



2023

Section: General Surgery

## Comparative Study Between Lateral Internal Sphincterotomy vs. Botulinum Toxin Injection In The Treatment Of Chronic Anal Fissure

Ibrahim Abo El-Fotouh Mohamed

*Department of General surgery and Endoscopy, Faculty of Medicine for boys, Al-Azhar University, Cairo, Egypt*

Mohamed Ibrahim Shalamesh

*Department of General surgery and Endoscopy, Faculty of Medicine for boys, Al-Azhar University, Cairo, Egypt*

Ahmed Shaker Mohamed Badawy

*Department of General surgery and Endoscopy, Faculty of Medicine for boys, Al-Azhar University, Cairo, Egypt, dr.ahmedelsery@gmail.com*

Follow this and additional works at: <https://aimj.researchcommons.org/journal>



Part of the [Medical Sciences Commons](#), [Obstetrics and Gynecology Commons](#), and the [Surgery Commons](#)

### How to Cite This Article

Mohamed, Ibrahim Abo El-Fotouh; Shalamesh, Mohamed Ibrahim; and Badawy, Ahmed Shaker Mohamed (2023) "Comparative Study Between Lateral Internal Sphincterotomy vs. Botulinum Toxin Injection In The Treatment Of Chronic Anal Fissure," *Al-Azhar International Medical Journal*: Vol. 4: Iss. 10, Article 41. DOI: <https://doi.org/10.58675/2682-339X.1980>

This Original Article is brought to you for free and open access by Al-Azhar International Medical Journal. It has been accepted for inclusion in Al-Azhar International Medical Journal by an authorized editor of Al-Azhar International Medical Journal. For more information, please contact [dryasserhelmy@gmail.com](mailto:dryasserhelmy@gmail.com).

# Comparative Study Between Lateral Internal Sphincterotomy Versus Botulinum Toxin Injection in the Treatment of Chronic Anal Fissure

Ibrahim Abo El-Fotouh Mohamed, Mohamed Ibrahim Shalamesh, Ahmed Shaker Mohamed Badawy\*

Department of General Surgery and Endoscopy, Faculty of Medicine for Boys, Al-Azhar University, Cairo, Egypt

## Abstract

**Background:** Anal fissure is one of the most public proctologic illnesses. Breaking the vicious cycle of spasm, ischemia, and pain in CAF is accomplished with surgical or medical procedures. Surgical procedures, such as anal dilatation, posterior midline sphincterotomy, and lateral internal sphincterotomy (LIS), have been the gold standard treatment for anal fissure. botulinum toxin injection seems to be an optimal non-operative therapy with similar healing rates but lowest rate of recurrence.

**Patients and methods:** This is a prospective observational trial was carried out at Department of general Surgery, Faculty of Medicine, Al-Azhar University hospitals. This study was conducted on 50 individuals with chronic anal fissure divided into 2 groups: Group (A): 25 patients was treated with lateral internal sphincterotomy, Group (B): 25 individuals will be treated with botulinum toxin injection.

**Results:** There was a significant correlation between Time of healing of fissures and duration of symptoms and between the time of healing of fissures and duration of symptoms. There was statistically insignificant variance among the groups regarding Maximal Squeeze Pressure (mmHg) and among the groups After 6 weeks. There was a statistically insignificant change among the groups regarding age or sex.

**Conclusion:** In individuals with simple chronic anal fissure, injection of botulinum toxin had approximately the same outcomes as lateral internal sphincterotomy in terms of postoperative pain recovery, bleeding, fissure healing, incontinence and fissure relapse.

**Keywords:** Botulinum toxin, Chronic anal fissure, Lateral internal sphincterotomy

## 1. Introduction

Anal fissure is still a prevalent proctologic issue that can cause considerable discomfort during bowel movements and even bleeding in rare cases. The pain associated with chronic anal fissure (CAF) leads to proportionate worsening of quality of life and tends not to heal without intervention.<sup>1</sup>

Breaking the vicious cycle of spasm, ischemia and pain in CAF is accomplished with surgical or medical procedures. Lateral internal sphincterotomy, posterior midline sphincterotomy and anal dilatation are some of the medical procedures used to treat anal fissure.<sup>2</sup>

Major postoperative problems such pain, bleeding, incontinence, and recurrence are a possibility with every surgical method. Participants who had lateral internal sphincterotomy saw more symptom treatment and required less time in the hospital as a result.<sup>3</sup>

Today, lateral internal sphincterotomy continues to be the gold standard for management of chronic anal fissure. This operation has been successful in more than 90% of cases and has rates of recurrence <10%.<sup>4</sup>

Also, it carries the risk of permanent complications like fecal incontinence in > thirty percent of patients.<sup>5</sup>

Accepted 4 June 2023.  
Available online 24 January 2024

\* Corresponding author.  
E-mail address: [dr.ahmedelsery@gmail.com](mailto:dr.ahmedelsery@gmail.com) (A.S.M. Badawy).

<https://doi.org/10.58675/2682-339X.1980>

2682-339X/© 2023 The author. Published by Al-Azhar University, Faculty of Medicine. This is an open access article under the CC BY-SA 4.0 license (<https://creativecommons.org/licenses/by-sa/4.0/>).

Because of this, several non-conventional medical therapies, such as botulinum toxin injections and organic nitrate preparations, have been investigated and put into practice. Botulinum toxin injection stands out as the non-invasive treatment with the best balance between speed of recovery and risk of recurrence.<sup>6</sup>

It has been proposed that high anal testing pressure is a fundamental pathophysiologic element of chronic anal fissure. The most common method for treating CAF, known as lateral internal sphincterotomy, needs general or local anesthesia but is successful in more than 90% of cases.<sup>7</sup>

Stomach gas, mucus, or feces incontinence can be a chronic side effect of this procedure and it has also been linked to abscesses and anal deformities in as many as 30% of patients.<sup>8</sup>

Topical nitrates, botulinum toxin injection (Botox) and calcium antagonists are among of the newer, less intrusive therapeutic approaches that have been presented.<sup>9</sup>

Intrasphincteric injection of botulinum toxin is a reliable and successful new option in the management of uncomplicated CAF. This method has been described initially by Jost and Schmrigrk. The use of botulinum toxin for chemical sphincterotomy (CS) has been linked to a reduced risk of complications and a shorter recovery time.<sup>10</sup>

## 2. Aim of the work

Assessment of botulinum toxin injection performance against lateral internal sphincterotomy for the treatment of chronic anal fissure.

## 3. Patients and methods

Fifty participants participated in this prospective, observational research with chronic anal fissure who were selected from attendee of general surgery clinics of Al-Azhar University Hospitals, Samples were collected by the systematic random method.

There were 2 groups of patients.: **Group (A):** Fifty five patients were treated with lateral internal sphincterotomy and **Group (B):** Fifty five participants were treated with botulinum toxin injection.

**The Inclusion criteria were:** All the patients diagnosed by medical history (pain and/or bleeding during or after defecation for at least 3 months) and a thorough medical history and physical, including an anoscopy or digital genital exam Conservative treatments (analgesics, warm sitz baths and high-

residue diet) have failed in these individuals, therefore more invasive measures are needed. With the following characteristics, we may say that the individuals has a CAF: The presence of a sentinel tag of skin, indurations at the margins and exposed internal sphincter fibres indicative of a posterior or anterior confined ulcer.

**The Exclusion criteria were:** Complex fissure (stenosis, abscess, fistula and symptomatic hemorrhoids), great sentinel pile, related illness (malignancy, inflammatory bowel disease, prior pelvic radiotherapy, tuberculosis and any immunosuppressive condition), Individuals have a history of anal canal surgery or an allergy to local anaesthetics.

### 3.1. Methods

The research participants were exposed to a detailed history taking and Careful clinical examination.

### 3.2. Surgical technique

Preoperative, intraoperative and postoperative measures were all included of the analysis.

#### 3.2.1. Ethical consideration

Official approval was acquired from the Al-Azhar University School of Medicine's Department of General Surgery's Ethical Committee. Institutional Review Board (IRB) approval, faculty of medicine (IRB) ethics committee approval and every individual provided informed and written permission after they were told of the study's aims, methodology and related objectives were all secured.

### 3.3. Data management and statistical analysis

Version 20 of SPSS was employed for input of data, processing and statistical analysis (Statistical Package for the Social Sciences). Kruskal-Wallis, Chi square, logistic regression analysis, Wilcoxon's and Spearman's correlation were utilized as significant tests. According to the kind of information (parametric and nonparametric) collected for each parameter, the appropriate analysis was performed on the supplied data. *P* values below 0.05 (5%) were regarded as statistically significant.

## 4. Results

### Table 1.

This table shows: demographic characteristics amongst the 2 studied groups. In group A, the mean

Table 1. Demographic characteristics among the studied groups.

	Group A (n = 25)	Group B (n = 25)	Test value	P value
Age (years)				
Mean ± SD	39.5 ± 3.8	40.4 ± 3.7	0.48	0.921
Min.-Max.	25–50	25–50		
Sex				
Male	20 (80%)	21 (84%)	0.502	0.91
Female	5 (20%)	4 (16%)		

P value less than 0.05 is significant, P value < 0.01 is highly significant.

SD, Standard deviation.

Student t-test.

X<sup>2</sup>, Chi- Square test.

Table 2. Maximal resting pressure (mmHg), maximal squeeze pressure (mmHg) and duration of symptoms, mo among the studied groups.

	Group A (n = 25)	Group B (n = 25)	Test value	P value
Duration of symptoms, mo				
Mean ± SD	11 ± 5	10 ± 4	1.56	0.28
Min.-Max.	5–16	5–15		
Maximal Resting Pressure (mmHg)				
Mean ± SD	105 ± 20	102 ± 22	1.2	0.64
Min.-Max.	80–120	80–120		
Maximal Squeeze Pressure (mmHg)				
Mean ± SD	115 ± 65	72 ± 25	6.67	0.00001
Min.-Max.	50–150	30–100		

Student t-test.

age was 39.5 ± 3.8, there were 80% male, 20% female. In group B, the mean age was 40.4 ± 3.7, 84% were male, 16% were female.

There was statistically insignificant change among the groups regarding age or sex (Table 2).

The Table shows Maximal Resting Pressure (mmHg), Maximal Squeeze Pressure (mmHg) and Duration of symptoms (mo). In group a, the mean Duration of symptoms (mo) was 11 ± 5, the mean Maximal Resting Pressure (mmHg) was 105 ± 20,

the mean Maximal Squeeze Pressure (mmHg) was 115 ± 65. In group B, the mean Duration of symptoms (mo) was 10 ± 4, the mean Maximal Resting Pressure (mmHg) was 102 ± 22, the mean Maximal Squeeze Pressure (mmHg) was 72 ± 25.

There was statistically insignificant variance among the groups regarding Maximal Squeeze Pressure (mmHg) (Fig. 1, Table 3).

This table shows: Time of healing of fissures in each of the study groups. In group A, 5 cases After 2 weeks, 5 cases After 4 weeks, 14 After 6 weeks, 1 had No healing after 3 months. In group B, 8 cases After 2 weeks, 8 cases After 4 weeks, 7 After 6 weeks, 2 had No healing after 3 months (Table 4).

There was statistically insignificant variance among the groups After 6 weeks.

This table shows: The recurrence rate for Group A is 1 out of 25, or 4%. The recurrence rate for Group B is 2 out of 25, or 8%. The test value, 0.354, is the change in recurrence rates amongst the two groups (Table 5).

This table shows: In Univariate correlation regression there were significant Correlation amongst Time of healing of fissures and Duration of symptoms, mo and Maximal Resting Pressure (mmHg) (Table 6).

This table shows: In Multivariate correlation regression there were significant Correlation among Time of healing of fissures and Duration of symptoms, mo and Maximal Resting Pressure (mmHg).

Table 3. Time of healing of fissures in each of the study groups.

	Group A (n = 25)	Group B (n = 25)	Test value	P value
After 2 weeks	5 (20%)	8 (32%)	0.9	0.33
After 4 weeks	5 (20%)	8 (32%)	0.9	0.33
After 6 weeks	14 (56%)	7 (28%)	4.4	0.044
No healing after 3 months	1 (4%)	2 (8%)	0.354	0.5515

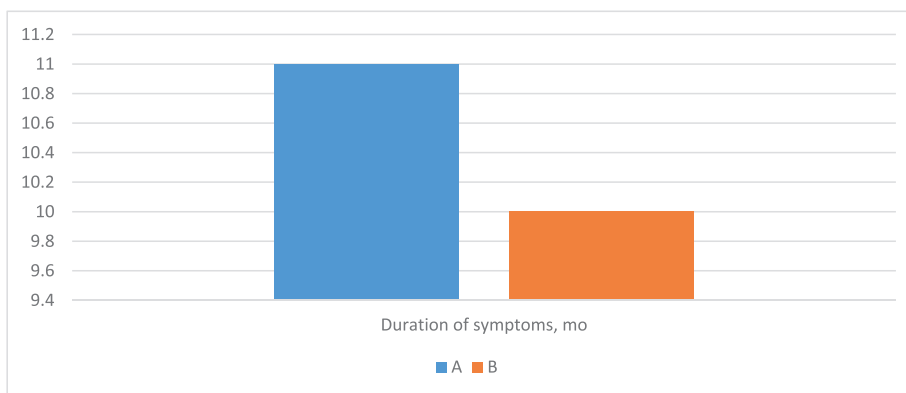
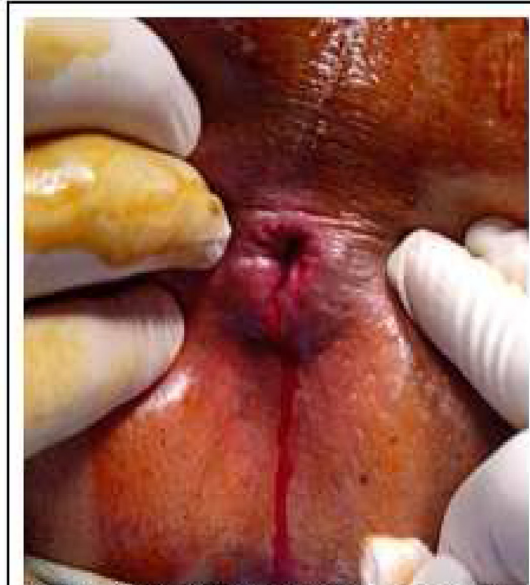


Fig. 1. Duration of symptoms among examined groups.

## Case presentation

**CASE 1****Botulinum toxin injection**

**Fig. (1.1):** A picture shows a case of chronic anal fissure (posterior fissure)



**Fig. (1.2):** A picture shows the intersphincteric groove (the site of injection)



**Fig. (1.3):** Palpation of the internal anal sphincter then Injection of Botulinum toxin on both sides of the anterior midline in a case of posterior fissure.

## CASE 2

### Botulinum toxin injection

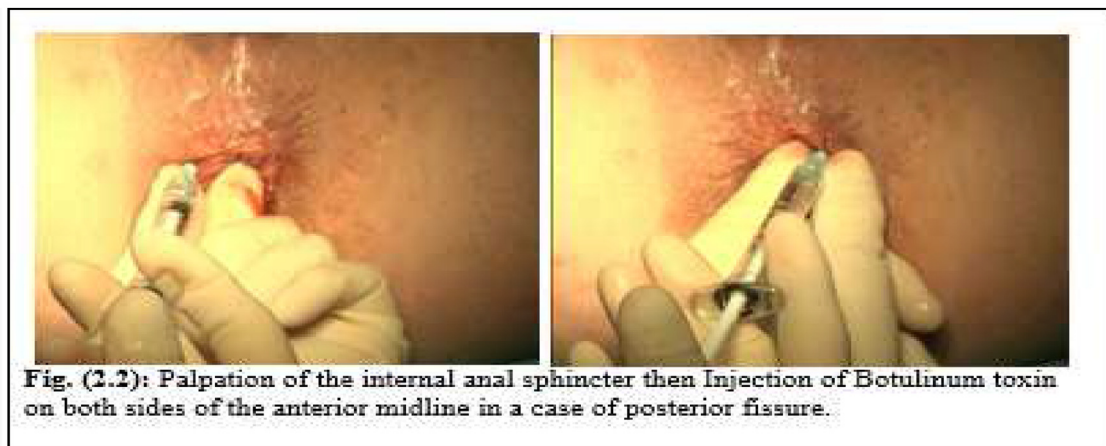


Table 4. Rate of recurrence of the study groups.

	Group A (n = 25)	Group B (n = 25)	Test value	P value
Recurrence	1 (4%)	2 (8%)	0.354	0.5515

Table 5. Univariate Correlation between Time of healing of fissures also a wide variety of danger factors amongst the groups.

	NGAL
Duration of symptoms, mo	
Correlation	-0.348
Significance	<0.0001
Maximal Resting Pressure (mmHg)	
Correlation	-0.471
Significance	<0.0001

Table 6. Multivariate correlation between time of healing of fissures and different risk factors among the researched groups.

Variable	Value
Duration of symptoms, mo	
Correlation	71.305
Significance	<0.0001
Maximal Resting Pressure (mmHg)	
Correlation	25.595
Significance	<0.0001

## 5. Discussion

When the anoderm sustains a linear lesion distal to the dentate line, it is known as a fissure or an anal fissure.<sup>11</sup>

The passage of hard stools or prolonged diarrhea is thought to play a role in the pathophysiology of an anal fissure.<sup>12</sup>

The internal anal sphincter tightens in response to a tear in the anoderm, causing discomfort, greater tearing, and a reduction in blood flow to the area. As a result of this loop, a poorly healing wound develops into a chronic fissure.<sup>13</sup>

The main results of this study were as follows:

We discovered, with regards to the demographics of the sampled communities, in group A, the mean age was  $39.5 \pm 3.8$ , there were 80% male, 20% female. In group B, the mean age was  $40.4 \pm 3.7$ , 84% were male, 16% were female. There was statistically insignificant alteration among the groups regarding age or sex.

Gandomkar *et al.*,<sup>14</sup> who sought to estimate the efficacy and difficulties of a combined topical diltiazem cream and botulinum toxin, provide support for the current investigation. In chronic cases of anal fissure, an injection is used instead of a partial lateral internal sphincterotomy. There were no distinguishing factors related to age or gender.

The current study shows Maximal Resting Pressure (mmHg), Maximal Squeeze Pressure (mmHg) and time span of symptoms (mo). In group A, the mean Duration of symptoms, mo, was  $11 \pm 5$ , the mean Maximal Resting Pressure (mmHg) was  $105 \pm 20$ , the mean Maximal Squeeze Pressure (mmHg) was  $115 \pm 65$ . In group B, the mean Duration of symptoms, mo, was  $10 \pm 4$ , the mean Maximal Resting Pressure (mmHg) was  $102 \pm 22$ , the mean Maximal Squeeze Pressure (mmHg) was  $72 \pm 25$ . There was a statistically significant alteration amongst groups in terms of Maximal Squeeze Pressure (mmHg), however there was no statistically significant change between groups in terms of Maximal Resting Pressure (mmHg) and Duration of symptoms.

The current investigation is backed by Leo *et al.*,<sup>15</sup> Maximal Squeeze Pressure (mmHg) was statistically significantly different across groups, although Maximal Resting Pressure (mmHg) and Duration of symptoms were statistically insignificantly different.

The current study shows Time of healing of fissures in each of the study groups. In group A, 5 cases (20%) After 2 weeks, 5 cases (20%) After 4 weeks, 14 (56%) After 6 weeks, 1 (4%) had No healing after 3 months. In group B, 8 cases (32%) After 2 weeks, 8 cases (32%) After 4 weeks, 7 (28%) After 6 weeks, 2 (8%) had No healing after 3 months. There was statistically significant distinction among the groups After 6 weeks ( $P = 0.044$ ).

The present study can be supported by Gandomkar *et al.*<sup>14</sup> They found that the healing rates at

one week, as well as at one-, two-, six- and twelve-month intervals. During twelve months of follow-up, the overall healing rates in the BD and PLIS groups were 65 % and 94 %, respectively ( $P$  less than 0.001).

The current study shows that the recurrence rate for Group A is 1 out of 25, or 4%. The recurrence rate for Group B is 2 out of 25, or 8%. The test value, 0.354, is the difference in recurrence rates amongst the 2 groups. There was statistically insignificant variance among the groups regarding the recurrence rate.

Ravindra,<sup>16</sup> who sought to evaluate the efficacy of botulinum toxin injection into the anal sphincter vs the conventional therapy for chronic fissure in anolateral internal sphincterotomy, provides support for the current investigation. Two of the sixty patients (one each in the test and control groups) were found to have a recurrence of anal fissure following treatment with either approach, for a total incidence of recurrence post-procedure of three percent.

The current study shows Correlation between Time of healing of fissures and variable risks among the groups analyzed. There was significant correlation between Time of healing of fissures and Duration of symptoms, mo and Maximal Resting Pressure (mmHg). In Univariate correlation regression There were significant Correlation between Time of healing of fissures and Duration of symptoms, mo and Maximal Resting Pressure (mmHg). In Multivariate correlation regression There were significant Correlation between Time of healing of fissures and Duration of symptoms, mo and Maximal Resting Pressure (mmHg).

Anal fissures can take longer to heal if the symptoms have been present for an extended period of time. This is because chronic fissures can cause the formation of scar tissue, which can make the fissure more difficult to heal. Additionally, chronic fissures can also lead to the development of anal stenosis, or a narrowing of the anus, which can further delay healing (Gilani and Tierney<sup>17</sup>).

Our findings corroborated those of Soltany *et al.*,<sup>6</sup> who found that the rate of recovery was greater in females and in individuals whose symptoms had been present for a shorter period of time.

### 5.1. Conclusion

In our research, we contrast botulinum toxin injection with lateral internal sphincterotomy for the management of the persistent and fissure. For postoperative pain relief, fissure healing, incontinence, bleeding control and fissure relapse in individuals with uncomplicated chronic anal fissure,

botulinum toxin injection was almost as effective as lateral internal sphincterotomy.

### Authorship

All authors have a substantial contribution to the article.

### Disclosure

The authors have no financial interest to declare in relation to the content of this article.

### Conflicts of interest

The authors declared that there were NO conflicts of Interest.

### References

1. D'Orazio B, Geraci G, Martorana G, Sciumé C, Corbo G, Di Vita G. Fisurotomy and anoplasty with botulinum toxin injection in patients with chronic anal posterior fissure with hypertonia: a long-term evaluation. *Updates Surg.* 2021;73:1575–1581.
2. Salati SA. Anal Fissure—an extensive update. *Pol J Surg.* 2021;93:46–56.
3. Wang WG, Lu WZ, Yang CM, Yu KQ, He HB. Effect of lateral internal sphincterotomy in patients undergoing excisional hemorrhoidectomy. *Medicine.* 2018;97:32.
4. De Robles MS, Young CJ. Real world outcomes of lateral internal sphincterotomy vs botulinum toxin for the management of chronic anal fissures. *Asian J Surg.* 2022;45:184–188.
5. Pinsk I, Czeiger D, Lichtman D, Reshef A. The long-term effect of standardized anal dilatation for chronic anal fissure on anal continence. *Ann Coloproctol.* 2021;37:115.
6. Soltany S, Hemmati HR, Toussy JA, Salehi D, Toosi PA. Therapeutic properties of botulinum toxin on chronic anal fissure treatment and the patient factors role. *J Fam Med Prim Care.* 2020;9:1562.
7. Boland PA, Kelly ME, Donlon NE, et al. Management options for chronic anal fissure: a systematic review of randomised controlled trials. *Int J Colorectal Dis.* 2020;35:1807–1815.
8. Sahin M, Ozturk D. Evaluation of patient satisfaction after lateral internal sphincterotomy for the treatment of chronic anal fissure. *E J Med.* 2021;25:565–570.
9. Sahebally SM, Meshkat B, Walsh SR, Beddy D. Botulinum toxin injection vs topical nitrates for chronic anal fissure: an updated systematic review and meta-analysis of randomized controlled trials. *Colorectal Dis.* 2018;20:6–15.
10. Brisinda G, Chiarello MM, Crocco A, Bentivoglio AR, Cariati M, Vanella S. Botulinum toxin injection for the treatment of chronic anal fissure: uni-and multivariate analysis of the factors that promote healing. *Int J Colorectal Dis.* 2022;37:693–700.
11. Acar T, Acar N, Güngör F, et al. Comparative efficacy of medical treatment versus surgical sphincterotomy in the treatment of chronic anal fissure. *Niger J Clin Pract.* 2020;23:539–544.
12. Wald A, Bharucha AE, Limketkai B, et al. ACG clinical guidelines: management of benign anorectal disorders. *Am J Gastroenterol.* 2021;116:1987–2008.
13. Zngana AM, Hiwa B. A comparative study between lateral internal anal sphincterotomy and botulinum toxin injection in the treatment of chronic anal fissure. *Zanco J Med Sci.* 2021;25:513–519.
14. Gandomkar H, Zeinoddini A, Heidari R, Amoli HA. Partial lateral internal sphincterotomy versus combined botulinum toxin A injection and topical diltiazem in the treatment of chronic anal fissure: a randomized clinical trial. *Dis Colon Rectum.* 2015;58:228–234.
15. Leo CA. *Refining and Improving the Assessment and Treatment of Faecal Incontinence.* vol. 237. 2020.
16. Ravindra C. *Comparative study of Botulinum Toxin Injection and Lateral Internal Sphincterotomy in the Treatment of Chronic Anal Fissure (Doctoral dissertation, Madras Medical College, Chennai).* 2020.
17. Gilani A, Tierney G. Chronic anal fissure in adults. *BMJ.* Jan 12:376–378.