

### **Open vs. Closed Sphincterotomy for Surgical Treatment of Anal Fissures**

#### **Abstract**

There is currently no specific evidence regarding the exact etiology of anal fissures. However, various management options were reported and validated among the relevant research. Lateral internal sphincterotomy has been validated among relevant investigations in the literature as a valid modality for managing patients with chronic anal fissures. In the present literature review, we formulated evidence based on these studies to compare open and closed techniques of this surgery according to the reported outcomes. However, evidence regarding the superiority of either of the techniques over the other is not consistent among these investigations. For instance, some studies reported that closed sphincterotomy is more favorable than the open approach and should be considered the treatment choice for chronic anal fissures. This is because the technique is associated with less frequent rates of complications, less expensive, safe, and effective. On the other hand, many other relevant studies also demonstrated that the reported outcomes for the two modalities exhibited non-significant differences. Therefore, we suggest that researchers should furtherly conduct additional investigations before drawing any conclusions in this field.

**Keywords:** Lateral internal sphincterotomy; management; anal fissures; surgery.

## **Introduction**

Although anal fissures might not seem a serious condition compared to other medical conditions, it certainly is a discomforting one. In addition, it causes defecation-related pain that might also persist for 1-2 hours afterward [1]. Different presentations were reported for these fissures, being multiple or single, irregular, large or small. They might also indicate the presence of severe medical conditions, including tuberculosis, trauma, venereal infections, systemic or local malignancies, inflammatory bowel diseases, or chemotherapy. On the other hand, it should be noted that there is currently no specific evidence regarding the exact etiology of anal fissures. However, various management options were reported and validated among the relevant research [2].

Both non-surgical and surgical approaches are present with variable outcomes and indications for the affected patients. Evidence also shows that various surgical options are present with variable efficiencies and adverse events. For instance, evidence shows that lateral internal sphincterotomy has a high success cure rate of up to 100% [3]. In this context, closed and open techniques can make the surgical approach. Some studies compared the two techniques with inconsistent findings [4]. Thus, this present literature review compares both modalities' efficacy and potential adverse events based on information from relevant studies.

## **Literature review**

### **Surgical approaches overview**

Different studies have assessed the efficacy of surgical management of anal fissures. However, very few of these studies have assessed the efficacy of open sphincterotomy versus the closed one for managing these events. The present section will initially provide a brief overview of the

different indications and adverse events of the different surgical approaches that are commonly reported in the literature. Then, we will draw a comparison between open and closed sphincterotomy based on different aspects and outcomes from the included relevant investigations. When no improvement is usually noticed among patients receiving medical or non-surgical management of anal fissures, surgical management should be indicated in these situations. Evidence from recent investigations, including clinical trials, shows that surgeons and clinicians should consider six weeks of medical therapy before judging its failure in managing anal fissures. In addition, fecal incontinence is a potential secondary to performing the surgical approach. Therefore, indicated patients should be informed about the risk of this event. This information should always be included in the informed consent before the patient signs it to maintain adequate transparency of the surgical approach [5, 6].

Different surgical approaches were reported and validated in the literature. For instance, in 1964, Watts et al. [7] reintroduced anal stretch for managing patients with anal fissures. The estimated success rate for the approach has been reported to be significant [8]. On the other hand, it has been demonstrated that the approach might be associated with recurrence (in 2-80% of the cases) and incontinence (in 51%) [9-12]. On the other hand, it should be noted that the estimated success rate for this procedure was reported to be 90% [10]. Furthermore, recent evidence showed that controlled pneumatic dilatation (using pressurized balloons) had been associated with favorable outcomes regarding the reduced incidence of sphincter injury [13, 14]. A previous study from Italy demonstrated that such an approach is commonly applied in different Italian settings. However, there is no sufficient evidence in the literature that supports its favorable outcomes in managing patients with anal fissures [15]. Finally, lateral internal sphincterotomy

was introduced to the literature was favorable outcomes and reduced adverse events. This approach will be discussed in the following section.

Another proposed alternative to conducting lateral internal sphincterotomy includes performing an anoplasty. The approach can be successfully conducted with and without sphincterotomy. However, its validity was not investigated by any randomized controlled trial in the current literature [16]. Some indications were proposed for conducting the approach in patients with anal fissures. These include diagnostic doubts, having a history of anal surgery, and normal tone of sphincter or hypotonia. Cryosurgery and diathermy coagulation was also reported in the literature. However, these surgical approaches are not recommended for managing patients with anal fissures [2].

### **Lateral internal sphincterotomy**

This approach is performed by introducing an incision to the internal anal sphincter, whether by open or closed techniques. Evidence shows that the hypertrophied papillae and sentinel node can also be excised during the surgical approach [13, 17]. A previous report estimated a more than 90% cure rate for lateral internal sphincterotomy [18]. Overall, evidence indicates that the management of anal fissures by lateral internal sphincterotomy is more favorable than non-surgical management approaches [19, 20]. However, the rate of fecal incontinence is higher among patients undergoing the surgical approach more than other patients, with an estimated incidence of 10% [21]. Accordingly, it has been recommended that the surgical approach should be cautiously performed for high-risk patients with anal fissures to avoid the development of such complications. The reported high-risk population includes patients with a history of biliopancreatic bypass for obesity, multiparous women, elderly patients, and patients with a history of proctologic surgeries. It has been further demonstrated that lateral internal

sphincterotomy's efficacy is higher than the estimated efficacy for other surgical interventions, including closed sphincterotomy and fissurectomy. This has been attributed to the reported favorable outcomes with lateral internal sphincterotomy. These outcomes include reduced postoperative incontinence, reduced pain, and faster healing [13].

### **Open versus closed sphincterotomy**

In general, evidence shows that the efficacy of open and closed techniques are similar, with no statistical differences regarding the rate of incontinence [22]. On the other hand, it should be noted that one previous randomized controlled trial demonstrated that the incidence of soiling was significantly higher following open sphincterotomy more than closed ones. Besides, some complications were reported for both techniques. Some of these include the development of fistulas, abscesses, hematomas, and bleeding. In addition, a previous meta-analysis reported that the rate of continence disturbances was 14% following internal sphincterotomy. The authors of this investigation further demonstrated that incontinence rates were not significantly impacted by whether internal sphincterotomy was conducted by open or closed technique [23]. Evidence shows that caution should also be considered when conducting the surgery for patients with recurrent fissures, diabetes, irritable bowel syndrome, diarrhea, and the categories above. A previous study by Rotholtz et al. [24] aimed to assess the outcomes of patients with anal fissures after conducting closed internal sphincterotomy. The authors reported that 7% of the included patients had incontinence after the operation within a mean follow-up duration of 66.6 months. These events were attributed to closed lateral internal sphincterotomy, and none recovered from the condition during the follow-up.

A previous investigation by Walker et al. [25] retrospectively compared closed and open sphincterotomy for managing chronic anal fissures. It has been reported that the rates of

complications were significantly lower in the closed technique group than the open one (20% versus 55%, respectively). However, it should be noted that the cure rate was achieved in all of the included populations. Another comparative study by Lewis et al. [26] demonstrated no significant difference between closed and open techniques regarding rates of morbidities and healing. Overall, it has been reported that 17% of patients suffered from incontinence, while 2.3% developed postoperative infections. In the same context, Pernikoff et al. [27] investigated the efficacy of partial internal sphincterotomy for patients suffering from chronic anal fissures. It has been reported that the rates of postoperative complications were higher in the open versus the closed group (15% versus 8%, P-value < 0.01, respectively). It is worth mentioning that the authors estimated an overall rate of 99% for the success of the surgical approach for the 500 retrospectively included patients. The follow-up period for the study was also reported to be long, being 5.6 years. Finally, Garcia-Aguilar et al. [21] conducted a large comparative investigation between closed and open techniques for 864 patients with chronic anal fistulas. It has been estimated that the rates of accidental bowel movements, soiling underclothing, and permanent postoperative difficulty controlling gas were significantly higher among patients that underwent open more than closed internal sphincterotomy. The estimated rates were 11.8 versus 3.1, 26.7 versus 16.1, and 30.3 versus 23.6, with P-value < 0.001, < 0.001, and = 0.062 for open and closed techniques, respectively. On the other hand, it has been reported that no significant differences were estimated between closed and open techniques in terms of the need for reoperation, recurrence of fissures, and persistence of symptoms. It has been furtherly estimated the rate of satisfaction among the included patients was remarkably higher in the closed than the open group (64.6% versus 49.7%, respectively). Therefore, it has been concluded that closed

internal sphincterotomy is associated with more favorable outcomes and patient satisfaction rates when compared to the open technique.

It should be noted that evidence regarding the superiority of either of the techniques of internal sphincterotomy over the other is still controversial. For instance, Casillas et al. [28] demonstrated no significant differences between the two open and closed internal sphincterotomy groups among the included patients with anal fissures. Interestingly, the authors found that conducting the surgical procedure under local anesthesia might be associated with a higher incontinence rate. Previous randomized controlled trials were also conducted in this context. Arroyo et al. [29] compared patient outcomes after conducting lateral internal sphincterotomy following both techniques at different follow-up points. It has been reported that the healing rate of chronic fissures was non-significantly lower in the closed group than the open one (90% versus 92.5%, respectively) at two years of follow-up.

Similarly, there was no significant difference between the two groups regarding incontinence rate after two years of follow-up (5% versus 2.5%, respectively). Therefore, it has been concluded that the investigated outcomes were similar among the two groups. Furthermore, no significant differences were also reported in Boulos and Araujo's clinical trial, which compared open and percutaneous lateral internal sphincterotomy [19]. Finally, another randomized controlled trial by Filingeri and Gravante compared open and subcutaneous lateral internal sphincterotomy among patients with chronic anal fissures. It should be noted that the authors reported that the subcutaneous approach was conducted with radiofrequency bistoury. The authors reported that mean pain scores and operative time were similar between the two groups. On the other hand, it was noted that the healing process and more accessible procedures were generally favorable with the percutaneous approach [30].

Gupta et al. [31] further conducted another randomized controlled trial to compare the efficacy of closed and open sphincterotomy for managing chronic anal fissures. It has been reported that the closed group had an overall significantly lower hospital stay and mean pain score than the open group. Furthermore, it has been furtherly shown that the open technique of internal sphincterotomy was associated with delayed healing in 4.4% of the included population. Therefore, it has been concluded that closed internal sphincterotomy is superior to the open approach for managing patients with chronic fissures. Similar findings were also reported in another randomized controlled trial by Kortbeek et al. [32], indicating the superiority of closed internal sphincterotomy over open approach. Unfortunately, not many further investigations were found in the literature to compare open and closed internal sphincterotomy. Therefore, further studies are required to establish solid evidence and help physicians and surgeons make correct decisions that benefit patients with anal fissures.

## **Conclusion**

Lateral internal sphincterotomy has been validated among relevant investigations in the literature as a valid modality for managing patients with chronic anal fissures. In the present literature review, we formulated evidence based on these studies to compare open and closed techniques of this surgery according to the reported outcomes. However, evidence regarding the superiority of either of the techniques over the other is not consistent among these investigations. For instance, some studies reported that closed sphincterotomy is more favorable than the open approach and should be considered the treatment choice for chronic anal fissures. This is because the technique is associated with less frequent rates of complications, less expensive, safe, and effective. On the other hand, many other relevant studies also demonstrated that the reported outcomes for the two

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UNDER PEER REVIEW

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