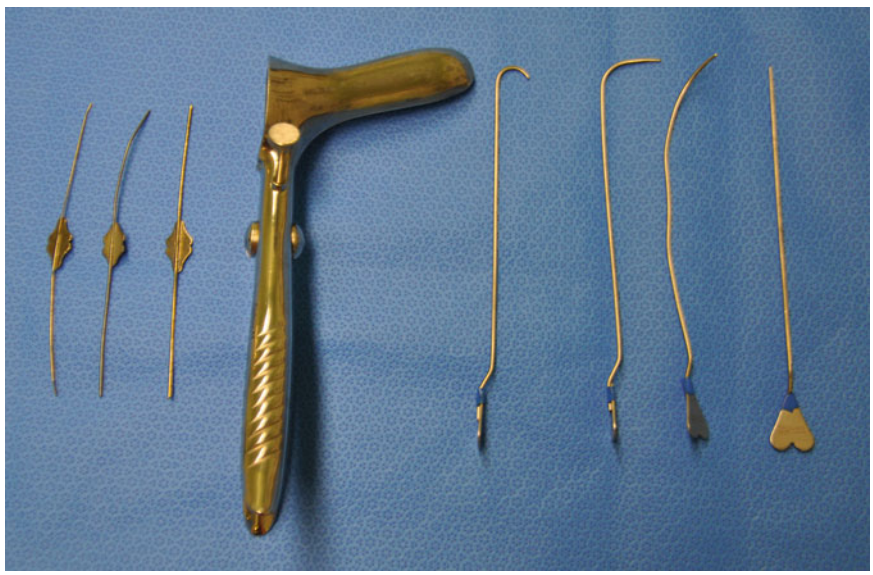

Fig. 9.3 Lacrimal probes (*left*), the Eisenhammer retractor and Lockhart–Mummery probes

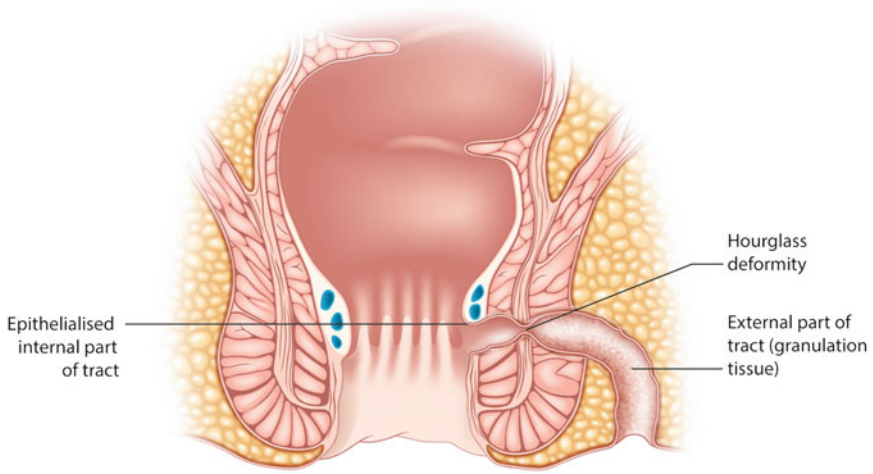

Fig. 9.4 Narrowing of the fistula tract with an hourglass deformity. A lachrymal probe may pass through if the Lockhart–Mummery probes do not

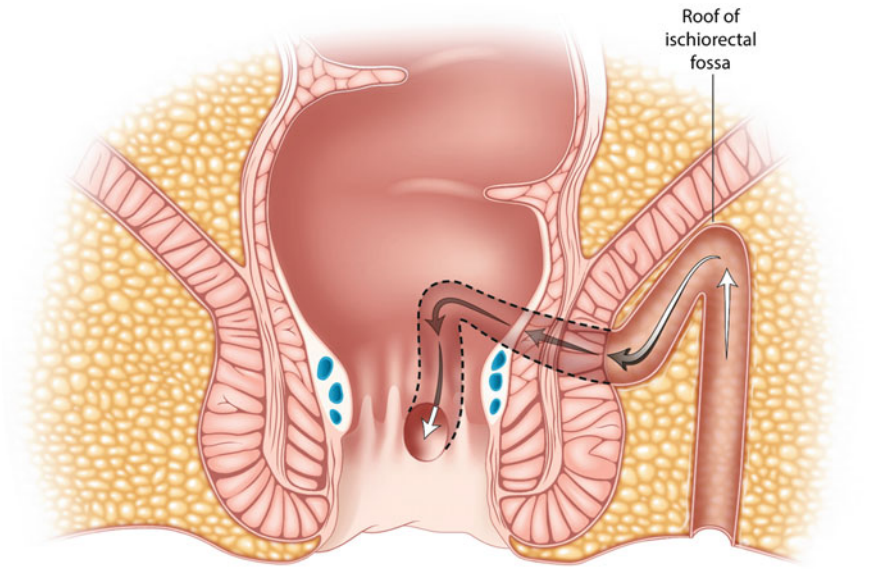

Fig. 9.5 Horseshoe fistulas may travel to the roof of the ischioanal fossa before running posteriorly towards the midline and then turning caudad before entering the anal canal

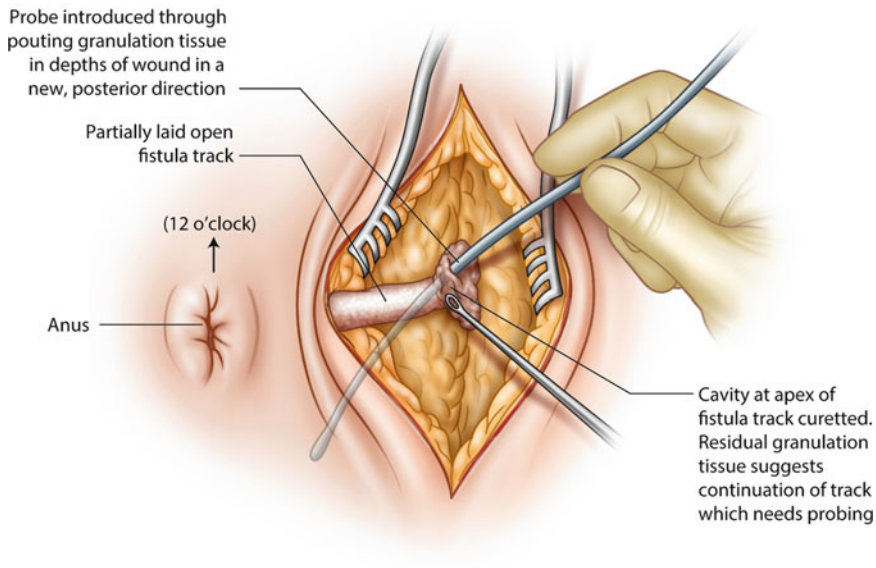

Fig. 9.6 A curved incision is made tracking the edge of the darkened anal pigment (which marks the outer boundary of the EAS) and this incision is deepened into fat. The tract is then laid open into this wound, avoiding damage to the EAS. Granulation tissue is curetted

of the fistula and the risk to function encountered if fistulotomy is performed. (Mostly, this judgment has already been made from the outpatient/office assessment. But to be able to make such a judgment in that setting requires a learnt ability to feel the internal opening in the conscious patient already described above. If not sure at this stage as to how much sphincter would be left behind were the fistula to be laid open, then the anaesthetist can be asked to lighten the anaesthesia, resulting in the anal sphincter contracting as outlined earlier. Alternatively, a loose seton may be placed and the patient re-examined when awake to determine the same.)

Some tracts cannot be negotiated with a fistula probe. The classic case is with a horseshoe fistula (Fig. 9.5). The strategy in these circumstances is depicted in Fig. 9.6.

Once the fistula has been negotiated a decision is taken whether or not to lay it open, mark it with a seton or adopt one of the other techniques covered in this book. The decision has already often been taken in the office/outpatient setting as described earlier, influenced by bowel habit, lack of IBS, patient's wishes and so on. Suffice it to say that the important consideration is how much sphincter to leave behind, not how much to cut. To repeat: as a ball park figure, a consenting patient with normal bowel habit and without IBS could have 2 cm of cephalad anal sphincter left behind: two thirds would not notice continence disturbance, and one third would experience only inadvertent loss of flatus and occasional 'skid marks' on the underwear [8, 17]. In referral centres and with much experience of assessment that distance can be reduced to 1 cm and with some patients with a weekly bowel habit to 0.5 cm.

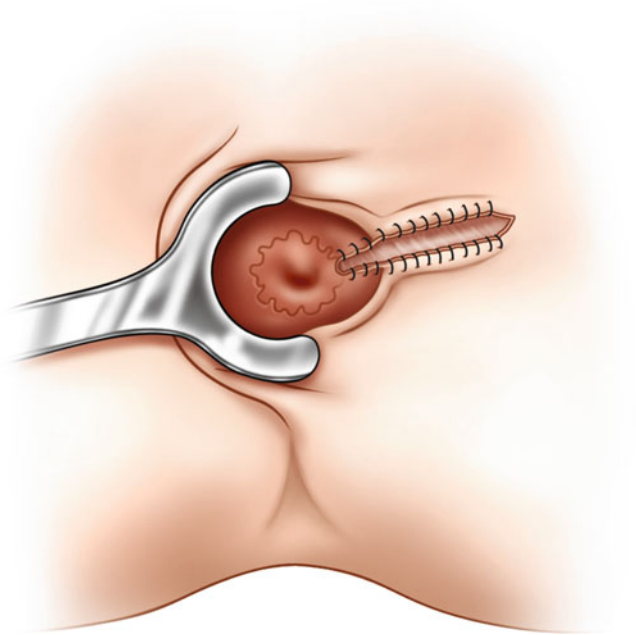

Fig. 9.7 Marsupialisation involves suturing the skin to the edge of the fistula tract with absorbable sutures to reduce wound size

Once the fistula has been laid open, granulation tissue is curetted away meticulously. Any point where it is difficult to curette away granulation tissue heralds the possibility of a secondary extension and needs careful probing.

Where possible, the wound can be marsupialised (Fig. 9.7).

Post-operative Care

The first 2 weeks with a large wound can be uncomfortable, but once lined with granulation tissue pain eases. There will be discharge and pus and blood and the patient will worry about infection, particularly when stools pass through the wound. Infection is actually rare. The wound can take 8 weeks or longer fully to heal, depending on its size and depth. Premature wound closure can lead to recurrence and can be prevented by regular wound digitation (which the patient or partner can be taught to do themselves once the wound is comfortable after the first fortnight). Sitz baths and various dressings are frequently used, but there is little evidence as to their efficacy.

Outcomes of Fistulotomy

The principle late complications are recurrence and impairment of continence, the latter not necessarily equating with dissatisfaction [6]. For example, Garcia-Aguilar reported in 2000 more dissatisfaction in patients suffering recurrence (61 %) than impairment of continence (24 %) [18].

Early complications relate to wound healing and discomfort. A randomised controlled trial of fistulotomy with and without marsupialisation from Thailand published in 2011 demonstrated reduced pethidine use in the marsupialised group but not improved healing [19]. Pescatori et al. showed the obvious, that marsupialised wounds were significantly smaller afterwards, and stayed smaller for 4 weeks [20]. They also found that bleeding was less but there was no difference in pain or septic complications. Ho et al. also found faster healing with marsupialisation (at a mean of 6 weeks compared to 10 weeks without) [21]. In a Cochrane review, the Ho and Pescatori studies were combined showing a small benefit in terms of recurrence and also, perhaps surprisingly, that incontinence was lower in the marsupialised group [1]. The review did not consider pain or wound healing.

Recurrence and Incontinence Rates After Fistulotomy

Several studies have examined fistulotomy in the context of case series and some as trials comparing fistulotomy with other techniques. Lindsey et al. published a trial in 2002 which included seven patients with low fistulas treated by fistulotomy, none of whom experienced recurrence or impairment of continence [22]. There was also no recurrence found in 54 patients with low fistulas laid open in a study comparing this with an Ayurvedic chemical seton [23]. Three patients experienced (mostly minor) deterioration in their continence. Van der Hagen et al. published results of fistulotomy in 62 patients with low tracts (although 15 % had Crohn's disease and 30% were recurrent fistulas and so might be considered 'complex') [24]. They found the longer the follow-up the higher the recurrence: 7 % at 1 year rising to 39 % at 3 years (although it might be argued that some in Crohn's disease might have been new rather than recurrent fistulas). Five percent developed minor staining after surgery.

In a very large series, Rosa et al. undertook fistulotomy in 70 % of 844 cases of anal fistula, the remainder treated by fistulectomy alone or a combination of both techniques [25]. Overall recurrence and incontinence rates were similar; 5 % and 7 % (mostly flatus/staining), respectively. A prospective multicentre study was published by Hyman in 2009 [26]. There were 13 hospitals and 245 patients, Crohn's disease in 10 %, recurrent tracts in almost a third, multiple tracts in a fifth and smoking in a quarter. In 120 patients the fistula was laid open and 87 % healed at 3 months. Both women and those who had already experienced recurrence were more likely to develop recurrence, and there was a tendency for a higher risk in smokers. In 2008 van Koperen et al. reported 109 patients undergoing fistulotomy for low fistulas with 7 % recurrence but minor staining in 41 % [27]. No factors significantly associated with recurrence were found.

It would seem that in most studies, the majority of which examined low fistulas but some also considering higher tracts, fistulotomy produced a recurrence rate of around 5 %.

Fistulotomy in Complex, Recurrent or High Fistulas

Fistulotomy in high fistulas should be undertaken with more caution, but with careful patient selection, some surgeons, often with tertiary referral practices and acknowledged expertise in fistula management, have demonstrated good results in this setting.

We have recently published two small series of fistulotomy including high, complex and recurrent tracts. In 2011 we reported a mixed series of mostly complex, recurrent and/or high anal fistulas treated surgically of which 48 were high fistulas treated by fistulotomy [8]. The recurrence rate was 4 % and the operation-induced continence disturbance was 36 %, the majority to flatus or with minor staining. This rate was similar to the low fistulas laid open in the same series. In 2012 we reported a separate, mixed series of 50 patients with mostly high, complex and/or recurrent fistulas who underwent fistulotomy [17]. The overall recurrence rate was 7 % including 9 % of those patients referred by another colorectal surgeon. We found that the presence of secondary extensions identified at fistulotomy was significantly associated with the risk of recurrence. Mostly minor deterioration in control was experienced by 40 %.

As with low, simple fistulas, fistulotomy remains the most effective way of healing high or recurrent fistulas; the risk of (albeit mostly minor) incontinence is probably around one in four to one in three patients and similar to that seen with low fistulas similarly laid open. This group of patients often have a chronicity and severity of symptoms as well as experience of failure which means they may be even more willing to tolerate flatus incontinence or minor staining for the chance of a cure.

Fistulotomy with Immediate Sphincter Reconstruction

In order to obtain the high cure rate of fistulotomy but obviate the risk of continence impairment associated with sphincter division, some surgeons have advocated immediate sphincter repair at the time of fistulotomy or fistulectomy. An early series of 120 almost exclusively low fistulas reported rapid wound closure following fistulotomy and immediate reconstruction with three patients (4 %) suffering recurrence and all patients satisfied with their functional outcome [28]. Higher and recurrent fistulas have also been examined. In 1995 Christiansen et al. reported a series of 14 patients with recurrent high anal fistulas treated with fistulectomy and immediate reconstruction [29]. Two (14 %) recurred and three patients (21 %) suffered minor incontinence. In 2009 Jivapaisarpong reported a series of 33 patients, 94 % with high transsphincteric tracts, and achieved a 12 % recurrence rate with no continence disturbance reported [30]. In a study comparing endoanal advancement flap with fistulectomy and immediate sphincter repair published in 2010, Roig et al. reported on 75 complex anal fistulas with a recurrence rate of 11 % and continence disturbance in 21 % [31].

Two recent series from the same unit (and with slightly overlapping study periods) have considered the impact of this technique on continence very carefully. In 2012 Arroyo et al. reported on 70 patients with and without continence impairment before fistulotomy and immediate repair [32]. Fistulas were medium/high transsphincteric or suprasphincteric in all cases. More than 40 % were recurrent. Recurrence occurred in 9 % of patients and the overall post-operative incontinence rate was 21 %. Of the 48 patients fully continent before the study procedure, eight (17 %) developed minor incontinence. Of the 22 who presented to the study with impairment of continence, 15 (70 %) gained significantly improved continence, although no corresponding improvement in anal manometry was seen.

Earlier, Perez et al. reported a very similar set of results in a series of 35 mostly high transsphincteric fistulas, 16 of them recurrent, with a recurrence rate of 6 % [33]. Of the 24 patients fully continent on entering the study, 3 (13 %) developed minor incontinence. Of the 11 with impairment of continence before the study procedure, function improved in 9 (70 %) and remained static in the other two. In these studies patients were given IV antibiotics for 3 days after surgery, allowed oral intake on the second post-operative day and were discharged on day 4 with instructions to return to normal diet on day 6.

We balance acknowledgment of these results with a degree of scepticism. Experience of secondary anal sphincter repair after obstetric injury showed many wound failures and deteriorating results over time [34].

Fistulotomy vs. Fistulectomy

Some surgeons advocate fistulectomy as an alternative to fistulotomy. In 1985 Kronborg compared the two techniques in a randomised controlled trial and found that while complications and recurrence were similar, the fistulectomy patients took around a week longer to heal [35]. Lewis favoured core out fistulectomy and stated with some truth that since the tract is followed under direct vision and without probing, false passages are not created, secondary tracts are transected

and more easily seen and the exact relation of the tract to the sphincter can be identified before division [36].

Toyonaga and colleagues undertook a prospective but not randomised observational study comparing fistulotomy with core out fistulectomy in high transsphincteric fistulas in 2007 [37]. Of the 70 patients recruited, three suffered recurrence with no difference seen between the two groups (1 of 35 fistulotomy, 2 of 35 fistulectomy, ns) but continence impairment was more common in the fistulotomy group. The impairment was mostly to flatus or staining of undergarments in both groups and occurred in 43 % after fistulotomy compared to 17 % after fistulectomy. All patients were satisfied by their outcome.

A randomised trial of 40 patients with low, simple fistulas reported by Jain et al. in 2012, compared core out fistulectomy with fistulotomy and marsupialisation [38]. All but two fistulas were very low, being subcutaneous or intersphincteric. Follow-up was only 12 weeks during which time there were no recurrences and no impairment of continence. The fistulectomy wounds took 2 weeks longer to heal but there was no difference in post-operative pain or return to social or sexual activity.

No clear advantage of fistulectomy over fistulotomy has been demonstrated. Although the Toyonaga study suggested a better functional outcome, the non-randomised nature of the study limits its impact.

Incontinence After Surgery

As discussed above, the degree of continence impairment seen after fistulotomy depends on a combination of factors including the amount of contracting muscle (IAS and EAS) left after division, anorectal and perineal sensation, the consistency of the stool and the presence or absence of IBS. As a result of the heterogeneity of these and other factors in different studies, the degree of incontinence following fistulotomy described in the literature varies widely. However, examples of consistency exist. For example, recent studies at St Mark's hospital examining patients undergoing fistulotomy by a single surgeon have demonstrated a consistent level of impairment of continence (mostly minor, found in around one in three to one in four patients) in separate, mixed groups of fistulas with large contingents of high and complex tracts [8, 17]. In a recent study from the Oxford group Bokhari et al. found an incontinence rate of 16 % in those patients undergoing fistulotomy for simple fistulas (defined as those with a low risk for incontinence) [39].

In a study of mixed surgical procedures in which around a quarter underwent fistulotomy, Stremitzer et al. reported minor incontinence in 9 % and severe incontinence in 4 % in the fistulotomy group [40]. Toyonaga et al. found 20 % of patients undergoing fistulotomy for intersphincteric tracts developed some impairment of continence [10]. Chang et al. laid open 45 intersphincteric fistulas with a worsening of continence in 38 % of patients although the incontinence was mostly minor and less than a third noted any alteration to their lifestyle [11]. Westerterp et al. examined the post-operative continence of 60 patients undergoing fistulotomy for various height fistulas with long-term review (up to 4 years) [41]. Impairment occurred in 82, 24 and 44 % of patients with high, middle and low tracts, respectively. Satisfaction was 87 % across the group in spite of this and perhaps due to the fact that there were no recurrences. van Tets et al. found minor incontinence in 27 % of 267 patients undergoing fistulotomy for predominantly transsphincteric and intersphincteric fistulas although some extrasphincteric tracts were included and higher tracts were more likely to suffer incontinence [42].

Risk Factors for Incontinence

Several studies have tried to identify risk factors for post-operative incontinence after fistulotomy. Jordan et al. found that preoperative incontinence was the only factor significantly associated with post-operative impairment on multivariate analysis, although fistula complexity, height and recurrent tracts were also identified on univariate analysis [43]. In a more recent study, we found that time to referral was associated with a worsening of continence post-operatively, presumably because this identified patients who had undergone surgery previously, had more complex tracts and, perhaps, were more willing to accept a functional disadvantage in return for a cure [17]. However, Cavanaugh et al. found that incontinence was only associated with the amount of EAS divided in 110 patients who had undergone fistulotomy for transsphincteric (59 %) or intersphincteric fistulas [7]. Toyonaga et al. found on multivariate analysis of 148 patients undergoing fistulotomy for intersphincteric fistulas that low preoperative voluntary squeeze pressure and previous drainage surgery were associated with a greater impairment of continence [10], whereas Chang et al. found that the preoperative resting pressure was the only factor associated on multivariate analysis [11]. In 1994 van Tets et al. found that height and location of internal opening and the presence of secondary extensions were all associated with impairment of continence after fistulotomy [42]. Although there is inconsistency between studies, fistula complexity, indicated by duration of symptoms, previous surgery or complex anatomy, and preoperative impairment of continence have been found by several groups as factors associated with functional impairment after fistulotomy.

Impact of Incontinence and Recurrence on Quality of Life

Impairment of continence does not necessarily equate to poor quality of life. In the large series of fistulectomy and/or fistulotomy patients published by Rosa et al., 7 % of patients had a permanent impairment of continence but the satisfaction rate in the study was 97 % [25]. However, in the study by Cavanaugh described above, quality of life indicators were examined alongside the Faecal Incontinence Severity Index and a correlation was seen in which a greater degree of incontinence was associated with a deteriorating quality of life, especially with a very high incontinence score [7]. In another group of 21 patients with recurrent fistulas and a median of three previous operations who were cured by surgery (fistulectomy, cutting seton, advancement flap) during the study period, the gastrointestinal quality of life index (GIQLI) was used to assess quality of life. As one might expect, the GIQLI score improved after curative surgery. Incontinence decreased after surgery in the group as a whole, so its influence on quality of life is not clear in this study, but the significant improvement in quality of life after cure led the authors to conclude that cure should be sought despite the risk of (mostly minor) functional impairment.

In 1996 Garcia-Aguilar et al. reported a large series of patients undergoing sphincter dividing surgery with a recurrence rate of 8 % and impairment of continence in 46 % but dissatisfaction with the outcome of surgery in only 12% [6]. In order to investigate this, the Minnesota group then published a further analysis of factors associated with patient satisfaction (2000) in this group and found that the presence of recurrence was more likely to lead to dissatisfaction than the presence of incontinence [18]. In fact, flatus incontinence alone was not significantly associated with dissatisfaction at all, although more frequent and more severe incontinence episodes, and those which interfered with social activities, were increasingly associated with dissatisfaction. In opposition to this view, Ellis issued a questionnaire to patients and reported they preferred to avoid risk of impairment of continence and preferred sphincter preserving procedures. But as with all questionnaires/referendums, word choice significantly impacts on the result [2]. The degree of pain, success and impairment of continence, the latter described as 'worsening your ability to control gas and bowel movements', were presented as percentages in various scenarios. Patients were then asked to rank the scenarios and naturally patients opted for the choices with lowest risk and highest success. However, the most popular scenarios involved fibrin glue or fistula plug success rates of 70 % which have been reported by only a few authors, most finding a much higher rate of failure. The vague definition of impairment of continence falls exactly into the trap described above and allows the patient to assume atrocious bowel function when a minor functional impairment is the norm. Over all, it does seem that a minor functional impairment may be less likely to dissatisfy the patient than recurrence.

It is very difficult to assess the relative impacts on quality of life of recurrence and incontinence in an objective way and different patients will have different expectations and thresholds for satisfaction following surgery. Those with recurrent fistulas and a pre-existing continence impairment will likely have a different viewpoint to those with a short history of a primary fistula or those with a cultural emphasis on personal hygiene during religious practices, for example. Careful and detailed preoperative counselling helps the surgeon determine the patient's approach to this dilemma and choose the appropriate operative strategy.

Conclusions

Fistulotomy is the operation most likely to lead to fistula cure, whether the tract is high or low, recurrent or primary, complex or simple. The fear of functional impairment is in our view over-exaggerated. Because of this fear, many surgeons perhaps undertake too many sphincter preserving techniques, resulting in much recurrence and misery. Recurrence may be more likely to dissatisfy a patient than minor incontinence. Careful patient selection and preoperative counselling remain crucial when choosing fistulotomy. Fistula anatomy, bowel habit, the presence or absence of IBS and above all a proper understanding of the patient's wishes will all help decision making.

As a ball park figure, a consenting patient with normal bowel habit and without IBS could have 2 cm of cephalad anal sphincter left behind: two thirds would not notice continence disturbance, and one third would experience only inadvertent loss of flatus and occasional 'skid marks' on the underwear. In referral centres and with much experience of assessment that distance can be reduced to 1 cm and with some patients with a weekly bowel habit to 0.5 cm.

Summary

- Fistulotomy works and has a recurrence rate of approximately 5 %.
- All fistulotomy carries a one quarter to one third risk of mild mucus leakage/flatus incontinence, mostly related to internal sphincter division.
- Higher fistulas can also be laid open safely with equivalent results so long as 1–2 cm of good quality contractile sphincter remains cephalad to the fistulotomy and bowel function is normal and there is no IBS.
- The patient needs to understand the balance between cure (mostly excellent) and potential functional deficit (usually minor).

References

1. Jacob TJ, Perakath B, Keighley MR. Surgical intervention for anorectal fistula. Cochrane Database Syst Rev. 2010;5:CD006319.
2. Ellis CN. Sphincter-preserving fistula management: what patients want. Dis Colon Rectum. 2010;53(12):1652–5.
3. Jorge JM, Wexner SD. Etiology and management of fecal incontinence. Dis Colon Rectum. 1993;36(1):77–97.
4. Vaizey CJ, Carapeti E, Cahill JA, Kamm MA. Prospective comparison of faecal incontinence grading systems. Gut. 1999;44(1):77–80.
5. Milligan E, Morgan C. Surgical anatomy of the anal canal with special reference to anorectal fistulae. Lancet. 1934;ii:1150–6.
6. Garcia-Aguilar J, Belmonte C, Wong WD, Goldberg SM, Madoff RD. Anal fistula surgery. Factors associated with recurrence and incontinence. Dis Colon Rectum. 1996;39(7):723–9.
7. Cavanaugh M, Hyman N, Osler T. Fecal incontinence severity index after fistulotomy: a predictor of quality of life. Dis Colon Rectum. 2002;45(3):349–53.
8. Atkin GK, Martins J, Tozer P, Ranchod P, Phillips RK. For many high anal fistulas, lay open is still a good option. Tech Coloproctol. 2011;15(2):143–50.
9. Lunniss PJ, Kamm MA, Phillips RK. Factors affecting continence after surgery for anal fistula. Br J Surg. 1994;81(9):1382–5.
10. Toyonaga T, Matsushima M, Kiriu T, Sogawa N, Kanyama H, Matsumura N, et al. Factors affecting continence after fistulotomy for intersphincteric fistula-in-ano. Int J Colorectal Dis. 2007;22(9):1071–5.
11. Chang SC, Lin JK. Change in anal continence after surgery for intersphincteral anal fistula: a functional and manometric study. Int J Colorectal Dis. 2003;18(2):111–5.
12. Kennedy HL, Zegarra JP. Fistulotomy without external sphincter division for high anal fistulae. Br J Surg. 1990;77(8):898–901.
13. Bennett RC, Goligher JC. Results of internal sphincterotomy for anal fissure. Br Med J. 1962;2(5318):1500–3.
14. Khubchandani IT, Reed JF. Sequelae of internal sphincterotomy for chronic fissure in ano. Br J Surg. 1989;76(5):431–4.
15. Lindsey I, Jones OM, Smilgin-Humphreys MM, Cunningham C, Mortensen NJ. Patterns of fecal incontinence after anal surgery. Dis Colon Rectum. 2004;47(10):1643–9.
16. Zbar AP, Khaikin M. Should we care about the internal anal sphincter? Dis Colon Rectum. 2012;55(1):105–8.
17. Tozer P, Sala S, Cianci V, Kalmar K, Atkin GK, Rahbour G, et al. Fistulotomy in the tertiary setting can achieve high rates of fistula cure with an acceptable risk of deterioration in continence. J Gastrointest Surg. 2013. doi:10.1007/s11605-013-2198-1. Epub ahead of print.

Generic

18. Garcia-Aguilar J, Davey CS, Le CT, Lowry AC, Rothenberger DA. Patient satisfaction after surgical treatment for fistula-in-ano. Dis Colon Rectum. 2000;43(9):1206–12.
19. Sahakitrungruang C, Pattana-Arun J, Khomviali S, Tantiphlachiva K, Atittharnsakul P, Rojanasakul A. Marsupialization for simple fistula in ano: a randomized controlled trial. J Med Assoc Thai. 2011;94(6):699–703.
20. Pescatori M, Ayabaca SM, Cafaro D, Iannello A, Magrini S. Marsupialization of fistulotomy and fistulectomy wounds improves healing and decreases bleeding: a randomized controlled trial. Colorectal Dis. 2006;8(1):11–4.
21. Ho YH, Tan M, Leong AF, Seow-Choen F. Marsupialization of fistulotomy wounds improves healing: a randomized controlled trial. Br J Surg. 1998;85(1):105–7.
22. Lindsey I, Smilgin-Humphreys MM, Cunningham C, Mortensen NJ, George BD. A randomized, controlled trial of fibrin glue vs. conventional treatment for anal fistula. Dis Colon Rectum. 2002;45(12):1608–15.
23. Ho KS, Tsang C, Seow-Choen F, Ho YH, Tang CL, Heah SM, et al. Prospective randomised trial comparing ayurvedic cutting seton and fistulotomy for low fistula-in-ano. Tech Coloproctol. 2001;5(3):137–41.
24. van der Hagen SJ, Baeten CG, Soeters PB, van Gemert WG. Long-term outcome following mucosal advancement flap for high perianal fistulas and fistulotomy for low perianal fistulas: recurrent perianal fistulas: failure of treatment or recurrent patient disease? Int J Colorectal Dis. 2006;21(8):784–90.
25. Rosa G, Lolli P, Piccinelli D, Mazzola F, Bonomo S. Fistula in ano: anatomoclinical aspects, surgical therapy and results in 844 patients. Tech Coloproctol. 2006;10(3):215–21.
26. Hyman N, O'Brien S, Osler T. Outcomes after fistulotomy: results of a prospective, multicenter regional study. Dis Colon Rectum. 2009;52(12):2022–7.
27. van Koperen PJ, Wind J, Bemelman WA, Bakx R, Reitsma JB, Slors JF. Long-term functional outcome and risk factors for recurrence after surgical treatment for low and high perianal fistulas of cryptoglandular origin. Dis Colon Rectum. 2008;51(10):1475–81.
28. Parkash S, Lakshmiratan V, Gajendran V. Fistula-in-ano: treatment by fistulectomy, primary closure and reconstitution. Aust N Z J Surg. 1985;55(1):23–7.
29. Christiansen J, Ronholt C. Treatment of recurrent high anal fistula by total excision and primary sphincter reconstruction. Int J Colorectal Dis. 1995;10(4):207–9.
30. Jivapaisarnpong P. Core out fistulectomy, anal sphincter reconstruction and primary repair of internal opening in the treatment of complex anal fistula. J Med Assoc Thai. 2009;92(5):638–42.
31. Roig JV, Garcia-Armengol J, Jordan JC, Moro D, Garcia-Granero E, Alos R. Fistulectomy and sphincteric reconstruction for complex cryptoglandular fistulas. Colorectal Dis. 2010;12(7 Online):e145–52.
32. Arroyo A, Perez-Legaz J, Moya P, Armananzas L, Lacueva J, Perez-Vicente F, et al. Fistulotomy and sphincter reconstruction in the treatment of complex fistula-in-ano: long-term clinical and manometric results. Ann Surg. 2012;255(5):935–9.
33. Perez F, Arroyo A, Serrano P, Candela F, Sanchez A, Calpena R. Fistulotomy with primary sphincter reconstruction in the management of complex fistula-in-ano: prospective study of clinical and manometric results. J Am Coll Surg. 2005;200(6):897–903.
34. Malouf AJ, Norton CS, Engel AF, Nicholls RJ, Kamm MA. Long-term results of overlapping anterior anal-sphincter repair for obstetric trauma. Lancet. 2000;355(9200):260–5.
35. Kronborg O. To lay open or excise a fistula-in-ano: a randomized trial. Br J Surg. 1985;72(12):970.
36. Lewis A. Excision of fistula in ano. Int J Colorectal Dis. 1986;1(4):265–7.
37. Toyonaga T, Matsushima M, Tanaka Y, Suzuki K, Sogawa N, Kanyama H, et al. Non-sphincter splitting fistulectomy vs conventional fistulotomy for high trans-sphincteric fistula-in-ano: a prospective functional and manometric study. Int J Colorectal Dis. 2007;22(9):1097–102.
38. Jain BK, Vaibhaw K, Garg PK, Gupta S, Mohanty D. Comparison of a fistulectomy and a fistulotomy with marsupialization in the management of a simple anal fistula: a randomized, controlled pilot trial. J Kor Soc Coloproctol. 2012;28(2):78–82.
39. Bokhari S, Lindsey I. Incontinence following sphincter division for treatment of anal fistula. Colorectal Dis. 2010;12(7 Online):e135–9.

40. Stremitzer S, Strobl S, Kure V, Birsan T, Puhalla H, Herbst F, et al. Treatment of perianal sepsis and long-term outcome of recurrence and continence. Colorectal Dis. 2011;13(6):703–7.
41. Westerterp M, Volkers NA, Poolman RW, van Tets WF. Anal fistulotomy between Skylla and Charybdis. Colorectal Dis. 2003;5(6):549–51.
42. van Tets WF, Kuijpers HC. Continence disorders after anal fistulotomy. Dis Colon Rectum. 1994;37(12):1194–7.
43. Jordan J, Roig JV, Garcia-Armengol J, Garcia-Granero E, Solana A, Lledo S. Risk factors for recurrence and incontinence after anal fistula surgery. Colorectal Dis. 2010;12(3):254–60.