# Comparative study between surgical lateral internal sphincterotomy and botulinum toxin injection in the treatment of chronic anal fissure

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**Introduction**
Anal fissure is a longitudinal ulcer from below the dentate line to above the anocutaneous line. In 90% of cases, it is posterior. The second location is anterior commissure. In women, ~80% are posteriorly, whereas 20% occur anteriorly. Botulinum toxin (BTX) action is mediated by its action on the autonomic nervous system. The treatment goal for BTX is the interruption of the internal sphincter spasm. Indeed, sphincter manometry after BTX injection has demonstrated a lowering of resting internal pressure. The aim is to compare effectiveness of surgical lateral internal sphincterotomy (LIS) versus BTX injection.
**Patients and methods**
A total of 60 patients were randomly allocated into two equal groups of 30 patients each: group I (lateral internal sphincterotomy group) and group II (BTX injection group).
**Results**
Chronic anal fissure can be successfully treated with surgical LIS with a 90% healing rate after 2 months, with no recurrence rate recorded, in comparison with a 70% healing rate in BTX injection, with a 20% incidence of recurrence.
**Conclusion**
LIS is a satisfactory treatment for chronic anal fissure, being quick and easy to be performed with minimal complications. Recurrence is uncommon. BTX is safe and easy, with rapid relief of pain, with no risk of anesthetic or operative complications. It is relatively less invasive than surgical, with negligible complications, but it has a higher recurrence rate. The risk of anal incontinence is higher in the surgical group especially in elderly patients than BTX injection; therefore, BTX injection is preferred in middle aged and elderly patients, risk factor for anal incontinence, or those of recent complaint of anal fissure.

**Keywords:**
anal fissure, botulinum toxin injection, lateral internal sphincterotomy

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## Introduction

An acute anal fissure will heal spontaneously or in response to medical management, whereas chronic fissure usually requires interference. Therefore, anal fissures are treated either conservatively or surgically [1]. Initial therapy includes a proper diet and good personal hygiene. A large amount of fiber intake with at least 2 L of fluid consumption daily is mandatory. Bulking agents can be added. High-fiber diet intake itself has been shown to heal 60–87% of acute fissures and decrease recurrences. Creams and ointments, consisting of anti-inflammatory agents or local anesthetics, have not been proven to promote healing but may alleviate some symptoms. Anal suppositories should be avoided as their insertion is generally painful and tends to migrate to the upper part. Relief of symptoms and healing will be seen in up to 60% of the patients who use these conservative measures [2]. Some clinicians still use an anal dilator as part of conservative treatment of anal fissure. However, many patients find self-dilatation is painful, and compliance is probably poor, and studies reported a high relapse rate [3]. In a study by Sajid *et al.* [4], factors that were found to be associated with a poor long-term outcome following conservative therapy were the presence of skin tag and fibrous polyp. Operation was required in 72% of patients with tag, compared with only 42% without. Similarly, operative treatment was necessary in 84% of patients with an anal polyp, compared with only 48% without. Various pharmacological agents have been shown to lower anal pressure and promote fissure healing. Chemical sphincterotomy is now the accepted first line of treatment in many centers [5]. Organic nitrates and nitrite were introduced into

medicine in the 19th century. Nitration in the smooth muscle cell releases nitric oxide, which is the main physiological vasodilator, normally produced by endothelial cells. There is now good evidence that nitric oxide is one of the most important inhibitory neurotransmitters in the internal anal sphincter [6]. Nitrosamines can be formed from nitrates (usually agricultural runoff) in drinking water upon ingestion, but it is considered by The National Academy of Sciences as lacking margin of safety for sensitive individuals. Most nitrosamines are carcinogenic and associated with gastric cancer risk and esophageal cancer [7]. Topical application of glyceride trinitrate (GTN) ointment for the treatment of patients with anal fissure has been tried in several recent studies with encouraging results. There are three possible reasons for the failure of topical GTN to produce healing of chronic anal fissure: (a) a raised threshold to the relaxant action of topical GTN on the internal anal sphincter in patients with fissure, (b) a shorter than expected duration of action, and (c) the development of tachyphylaxis (a decrease in response to a drug owing to prior exposure to the agent) [6]. Topical application (2%, four times daily) has a higher healing rate than oral dosage (60 mg, twice daily) (65 vs. 38%). Comparative studies of GTN and nifedipine have shown equivalent healing, but fewer adverse effects, with, nifedipine. Overall, 50% of patients failing treatment on GTN may heal with nifedipine [8]. The aim of surgical treatment is to reduce the activity of the internal anal sphincter or to cover the anal ulcer by well-vascularized skin to allow healing of the ischemic fissure [9–12].

#### Internal anal sphincterotomy

Internal anal sphincterotomy includes posterior midline sphincterotomy, lateral sphincterotomy, multiple sphincterotomies around the circumference of the anal canal, and bilateral partial sphincterotomies [13]. Open technique lateral internal sphincterotomy (LIS): it is usually performed under general anesthesia as a day procedure. Closed technique subcutaneous LIS: no bowel preparation is required, and it is possible to perform the procedure under local anesthesia. Botulinum toxin (BTX) is produced by *Clostridium botulinum*; it is a lethal biological toxin but has numerous therapeutic values in the treatment of various ophthalmological and neurological disorders [14]. Therapeutic indications include upper motor neuron syndrome, focal hyperhidrosis, blepharospasm, strabismus, and chronic migraine as well as a widely used cosmetic treatments [15]. BTX can cause botulism, a serious and life-threatening illness in humans and animals [16]. Several different products are currently available from BTX; the most commonly used agents are Botox and Dysport. Both of which are BTX type. The injected dose of Botox is 2.5–10 U for each injection (total of 5–20 U) and 10–20 U (total 20–40 U) for Dysport [17].

Forms of BTX types A and B are available commercially for research and various medical and cosmetic procedures. BTX type-A is used for cosmetic treatment, because the benefits of treatment with BTX type-A last 2–4 times longer than BTX type-B, and BTX type-A causes little discomfort during injection, compared with BTX type-B, which is quite painful for many patients. The safety margin with BTX type-A medications is very high. Therefore, BTX type-B product is less commonly used [16]. BTX treatment for anal fissures produces pain relief in most patients within the first 2 days. Cure rates evaluated 2–3 months after injection are ~80%. A second injection for treatment failure will produce a cure in 70% of cases that failed [18].

## Patients and methods

This is a randomized (using research randomizer) study conducted on 60 patients with chronic anal fissure. The patients received informed consent after sufficient research information (research characteristics, benefits, and potential complications) were presented. The research protocol was accepted by the Institutional Human Ethical Committee. The study was done in Beni–Suef University Hospital and El Fayoum University Hospital during the period from March 2017 to March 2019.

The 60 patients included in this study were subjected to preoperative assessment including the following:

(1) Complete history taking, focusing on the following points: pain, bleeding, constipation, pruritus, and discharge.

All patients were categorized according severity of pain into mild, moderate, and severe.

(1) Clinical examination (general and local):

Anorectal examination, aiming to detect the site of the fissure ensuring its chronicity and presence of associated anal pathology.

(1) Laboratory investigations: it included hemoglobin %, bleeding and clotting times, INR, serum creatinine, SGPT, and FBS.

### Exclusion criteria

The exclusion criteria were age less than 16 years old and more than 60 years old, complicated anal fissure, associated complicated piles, atypical anal fissure, and recurrent surgically treated patients.

A total of 60 patients were randomly allocated into two equal groups of 30 patients each.

(1) Group I (LIS group).
(2) Group II (BTX injection group).
    (a) Group I (LIS group):

The 30 patients of this group were subjected to surgical treatment of the chronic anal fissure in the form of open LIS; the operation was done under general anesthesia without muscle relaxant. The patient started liquid diet four hours after the operation and anal dressing was removed eight hours after the operation with application of local anesthetic cream before defecation. In this group, the patients were discharged on the next postoperative day with instructions concerning high residue diet, analgesics, and warm sitz baths.

Follow-up criteria: patients were followed up in outpatient clinic for relief of pain, fissure healing, posttreatment bleeding, infection, and incontinence, as well as recurrence and satisfaction. Follow-up was carried out at one week, then second week, then 1st month then, 2nd month, and then 3rd month after treatment. During every follow-up visit, treatment success and improvement of the previous symptoms were evaluated. Healing and recurrence rates were determined, with healing being defined as complete re-epithelialization of the fissure site as documented by the physician. Recurrence was defined as fissure identified after documentation of complete healing. Incontinence was categorized as soiling of underclothing or lack of flatus control.

**Table 1 Age distribution in the two groups**

| | Age | | | |
|---|---|---|---|---|
| Technique | 20–29 | 30–39 | 40–49 | 50–60 |
| LIS | 9 | 3 | 9 | 9 |
| BTX | 3 | 15 | 9 | 3 |
| Total | 12 | 18 | 18 | 12 |

BTX, botulinum toxin; LIS, lateral internal sphincterotomy. *P* value 0.198; $\chi^2$=4.66.

**Table 2 Technique=lateral internal sphincterotomy**

| Sex | Valid *n* (%) |
|---|---|
| Male | 12 (40.0) |
| Female | 18 (60.0) |

(1) Group II (BTX group):

BTX was injected in the internal anal sphincter. The toxin was diluted in saline to 20 u/ml. Overall, 20 units of BTX were administered, and then internal anal sphincter was palpated between index finger and thumb of the left hand while patient in the left side position. An equal volume (10 U) of BTX was injected on each side of anterior midline. Local anesthesia was used during the procedure. The age distribution was almost similar in the two groups (mean age: 39–40 years) (Table 1).

The sex distribution was also similar in the two groups, and they were mainly females (60%) in BTX group (Tables 2–4).

Technique = Botox injection

### Site of anal fissure

The posterior midline (posterior commissure) was the most common site for fissure followed by the anterior midline site (Table 5).

### Clinical presentation

Pain was almost always present in 100% in all the patients of the two groups (Table 6).

Pain during defecation varied from mild, moderate to severe which was appreciated subjectively according to

**Table 3 Sex distribution**

| Sex | Valid *n* (%) |
|---|---|
| Male | 15 (50.0) |
| Female | 15 (50.0) |

**Table 4 Sex distribution in the two groups**

| Sex | Valid *n* (%) |
|---|---|
| Male | 27 (45) |
| Female | 33 (55) |

*P* value 0.65; $\chi^2$=0.202.

**Table 5 Site of anal fissure**

| | | Technique | |
|---|---|---|---|
| Site of anal fissure | | LIS | BTX |
| Posterior | Count | 27 | 24 |
| | % within technique | 90.0 | 80.0 |
| Anterior | Count | 3 | 6 |
| | % within technique | 10.0 | 20.0 |
| Total | Count | 30 | 30 |
| | % within technique | 100.0 | 100.0 |

BTX, botulinum toxin; LIS, lateral internal sphincterotomy. *P* value 0.531; $\chi^2$=0.392.

**Table 6 The presenting symptoms in the two groups**

| | | Technique | | |
|---|---|---|---|---|
| | | LIS | BTX | |
| Pain as presenting symptom | Count | 30 | 30 | |
| | % within pain | 50.0 | 50.0 | *P* value 1 |
| | % within technique | 100.0 | 100.0 | |
| Pain during defecation | Technique | | | |
| | LIS | BTX | | |
| Sever (7–10) | Count | 21 | 21 | |
| | % within technique | 70.0 | 70.0 | |
| Moderate (4–5) | Count | 6 | 6 | |
| | % within technique | 20.0 | 20.0 | |
| Mild (1–3) | Count | 3 | 3 | |
| | % within technique | 10.0 | 10.0 | |
| Constipation | Technique | Total | | |
| | LIS | BTX | | |
| Yes | Count | 24 | 24 | 48 |
| | % within technique | 80.0 | 80.0 | 80.0 |
| No | Count | 6 | 6 | 12 |
| | % within technique | 20.0 | 20.0 | 20.0 |
| Bleeding | Technique | Total | | |
| | LIS | BTX | | |
| Yes | Count | 21 | 24 | 45 |
| | % within bleeding | 46.7 | 53.3 | 100.0 |
| | % within technique | 70.0 | 80.0 | 75.0 |
| No | Count | 9 | 6 | 15 |
| | % within bleeding | 60.0 | 40.0 | 100.0 |
| | % within technique | 30.0 | 20.0 | 25.0 |
| Pruritus | Technique | | | |
| | LIS | BTX | | *P* value 0.606 |
| Yes | Count | 9 | 6 | $\chi^2$=0.267 |
| | % within technique | 30.0 | 20.0 | |
| No | Count | 21 | 24 | |
| | % within technique | 70.0 | 80.0 | |
| Discharge | Technique | | | *P* value 1 |
| | LIS | BTX | | |
| Yes | Count | 3 | 3 | |
| | % within technique | 10.0 | 10.0 | |
| No | Count | 27 | 27 | |
| | % within technique | 90.0 | 90.0 | |

BTX, botulinum toxin; LIS, lateral internal sphincterotomy.

patient's complaint, which was given a score (ranging from 1–3 for mild, 4–6 for moderate, and 7–10 for severe pain) experienced by the patient before entering the trial (Table 6).

Patients were complaining of constipation, bleeding, pruritus, and discharge (Table 6).

## Results

### Postoperative healing

Complete healing of the fissure was asymptomatically higher after LIS 90% than 70% after BTX injection. In addition, in 10% of patients of LIS group and 20% of patients of BTX group, the fissure did not heal and the patients were asymptomatic, and in 10% of cases of BTX group, the fissure did not heal with persistence of complaint (Table 7).

### Operative pain relief

A relief of pain was maximum (80%) after the first month from LIS group, and 20% of patients from this group were relieved at the second month. The same report was recorded in BTX group, but with maximum incidence of pain relief at the end of first month (70%) (Table 8).

### Complication

(1) Postoperative bleeding:

Postoperative bleeding was recorded in 10% of cases of LIS group (Table 9).

**Table 7 Incidence of healing of the fissure in the two groups 2 months posttreatment**

| | | Technique | |
|---|---|---|---|
| Healing | | LIS | BTX |
| Complete healing | Count | 27 | 21 |
| | % within healing | 56.0 | 44.0 |
| | % within technique | 90.0 | 70.0 |
| Nonhealing (asymptomatic) | Count | 3 | 6 |
| | % within healing | 66.0 | 33.0 |
| | % within technique | 10.0 | 20.0 |
| Nonhealing (symptomatic) | Count | 0 | 3 |
| | % within healing | 0.0 | 100.0 |
| | % within technique | 0.0 | 10.0 |
| Total | Count | 30 | 30 |
| | % within healing | 50.0 | 50.0 |
| | % within technique | 100.0 | 100.0 |

BTX, botulinum toxin; LIS, lateral internal sphincterotomy. *P* value 0.45; variance 1.

**Table 8 Pain relief in the two groups**

| | | Technique | |
|---|---|---|---|
| Pain relief | | LIS | BTX |
| 1st month | Count | 24 | 21 |
| | % within pain relief | 53.0 | 47.0 |
| | % within technique | 80.0 | 70.0 |
| 2nd month | Count | 6 | 6 |
| | % within pain relief | 50.0 | 50.0 |
| | % within technique | 20.0 | 20.0 |
| 3rd month | Count | 0 | 3 |
| | % within pain relief | 0.0 | 100.0 |
| | % within technique | 0.0 | 10.0 |
| Total | Count | 30 | 30 |
| | % within pain relief | 50.0 | 50.0 |
| | % within technique | 100.0 | 100.0 |

BTX, botulinum toxin; LIS, lateral internal sphincterotomy. *P* value 0.587; $\chi^2$=1.067.

**Table 9 Incidence of bleeding as complication in the two groups**

| | | Technique | |
|---|---|---|---|
| Bleeding (complication) | | LIS | BTX |
| Mild | Count | 3 | 0 |
| | % within bleeding (complication) | 100.0 | 0.0 |
| | % within technique | 10.0 | 0.0 |
| No | Count | 27 | 30 |
| | % within bleeding (complication) | 47.4 | 52.6 |
| | % within technique | 90.0 | 100.0 |
| Total | Count | 30 | 30 |
| | % within bleeding (complication) | 50.0 | 50.0 |
| | % within technique | 100.0 | 100.0 |

BTX, botulinum toxin; LIS, lateral internal sphincterotomy. *P* value 0.305; $\chi^2$=1.05.

**Table 10 Incidence of infection in the two groups**

| | | Technique | |
|---|---|---|---|
| Infection | | LIS | BTX |
| Yes | Count | 3 | 0 |
| | % within infection | 100.0 | 0.0 |
| | % within technique | 10.0 | 0.0 |
| No | Count | 27 | 30 |
| | % within infection | 47.4 | 52.6 |
| | % within technique | 90.0 | 100.0 |
| Total | Count | 30 | 30 |
| | % within infection | 50.0 | 50.0 |
| | % within technique | 100.0 | 100.0 |

BTX, botulinum toxin; LIS, lateral internal sphincterotomy. *P* value 0.305; $\chi^2$=1.05.

Postoperative infection: it occurred in 10% of patients with LIS group (Table 10).

### Postoperative incontinence

Temporary uncontrolled flatus appeared in 10% of LIS group and 10% of BTX group.

Temporary soiling of under appeared only in 10% of LIS group (Table 11).

By the end of the first month, this symptom disappeared in all patients.

Incidence of recurrence: The incidence of recurrence was 20% of the BTX group (Table 12).

**Table 11 Incidence of temporary incontinence in the two groups**

| | | Technique | |
|---|---|---|---|
| Incontinence | | LIS | BTX |
| Temporary uncontrolled of flatus | Count | 3 | 3 |
| | % within incontinence | 50.0 | 50.0 |
| | % within technique | 10.0 | 10.0 |
| Temporary soiling of under | Count | 3 | 0 |
| | % within incontinence | 100.0 | 0.0 |
| | % within technique | 10.0 | 0.0 |
| No | Count | 24 | 27 |
| | % within incontinence | 47.1 | 52.9 |
| | % within technique | 80.0 | 90.0 |
| Total | Count | 30 | 30 |
| | % within incontinence | 50.0 | 50.0 |
| | % within technique | 100.0 | 100.0 |

BTX, botulinum toxin; LIS, lateral internal sphincterotomy. *P* value 0.58; $\chi^2$=1.056.

### Satisfaction

Overall, 90% of patients in LIS group had shown complete satisfaction of the results but only 40% in

**Table 12 Incidence of recurrence in the two groups**

| | | Technique | |
|---|---|---|---|
| Recurrence | | LIS | BTX |
| Yes | Count | 0 | 6 |
| | % within recurrence | 0.0 | 100.0 |
| | % within technique | 0.0 | 20.0 |
| No | Count | 30 | 24 |
| | % within recurrence | 55.5 | 44.5 |
| | % within technique | 100.0 | 80.0 |
| Total | Count | 30 | 30 |
| | % within recurrence | 50.0 | 50.0 |
| | % within technique | 100.0 | 100.0 |

BTX, botulinum toxin; LIS, lateral internal sphincterotomy. *P* value 0.136; $\chi^2$=2.2.

**Table 13 Incidence of satisfaction in the two groups**

| | | Technique | |
|---|---|---|---|
| Satisfaction | | LIS | BTX |
| Yes | Count | 27 | 12 |
| | % within satisfaction | 69.2 | 30.8 |
| | % within technique | 90.0 | 40.0 |
| No | Count | 3 | 18 |
| | % within satisfaction | 14.3 | 85.7 |
| | % within technique | 10.0 | 60.0 |
| Total | Count | 30 | 30 |
| | % within satisfaction | 50.0 | 50.0 |
| | % within technique | 100.0 | 100.0 |

BTX, botulinum toxin; LIS, lateral internal sphincterotomy. *P* value 0.019; $\chi^2$=5.4.

BTX group had shown complete satisfaction (Table 13). six (20%) patients of BTX group had recurrence, nine (30%) patients had nonhealing fissure, and three (10%) patient was not satisfied by the technique itself, so 60% from BTX group were not satisfied by BTX injection treatment.

## Discussion

Anal fissure is a common, painful condition that causes significant morbidity, mostly in young adults. Acute anal fissures often heal spontaneously or with the help of medical treatment. Recurrence rates range from 30 to 70% if treatment is abandoned after the fissure is healed [19].

Chronic anal fissure is a nonhealing linear tear in the distal anal mucosa below the dentate line. An anal fissure is likely to be nonhealing if the fissure persists beyond 4 weeks. A chronic fissure can be identified by the presence of indurated edges, visible internal sphincter fibers at the base of the fissure, a sentinel polyp at the distal end of the fissure, or a fibro-epithelial polyp at the apex. A chronic fissure classically occurs at the posterior midline position (6 o'clock position), with the anterior midline position occurring in 10% of females and 1% of males [20].

The present study included 60 adult patients with chronic anal fissure. Their ages ranged between 16 and 60 years old. It was similar to the statement that most patients who develop anal fissures are young to middle aged adults. However, patents of all ages, including infants and the elderly, can develop an anal fissure, as reported by Costilla and Foxx-Orenstein [21].

Regarding the healing rate in the present study, there was high success with complete healing after treatment with lateral internal anal sphincterotomy (90% for LIS and 70% for BTX). The time to complete healing was earlier with LIS than with BTX.

In patients treated by surgical LIS, healing occurred in 90% of cases within 2 months. These findings go hand in hand with Romano *et al.* [22] and Arroyo *et al.* [23], who found the healing rates approaching 90–100% in some clinical trials.

Floyd *et al.* [24] found the healing rate after lateral sphincterotomy in 62% patients within 2 months, which goes hand in hand with the present study.

In patients treated by BTX injection, healing occurred in 70% of cases. These findings go hand in hand with Mentes *et al.*, [25], whose study was carried on 61 patients for 2-year follow-up.

Maria *et al.* [14], reported a small randomized trial in 30 patients of 20 U BTX-A versus saline injected into the internal anal sphincter in outpatients with neither sedation nor anesthesia. Within 2 months, 73% of treated patients had healed compared with 13% of controls (group received placebo).

In a study by Godevenos *et al.* [26], 78% of patients treated with BTX presented with completely healed anal fissure, whereas 10% needed LIS.

The study by Giral *et al.* [27] showed that LIS and BTX injection treatment modalities had similar fissure healing rates (82 vs. 70%).

In the present study, incontinence was reported in 10% of cases with LIS, which was temporary uncontrolled flatus and improved within 3 weeks, and 5% of cases with BTX, which represented with fecal incontinence. This result goes hand in hand with Romano *et al.* [22], which were 15 and 9%, respectively.

Continence disturbance in the present study occurred in 5% of patients in BTX group, which was insignificantly different from that of 10% of patients in the LIS group. These findings go hand in hand with Hyman [28] and Nelson [29], in which continence disturbance was seen in less than 10% and primarily involved incontinence to flatus, which often improved with time.

A study by Hieda *et al.* [30] carried out on 89 patients showed success rate of 100% after LIS and recurrence rate of 5.6%.

In a study by Arroyo *et al.* [23] carried out on 40 patients, after LIS, the recurrence rate was 7.5% after 3-year follow-up.

Long-term follow-up and number of patients were responsible for differences between results in the studies. However, in the present study, we found a recurrence rate in the BTX injection group of ~20% among the cases, which is similar to the results carried out by Mentes *et al.*, [25] whose study was carried out on 61 patients for 2-year follow-up, with recurrence rate of 11.4%.

Regarding complication after treatment in the present study, the complications included bleeding, infection, and incontinence, with insignificant differences between surgical sphincterotomy and BTX injection. This goes hand in hand with Arroyo *et al.* [23] who found no significant differences between the two methods of treatment in the immediate complication rates following treatment.

In the present study, pain after defecation was the presenting symptom in all patients, constipation in 80% and bleeding in 75%. This goes hand in hand with Ammari *et al.* [31], who found pain and bleeding after defecation were the presenting symptom in all patients.

Giral *et al.* [27] injected the VTX on each side of the fissure, mainly to the posterior of the anal sphincter. However, it was suggested that anterior injection of BTX could better reduce the resting pressure of the anal sphincter (88 vs. 60% respectively), which could be due to the fibrotic base of the fissure or ischemic degeneration of the myenteric plexus of the posterior sphincter.

On the contrary, LIS causes irreversible effects on internal anal sphincter, and low doses of BTX (20 IU) were used in the present study, which might be one of the causes attributing to the increase in recurrence rate after treatment with it. This explanation might be supported by the published data confirming that higher dose of BTX are associated with improved rates of healing [32].

## Conclusion

We believe that LIS is a satisfactory treatment for chronic anal fissure, being quick and easy to be performed with minimal complications. Recurrence after this mode of therapy is uncommon.

Injection of BTX is an accepted method of treatment. It is safe and easy to use, with rapid relief of pain and no risk of anesthetic or operative complications; however, it is an effective alternative modality in the treatment of chronic anal fissure. It is relatively less invasive than surgical approach, and the complications are negligible, but it has a higher recurrence rate than LIS. The risk of anal incontinence is higher in the surgical group especially in elderly patients.

On the contrary, BTX injection is a preferred option in the middle aged and elderly patients or those with the risk factor for anal incontinence or those of recent complain of anal fissure.

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#### Conflicts of interest

There are no conflicts of interest.

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