

## Review Article

# High perianal fistula: a narrative review of common management techniques

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## ABSTRACT

Perianal fistula is a common and problematic condition that results in perianal pain, recurrent infection, anal discharge and overall reduced quality of life. Low perianal fistula, those that involve the lower third of the external anal sphincter, are relatively easily managed with the use of a fistulotomy. However, high perianal fistula, ones that involve the upper two thirds of the external anal sphincter are extremely difficult to treat. There is no consensus on best management of these type of fistula with little high-quality evidence to guide management. We perform a narrative review of recent literature on common surgical techniques and provide an opinion of the utility of each to guide management.

**Keywords:** Perianal fistula, Surgery, Seton, ERAF, LIFT, Fistula plug, Laser ablation

## INTRODUCTION

Perianal fistula is a common and troublesome condition. The estimated prevalence is between 8-20 per 100,000 with a male predominance.<sup>1,2</sup> An anal fistula is an abnormal communication between the anorectal tract and the perianal skin. At examination there is an internal opening in the anal canal and one or more external openings in the perianal skin. According to the cryptoglandular hypothesis, perianal fistula originates from an intersphincteric gland infection and abscess formation as the initiating event.<sup>3</sup> The abscess is then drained either surgically or spontaneously. A remnant of the abscess remains consisting of infected material and granulation tissue which gives rise to the formation of the fistula.<sup>1</sup> Common symptoms of perianal fistula include pain, discharge of blood/mucus and recurrent perianal sepsis.<sup>4</sup> Perianal fistula can be classified as low or high fistula. A low perianal fistula is one that involves only the lower third of the external anal sphincter.<sup>5</sup> A high perianal fistula is one that involves the upper two thirds

of the external anal sphincter and remains a surgical challenge for general and colorectal surgeons.<sup>4</sup> The aim of high fistula management is to eradicate disease whilst preserving the anal sphincter function. Fistulotomy is considered safe and effective for the management of a low perianal fistula, however there is constant debate about best management for high perianal fistula.<sup>6</sup> Some common techniques used in the management of a high fistula include ligation of the intersphincteric tract (LIFT), draining and cutting setons, endorectal advancement flaps (ERAF), radiofrequency and laser ablation and fistula plug. The purpose of this article is to explore recent evidence for these common techniques and to provide an opinion on the utility of each to help guide treating surgeons.

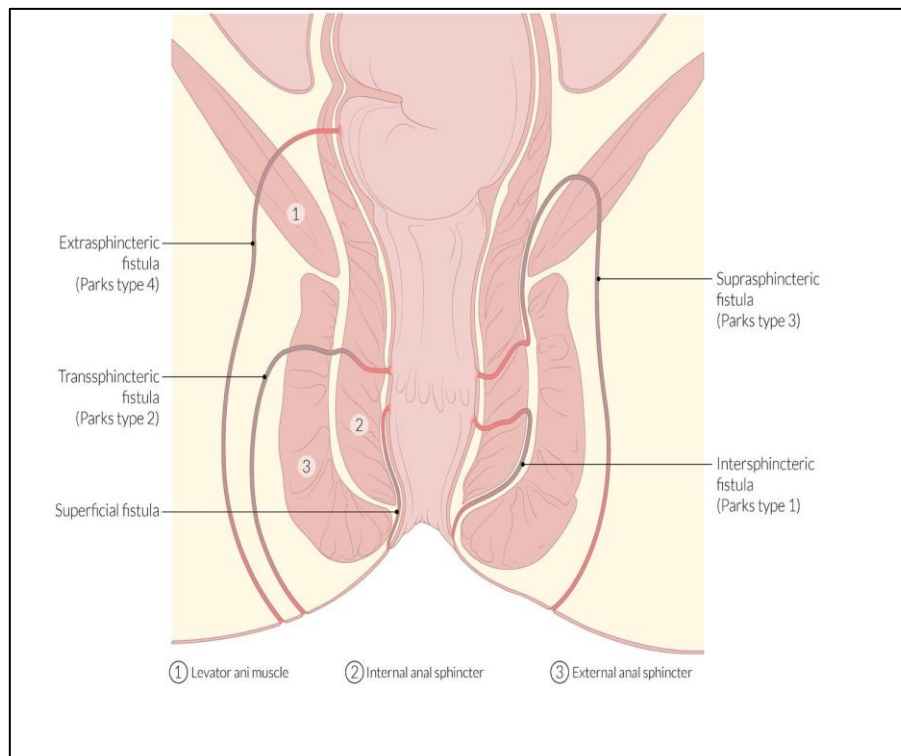
## LITERATURE REVIEW

A literature review was conducted using PubMed, Medline, and Cochrane database to identify articles reporting on perianal fistula management. Care was taken

to identify articles reporting more recent evidence to allow up to date recommendation on the different treatment strategies. Articles were excluded if they did not include idiopathic perianal fistula or high perianal fistula in the study sample. From the articles, outcomes on healing, recurrence, continence, and complications were sought. The searches were limited to full text articles, human studies and those published in the English language.

## CLASSIFICATION

The most widely accepted theory for idiopathic perianal fistula is the cryptoglandular hypothesis first described by Parks in 1961.<sup>6</sup> The cryptoglandular hypothesis states that fistula formation originates from infection and abscess formation of the proctodeal anal glands that are positioned in the intersphincteric space.<sup>6</sup> The parks classification of perianal fistula describes four separate types based on the course of the fistulous tract.<sup>6</sup>



**Figure 1: Types of perianal fistula.**

## MANAGEMENT

The aim of fistula management includes closure of the fistula with low rates of recurrence and preservation of anal continence. The management of high perianal fistula is debated with no clear consensus on what is considered best treatment<sup>7</sup>. Over the last decade or so multiple “sphincter saving” procedures have been suggested, most with mixed results. Common techniques include LIFT, ERAF, loose or cutting setons, radiofrequency ablation and fistula plug insertion.

### LIFT

LIFT was first described as a surgical procedure for perianal fistula in 2007.<sup>8</sup> It was designed as a novel treatment that would be completely sphincter sparing. The pilot results were reported after the procedure was performed on 18 patients. The authors found the sample had a low recurrence rate with no changes to preoperative continence. After this the authors refined and published the surgical steps in 2009.<sup>9</sup>

Multiple studies have since been performed to assess both the long- and short-term outcomes of LIFT procedure. The theoretical basis for the LIFT procedure is that ligation and excision could block the entrance for faecal particles into the fistula tract.<sup>8</sup> Hong et al performed a systematic review and meta-analysis of 24 studies which demonstrated a pooled success rate of 76.4%.<sup>10</sup> It was found that multiple studies did not comment if the transsphincteric fistula were high or low, so results need to be interpreted with caution. Additionally, only three studies compared pre and post continence scores using validated questionnaires.<sup>10</sup> These studies did not however report worsening of the pre continence scores post LIFT.

A 2017 study evaluated the efficacy and long-term outcomes of the LIFT in 43 patients who had a follow up of at least one year.<sup>11</sup> An overall success was found in 36/43 (83.7%).<sup>11</sup> Eight patients presented post LIFT with dehiscence at the intersphincteric space, and all treated successfully with repeated LIFT. Malakorn et al conducted a retrospective observational study in a single institution with the purpose of reporting their 10-year

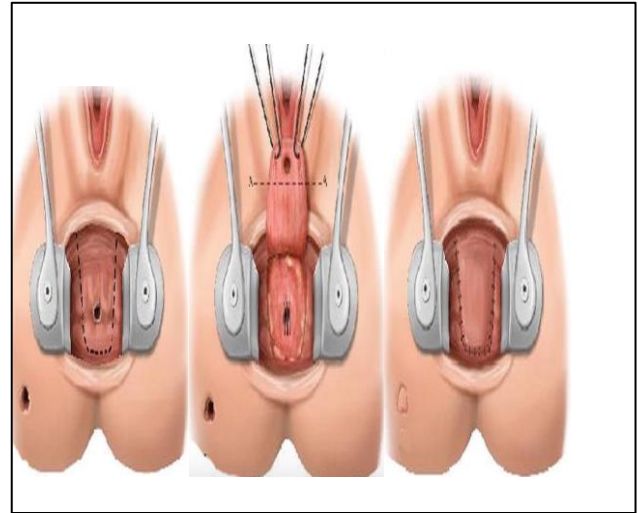
experience using the LIFT technique.<sup>12</sup> Two hundred and fifty-one patients were included with a median follow up time of 71 months. The authors were able to demonstrate an overall healing rate of 87.7% with no major complications.<sup>12</sup> This study included both low and high transphincteric fistula and the healing rates between these two groups varied greatly. An overall healing rate of 92.1% in the low fistula group versus 60% in the high fistula group.<sup>12</sup> In 2019 surgeons at a national referral site for complex and perianal fistula reported their difficulty in achieving success in high transphincteric fistula using the LIFT procedure.<sup>13</sup> Primary outcomes included successful healing after LIFT whereas a secondary outcome measure was the conversion of the in fistula into a low lying intersphincteric fistula. Forty-six patients were included in the study with only 17 achieving primary healing post LIFT (37%).<sup>13</sup> However, of the 29 failures, 16 converted to an intersphincteric fistula and were able to be successfully treated with a further operation. An overall success rate was thus achieved in 71%.<sup>13</sup> Therefore, despite the failures were found to be high, many were able to be “down staged” to a more manageable fistula. It could be argued that LIFT can be used to not only result in fistula healing but additionally offers the benefit of potentially modifying the complexity of the fistula, so it is amenable to a more simplified procedure. Wen et al similarly found, patients that failed or had a recurrence, their fistula was able to be downgraded and successfully treated.<sup>14</sup> Again, a 2019 danish publication evaluating LIFT for high transphincteric fistula found a relatively low primary healing rate but demonstrating good overall results.<sup>15</sup> Sixty-five patients with high transphincteric fistula underwent LIFT with a primary healing rate of 42%.<sup>15</sup> Most of the failures were able to be downgraded and have a secondary procedure that yielded good results with an overall success of 86%.<sup>15</sup>

A common conclusion is that LIFT is a viable treatment option for patients with high transphincteric fistula. When LIFT fails there is supporting data that the fistula is often downgraded to a more manageable fistula. No significant continence changes have been uniformly reported however there is a lack of investigation and evaluation of pre and post procedure continence scores using validated systems. There is a general paucity of high-level evidence for the use of LIFT in high perianal fistula. Therefore, caution needs to be taken when interpreting study results.

### ERAF

ERAF was first described by Noble in 1902 for rectovaginal fistula.<sup>16</sup> Since its first description, modifications have been made to include varying flap thickness. Flap thickness can be described as mucosa only, partial thickness (submucosa and some of the internal sphincter) and full thickness (Includes the entire internal sphincter).<sup>17</sup> The internal opening, surrounding inflammatory tissue and overlying anoderms is excised. A flap is then cut around the opening and lifted to expose

the fistula, which is then cleaned, and the internal opening sewn shut. After cutting the end of the flap on which the internal opening was, the flap is pulled down over the sewn internal opening and sutured in place.



**Figure 2: ERAF procedure.**

In 1985 Aguilar showed by using this rectal advancement flap in the treatment of anal fistula there was only a recurrence of 1.5% and a faecal incontinence of 10%.<sup>18</sup> However, these initial promising results have been difficult to replicate with significantly higher rate of recurrence and incontinence in recent larger trials and reviews. A 2017 systematic and meta-analysis analysed articles from 1985 to 2015 for the use of the endorectal advancement flap in the management of complex perianal fistula.<sup>19</sup> Rates of anal incontinence and fistula recurrence were reported as primary outcomes. Subgroup analysis was performed to describe outcomes in relation to flap thickness. Twenty-six studies comprising of 1655 patients were included in the study with 663 patients being treated with mucosal flaps, 768 with partial thickness and 224 with full thickness flaps. The median pooled recurrence rates were 21%.<sup>19</sup> Mucosal flaps were found to have much higher rates of recurrence at 26.7% compared to partial thickness and full thickness flaps at 22.9% and 7.4% respectively.<sup>19</sup> However, the rates of faecal incontinence inversely demonstrated higher rates in full thickness at 20.4% compared to partial thickness at 14.1% and 10.3% for mucosal only flaps.<sup>19</sup> A retrospective review of 54 patients who either underwent partial thickness or full thickness again demonstrated greater results in the full thickness group with only 1 patient having recurrence as opposed to 12 in the partial thickness group.<sup>20</sup> Only 11% of the pooled patients developed incontinence but full thickness flap did not pose an increased threat to continence post procedure in this study population.<sup>20</sup> Similarly, in a recent study with 10 year follow up found a recurrence rate of 26.9%.<sup>21</sup> However, of note 90.3% of these recurrences occurred within the first-year post procedure.<sup>21</sup> This was again noted in a 2012 prospective study of 40 patients

undergoing ERAF for complex perianal fistula.<sup>22</sup> Follow up was conducted over 36 months and of the 12 patients that experienced recurrence all had occurred within the first 12 months post procedure. This was supported by Ortiz et al that concluded a 1 year follow up post ERAF was acceptable to identify most patients that will suffer fistula recurrence.<sup>23</sup> Stremitzer et al conducted a retrospective analysis to identify if a repeated ERAF was a feasible and an appropriate option for those patients who had recurrence.<sup>24</sup> Nine patients who had a failed ERAF underwent a secondary procedure with seven (77.78%) being successfully treated.<sup>24</sup> Mizrahi et al achieved similar success with healing in 8/12 (67%) patients who underwent repeated ERAF after an initial recurrence/failure.<sup>25</sup> Stremitzer et al did however suggest a repeated procedure using a full thickness flap was preferable due to the extensive scarring found in those who had an initial mucosal flap.<sup>24</sup>

Since 1985 there has been inconsistencies in the degree of recurrence and anal incontinence from ERAF in the treatment of perianal fistula. However, there are some consistent findings that may be able to guide surgeons who are performing endorectal advancement flap. Mucosal only flaps have the highest rates of recurrence and in relation to anal incontinence it remains unclear if partial thickness or full thickness flap have worse functional outcomes. Therefore, it would appear full thickness flaps may be a preferable option over mucosal only flaps. Additionally, for those who have a failed ERAF, a repeated procedure can be considered a feasible option with promising secondary healing rates.

### ***Loose seton***

The use of setons for the management of fistula in ano goes back as far as 400BC when Hippocrates used horsehair to treat a perianal fistula.<sup>26</sup> Different materials have been used in the past such as rubber band type materials, silk, steel, and plastic. Draining setons, or more commonly known as loose setons, have traditionally been used as a bridging tool between controlling perianal sepsis and definitive fistula management. However, more recently there has been interest in the utility of the loose seton being a definitive treatment option for high perianal fistula. Loose setons are thought to be a safe and affordable alternative that carry less risk of sphincter damage.

The loose seton technique involves identification of the internal and external opening of the fistula tract. Commonly, if the internal opening is not easily identified then infiltrating the tract with hydrogen peroxide can help identify the opening. Once both openings have been established a seton is passed through the tract and tied loosely at its end. The aim is to leave the seton in situ for a prolonged period to allow for healing of perianal sepsis and to promote fibrosis or migration of the fistula tract.

Kelly et al performed one of the only multicentre studies investigating the utility of loose seton for the management of high perianal fistula.<sup>27</sup> The group retrospectively reviewed the outcomes of 200 patients after undergoing the loose technique. All patients had clearance of the fistula with 93% having a controlled fistulotomy once there was minimal sphincter involvement and the remaining 7% had spontaneous resolution of the fistula.<sup>27</sup> The seton was tolerated in 96% of patients, 3% had a local reaction to the seton material which required the material type to be changed and only 1% could not tolerate due to perianal discomfort.<sup>27</sup> There was a recurrence rate of 6% and no patients experienced any postoperative incontinence.<sup>27</sup> The results reported from Kelly et al are comparable to more recent research. Dadou et al reported the results from a single surgeon performing the loose seton technique in a retrospective case series over a 10-year period.<sup>28</sup> Seventy-six patients were included in the study with a mean follow up of 63 months. Authors found 85.5% of patients had complete resolution of the fistula or significant improvement in their symptoms.<sup>28</sup> Similarly, they reported a 6.6% recurrence rate after seton removal at follow up.<sup>28</sup> Fung et al reported the results from a smaller case series of 46 patients.<sup>29</sup> Fistula resolution was achieved in 86% of patients however fistula recurrence was found to be higher at 19%.<sup>29</sup> There was however no change in pre- and post-operative continence scores for all patients. Additionally, Eitan et al used the loose seton technique as a primary approach to manage high trans sphincteric anal fistula in 42 patients.<sup>30</sup> The seton was left in situ until complete resolution of the fistula was achieved. They found that 19.5% of patients had fistula recurrence at follow up, however these patients underwent re-insertion of the seton loose seton with complete resolution.<sup>30</sup> This provided encouragement as despite the higher fistula recurrence a repeated low risk procedure could be performed and still yield promising results.

Loose seton is considered a safe, convenient, conservative, and a cheap option for both patients and surgeon. Loose seton appears to be relatively well tolerated by patients with promising results. From the current literature it can be considered a more conservative option that has so far demonstrated low rates of incontinence and is not technically challenging. There may be an argument for the loose seton technique to be performed as a primary surgical option.

### ***Cutting seton***

Cutting seton is one of the older surgical techniques for the management of high perianal fistula. However, the results of cutting seton vary. This may be attributed to the use of different seton materials, length of tightening and surgical technique. A cutting seton is generally considered an older treatment method that has seemed to have fallen out of favour for more “advanced” techniques. In theory, cutting setons result in the

formation of fibrosis, which prevents retraction of the sphincter behind the seton as it cuts through the fistula<sup>31</sup>.

The technique for a cutting seton is similar to a loose seton. After identification of the internal and external opening, a seton material is placed across the fistula tract and tied tightly. Patients generally undergo tightening's until the fistula has either cut through or becomes low lying and patients can undergo a fistulotomy.

Soliman et al investigated 81 patients over an 11-year period with high transphincteric perianal fistula managed with nylon cutting seton.<sup>32</sup> Examination under anaesthesia (EUA) and tightening of the seton occurred every 6-8 weeks. At time of publishing 70/81 patients (86.4%) had healed, 10/81 patients (12.3%) had a seton still in situ and 1/81 was lost to follow up.<sup>32</sup> The authors found six patients (7.4%) developed fistula recurrence and no patient reported worsening of continence.<sup>32</sup> Similarly, Shirah et al performed a prospective study of 372 patients with a high fistula treated with a silk cutting seton.<sup>33</sup> Compared to Soliman et al the patients had their seton tightened weekly in the outpatient department avoiding the need for further general anaesthesia. After the fistula had healed all patients were followed up for two years. One hundred and ninety-four patients experienced pain due to tightness of the seton which was relieved by oral analgesics. All seton's cut through the fistulous tract with a median time of 8 weeks (range 5-11 weeks). Recurrence rate was found in 9 patients, however 5 of these patients had crohns disease. More recently a 2020 study aimed to compare the success rates of suture selection, recovery times and pain associated with seton placement for high fistula.<sup>34</sup> Patients were randomly assigned to be treated with silk or polypropylene suture. Patients that received polypropylene seton had higher degree of pain completing daily activities, defecation and resting.<sup>34</sup> However, patients in the silk group had higher number of operations and longer duration of seton placement. There was no difference in fistula recurrence between the two groups. Authors suggested that a multistage seton placement with silk was preferable over polypropylene due to significant pain experienced with polypropylene seton suture. A small 2016 study using silk seton suture noted an overall incontinence rate of 15.8% with 9.9% incontinent to flatus and 5.9% incontinent to liquid stool.<sup>35</sup>

A rubber or vascular loop seton is one of the most used seton materials. Patton et al performed a prospective review of consecutive patients who underwent cutting seton placement using a vascular loop for the management of high perianal fistula disease.<sup>36</sup> The seton was in place for an average of nine months which was the time taken for the seton to cut through completing the fistulotomy. The number of seton tightening's required ranged from one to eight. Fistula healing was high with a 98% success rate. Despite some patients having some degree of preoperative incontinence, 37% of patients described a deterioration in their bowel function post

operatively.<sup>36</sup> However, in quality-of-life assessment 83% of patients reported a high overall level of satisfaction. Only two patients were noted to be totally unsatisfied with the outcomes of the operation.<sup>36</sup> Similarly, Rosen et al used an elastic vessel loop seton for management of 121 complex perianal fistula.<sup>37</sup> The median time for healing was 3 months with a 98% complete fistula healing rate. Tightening's were well tolerated being performed monthly in the outpatient setting with an average number of 3.3 tightening's. The incontinence rate decreased postoperatively to 19% to 11.6%. Eight patients developed new incontinence however none of these included major incontinence and all denied any change in lifestyle. These studies demonstrate a high healing rate with varied degree of incontinence. However, despite this there was a high overall satisfaction rate on quality-of-life assessment.

There is no standardised cutting seton procedure, seton material, guidelines for tightening or post-operative follow up. This, like the preference of treatment, is largely up to the discretion of the treating surgeon. The ideal seton material has not been clearly established. In addition, there is not any clear evidence that suggests faster, or slower intervals of tightening have an added advantage regarding fistula healing, recurrence, or incontinence. These studies do however demonstrate a high healing rate, relatively low level of recurrence with varied degree of incontinence. Despite the varied incontinence scores there was a high overall patient satisfaction. It can be argued that the overall quality of life should be the primary post-operative indicator of success. This suggests patients may be willing to accept some degree of deterioration in bowel function for a high healing rate. It would be reasonable to assume that the degree of incontinence would be mild and patient values need to be thoroughly assessed in the preoperative setting. Cutting seton is a technically easier operation when compared to techniques such as LIFT and endorectal advancement flaps. Most patients tolerated the procedure well and could be managed in the outpatient setting. Long term follow up is still lacking, however it is the opinion of the authors that cutting seton remains a viable, safe option for the management of high perianal fistula. It is not clear specifically why the procedure has fallen out of vogue however presumed to be because of the inconsistent degree of incontinence experienced and a perception of pain and discomfort associated with cutting setons.

### **Radiofrequency and laser ablation**

Radiofrequency ablation technology used in the management of perianal fistula is the same technology that is classically used to treat varicose veins.<sup>38</sup> It is proposed that this technology can act in a suitable minimally invasive manner to treat perianal fistula without disturbing the sphincter complex. The passage of radiofrequency waves through the fistula tissue results in heating and destruction of the tissue.<sup>39</sup> Similarly, laser



technology such as the fistula laser closure (FiLaC) device uses a radial emitting laser fibre to heat and destroy the fistula tract resulting in granulation, shrinkage and sealing of the fistula tract.<sup>40</sup> Laser ablation technology was first described as a novel treatment technique by Wilhelm in a pilot study in 2011 and since has gained some momentum.<sup>41</sup> Laser ablation is an attractive treatment as it is considered less invasive, lower risk of sphincter damage, shorter learning curve and faster operative time.

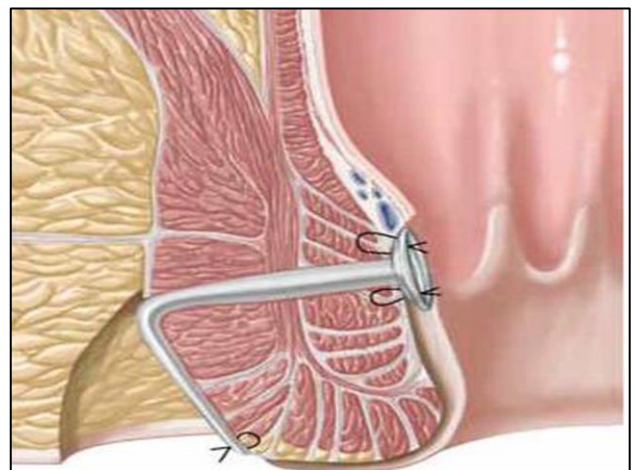
Laser ablation procedures include the injection of the external opening with methylene blue or hydrogen peroxide to identify the internal opening. A guide wire is commonly passed through the fistula tract then a plastic hollow catheter passed over the wire. A radial emitting laser fibre is then inserted through the catheter with tip at the internal opening. The fibre then emits a laser energy 360 degree and slowly pulled through the fistula tract closing the fistula as it is withdrawn. Some authors advocate for closure of the internal opening with a mucosal flap however there is no clear added benefit of closure of the internal opening.<sup>42</sup> An early study performed by Giamundo et al performed laser ablation in perianal fistula's deemed not suitable for fistulotomy.<sup>42</sup> In a series of 35 patients, they were able to provide promising results with a successful healing rate of 71% with a median of 20 month follow up and no patients reporting post-operative incontinence.<sup>42</sup> These promising reports were replicated by Ozturk and Gulcu in a retrospective review claiming an 82% success rate with the use of laser ablation<sup>43</sup>. However, majority of the patients in this study had low lying fistulas. Terzi et al (2018) was one of the earlier papers to describe the long-term effectiveness of laser ablation<sup>44</sup>. One hundred and three patients were included in the study which revealed only 40% demonstrated complete overall healing. The research included both high and low-lying fistula however the authors detected no significant difference in healing rates irrespective of classification of the fistula. Like earlier studies there was no report of worsening of post procedural faecal continence.<sup>44</sup> Similarly, Isik et al performed a retrospective analysis of long-term outcomes of 100 patients who underwent laser ablation.<sup>45</sup> They demonstrated an overall success of 62% over a median follow up period of 64 months. However, the authors demonstrated a large selection bias as 664 patients were eligible and only 15% of these patients underwent laser ablation<sup>45</sup>. Again, there were no reports of major or minor incontinence. A similar healing rate of 63.5% was found by Wilhem et al in patients with cryptoglandular fistulas that were not amenable to fistulotomy.<sup>46</sup> Only 1.7% of patients were found to have a worsening in continence, however this was to mucus and gas only.<sup>46</sup> To our knowledge Elfeki et al performed the only systematic review and meta-analysis of the safety and efficacy of fistula laser closure.<sup>47</sup> Seven studies with 454 patients demonstrated a weighted mean healing rate of 67.3%. The weighted rate of incontinence was 1% in the form of minor soiling only. The authors found that

suprasphincteric fistula classification interestingly was a predictor of treatment failure.

Laser ablation is worthwhile to be considered as part of the treatment spectrum in the management of high perianal fistula. There is minimal reporting of any change to faecal continence and is technically a simple operation when compared to other techniques such as LIFT or advancement flaps. It does however require specific equipment that would be more expensive when compared to other techniques such as seton insertion. The biggest advantage identified was that it appears to be relatively safe in avoiding any further disturbance to faecal continence. For this reason, it can be considered higher on the treatment spectrum for those that are highly concerned about faecal incontinence. However, expectations for success should remain modest for complete healing.

### ***Fistula plug***

Anal fistula plugs offer an alternative treatment option for the management of high perianal fistula. Fistula plugs were developed to provide a quick, safe, and effective means for the management of perianal fistula.<sup>48</sup> Initially, studies demonstrated promising results however were unable to be successfully replicated. Anal fistula plugs are either collagen or bioprosthetic, usually porcine intestinal wall. Anal fistula plugs work by plugging the fistula tract and acting as a framework for cellular ingrowth and remodelling to obliterate the tract without any interference with the sphincter complex. Porcine bioprosthetic plugs seem to dominate the literature regarding popularity. This may be as they are considered desirable as the material is resistant to infection, serves as a matrix for cellular remodelling and does not result in foreign body reaction.<sup>49</sup> The perianal fistula plug technique involves washing out the tract with hydrogen peroxide or normal saline. The plug is prepared and then pulled through the fistula. The plug is then cut, and internal opening anchored to the anal mucosa whilst the external opening is anchored to the skin via sutures.



**Figure 3: Fistula plug placement.**

Similarly, to most treatment strategies for the management of high perianal fistula there is an abundance of small sample, single centre reviews with minimal follow up which make drawing definite conclusions difficult. The fiat trial is one of the largest known trials assessing fistula plug in the management of high perianal fistula.<sup>50</sup> The authors compared fistula plug against “surgeons’ preference” for the management of perianal fistula. In assessment of quality-of-life (QoL) scores both groups demonstrated increased QoL without any statistical difference found between the two groups.<sup>50</sup> These results are complemented by Adamina et al who found after 2 years that patients managed with fistula plug improved on all areas on the quality-of-life scales.<sup>51</sup> This was reinforced by Bondi et al that found no difference in quality-of-life scores when comparing fistula plug to advancement flaps.<sup>52</sup> When comparing fistula healing rates, complications, and incontinence scores there was no statistical difference found between groups in the fiat trial.<sup>50</sup> The Bondi et al non inferiority trial demonstrated similar results finding no difference between fistula plugs and advancement flaps.<sup>52</sup> However, they did demonstrate that there was a 66% recurrence in the fistula plug group vs 38% recurrence in the advancement flap group at 12 months.<sup>52</sup> Similarly, Tan et al found after a median of 59 weeks, patients treated with fistula plug had an 86% recurrence rate.<sup>53</sup> In addition, Blom et al demonstrated low healing rates in four independent patient groups with only 24% of patients at final assessment demonstrating a healed fistula with no discomfort or discharge.<sup>54</sup> Aho Fält et al demonstrated an overall healing rate of using 1-5 plugs for high perianal fistula of 38%.<sup>55</sup> Interestingly, the authors found no further healing was observed after the use of three plugs in patients. Mcgee et al in noted that successful closure was associated with increased tract length.<sup>56</sup> The authors found that fistula’s longer than 4cm were nearly three times more likely to heal compared with shorter fistula.<sup>56</sup>

It is important for surgeons to gain an understanding from patient their wishes and expectations of the management of the perianal fistula. It is also the role of the surgeon to provide realistic goals and to manage the expectations of patients. Findings consistently demonstrate a relatively low fistula healing rate with a high recurrence rate. However, there is evidence to suggest that quality of scales improve post-surgery. Fistula plug surgery is considered safe with minimal trauma to the sphincter complex. For patients who are aiming to improve quality of life than fistula plug may be a viable option. The fiat trial as well as the work of Bondi et al provides evidence that when compared to other treatment options there is no statistical difference to suggest that fistula plug is an inferior treatment option.

## CONCLUSION

At current there is no ideal “gold standard” for the management of high perianal fistula. Treatment decisions are generally anecdotal based on surgeon preference. An

honest decision with patients should be performed to better understand the patient wishes and values in relation to their management. Additionally, large volume, multi-center randomised trials reviewing the primary success and overall success rates of these techniques is desperately needed to help guide surgeons in their decision making. Current techniques need to be further refined or newer techniques developed which will demonstrate consistent high rates of fistula healing, low rates of complications or recurrence, minimal effects on anal continence and high overall patient satisfaction. Until then, it is our hope that this review will provide some guidance in the management of high perianal fistula.

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