



7-1-2024

Section: General Surgery

## Evaluation of LASER technique in treatment of Chronic anal fissure

Mohammed Arafat Abdul-Maksoud

*General Surgery, Faculty of Medicine for Boys, Al-Azhar University, Cairo, Egypt*

Osama Fathy Ibrahim Al-Mezaien

*General Surgery, Faculty of Medicine for Boys, Al-Azhar University, Cairo, Egypt*

Abdul-Rahman Hemiedah El-Sayed

*General Surgery, Faculty of Medicine for Boys, Al-Azhar University, Cairo, Egypt,*  
abdalrhmanhemida21@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

Abdul-Maksoud, Mohammed Arafat; Al-Mezaien, Osama Fathy Ibrahim; and El-Sayed, Abdul-Rahman Hemiedah (2024) "Evaluation of LASER technique in treatment of Chronic anal fissure," *Al-Azhar International Medical Journal*: Vol. 5: Iss. 6, Article 37.

DOI: <https://doi.org/10.58675/2682-339X.2496>

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).

# Evaluation of LASER technique in treatment of Chronic anal fissure

Mohammed A. Abdul-Maksoud, Osama F. I. Al-Mezaien, Abdul-Rahman H. El-Sayed \*

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

## Abstract

*Background: A linear defect, or laceration, in the anoderm that is situated between the dentate line and the anal margin, is referred to as an anal fissure. An ulceration with exposed internal anal sphincter muscle fibers at its base and built-up scarred margins is known as a chronic anal fissure.*

*Objectives: To assess the effectiveness of the LASER approach in treating chronic anal fissures in terms of healing time, incontinence rate, postoperative discomfort, comorbidities, and patient satisfaction with reference to safety and repeatability.*

*Patients and Methods: This prospective comparative study between two methods of treatment of chronic anal fissures was made in the department of surgery in Al-Azhar University Hospitals, Cairo, Egypt. The study was done in about 11 months between 2022 to 2023. This study included 80 cases presented with chronic anal fissure.*

*Results: There was no statistically substantial variation between the groups regarding demographic data, clinical symptoms, or the number of postoperative infected cases. There was highly statistically substantial variation regarding the Intraoperative amount of blood loss and healing duration. Pain at day 1 and day 7 was associated significantly with the open group, then the laser group was significantly lower, then at 2 weeks, it was associated only with the open group, and at 30 days, no significant difference was found among groups, and all groups significantly improved regarding pain.*

*Conclusion: The laser technique is a safe, minimally invasive procedure for the management of chronic anal fissures and is associated with minimal postoperative pain, short hospital stays, and early return to normal activities.*

**Keywords:** Chronic anal fissure; Laser Sphincterotomy; Anal sphincter muscles

## 1. Introduction

A linear defect, or laceration, in the anoderm that is situated between the dentate line and the anal margin, is referred to as an anal fissure. It may be chronic or acute. A chronic anal fissure is an ulceration with exposed internal anal sphincter muscle fibers at its base and built-up scarred margins, while an acute fissure is a simple laceration. <sup>1</sup>

A hypertrophied anal papilla at the proximal end of the fissure (difficult to discern on physical examination) and an external skin tag (sentinel pile) at the distal end of the fissure are both common accompanying features of chronic anal fissures. <sup>2</sup>

Reducing spasm is the key to treating anal fissures because it increases blood flow, which promotes fissure repair. The primary cause of anal fissures that do not heal is believed to be

attributable to hypertonicity or spasm in the IAS, which may result in chronic fissures by causing local ischemia due to insufficient blood supply. Increased resting anal pressure and insufficient medical care to relieve spasms are two factors contributing to chronic anal fissures. <sup>3</sup>

In cases when a patient has a persistent fissure, laser sphincterotomy, or LASER therapy, is chosen. During therapy, the surgeon makes an incision with a laser. This aids in the healing of the fissure by relaxing the tense anal sphincter muscles. <sup>4</sup>

The laser scalpel is one of the various varieties of scalpels that are available. The qualities of cutting quality, hemostasis, controllability, adaptability, simplicity of usage (learning curve), etc., clearly demonstrate the superiority of the laser approach. For some procedures where it has shown its superiority, the laser is thus the clear first option.

Accepted 21 June 2024.  
Available online 31 June 2024

\* Corresponding author at: General Surgery, Faculty of Medicine for Boys, Al-Azhar University, Cairo, Egypt.  
E-mail address: [abdalrhmanhemida21@gmail.com](mailto:abdalrhmanhemida21@gmail.com) (A. H. El-Sayed).

<https://doi.org/10.58675/2682-339X.2496>

2682-339X/© 2024 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/>).

However, due mostly to a dearth of meta-analysis data, this is still not the case for all surgical specialties. More extensive clinical research is needed to assess and characterize certain methods. Several of these particular methods are given in this issue.<sup>5</sup>

The purpose of this research was to assess the effectiveness of the LASER approach in treating chronic anal fissures with respect to healing time, incontinence rate, postoperative discomfort, comorbidities, and patient satisfaction regarding safety and repeatability.

## 2. Patients and methods

This prospective comparative study between two methods of treatment of chronic anal fissure was made in the department of surgery in Al-Azhar University Hospitals, Cairo, Egypt. The study was done in about 11 months between 2022 to 2023. This study included 80 cases presented with chronic anal fissures: they were divided randomly into two groups.

Group A (40 patients) was subjected to a 1470-nm diode laser sphincterotomy, while group B (40 patients) was subjected to conventional lateral internal sphincterotomy.

Follow-up was obtained during the first six months postoperatively. All patients were evaluated preoperatively and postoperatively, with standardization of technique in all cases. The Al-Azhar University Faculty of Medicine's ethics committee granted ethical clearance.

**Inclusion criteria:** Patients of both genders between the ages of 20 and 60 who have anal discomfort due to a single, chronic anal fissure that is not responding to medication, as well as those who are surgical candidates and do not have any medical contraindications, sepsis, or current infections in their bodies.

**Exclusion criteria:** The study excluded patients who had a mental illness, children, patients with concurrent perianal abscess or fistula in anus, patients with any anal disease, patients who had undergone previous proctologic surgeries, patients with a history of radiation therapy, pregnant women, patients under the age of eighteen, patients with Crohn's disease, patients requiring manual maneuvers during evacuation due to constipation, patients with anal neoplasms, patients infected with the HIV, patients with fecal incontinence, proctitis, severe systemic diseases, and uncontrolled comorbidities such as diabetes, renal failure, and anticoagulant therapy, as well as patients who were deemed unfit for surgery or who refused surgery.

Every subject gave both written and verbal informed permission before having surgery or taking part in the trial.

Every patient had a comprehensive medical

history, clinical assessment, and physical examination, including proctologic examination, anoscopy, and endoanal ultrasonography.

**Operative technique:** The surgical operations were carried out in a lithotomy posture in both groups. Under general or regional anesthesia, the surgeries were carried out as daycare procedures and a proctoscope was used to see the anal canal.

(Group A): All cases in (Group A) were treated under spinal or local anesthesia.

The patient is in the lithotomy position, and a lubricated proctoscope was inserted into the anus. This method began with a tiny incision made at the mucocutaneous junction. A diode laser probe was then placed there, operating at a power of 8 W and a wavelength of 1470 nm. After that, laser fibers were injected into the intersphincteric plane. The anal mucosa is palpated and saved by the application of one finger from behind to avoid injury or burn of the mucosa or internal sphincter, then starting to cut the internal sphincter by the laser fibers until feeling release of the sphincter fibers. A laser beam did a Fissurectomy. Remove the sentinel pile if it is present in the laser beam. Ice packing is then applied for 1 minute to minimize the harmful effect of heat.

The aim of surgery is to create a smooth, dry wound with less tissue heat damage. Other objectives include effective pain management after the procedure, quick, useful, elastic, and stable healing, and the avoidance of any relapses.

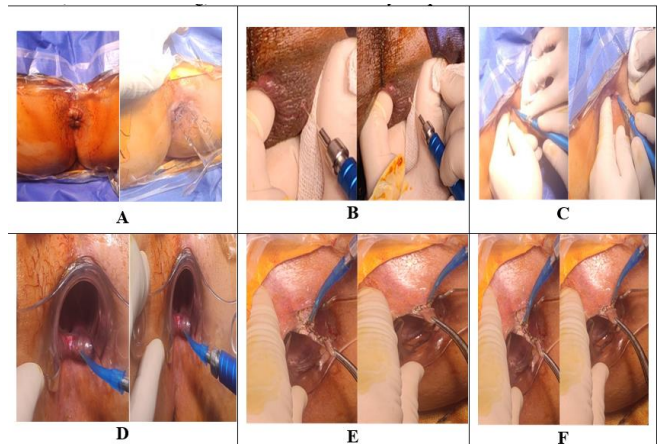


Figure 1. Showed (A): lithotomy position and introduced lubricated proctoscope. (B) small incision at the mucocutaneous junction by using diode laser probe. (C) The anal mucosa is palpated and saved by application of one finger from behind. (D) Fissurectomy was done by laser beam. (E) Removal of sentinel pile by the laser beam. (F) Ice packing is then applied for 1 minute.

(Group B): Under spinal anesthesia, patients in (Group B) received left lateral internal sphincterotomy.

Following a fissurectomy, a longitudinal incision of around 0.5 to 1 cm was made in the intersphincteric groove, and the muscle and mucosa were separated using an artery.

Below the dentate line, the distal half of the internal anal sphincter was separated under direct vision, pressure was applied for three minutes, and a tiny dressing was put at the conclusion of the treatment. To reduce discomfort after surgery, a local injection of marcaine (0.25% 10 ml) was administered.

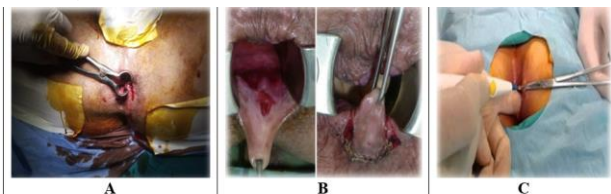


Figure 2. left lateral internal sphincterotomy.

Postoperative follow-up: Patients in all groups were instructed to take warm sitz baths, eat a high-fiber diet, and take little laxatives like three tablespoons before bed. In the outpatient section, cases were examined every week for six weeks in a row and then every two weeks for the next three months. Questions on pain relief, anal discharge, anal bleeding, flatus/feces leakage, and any adverse effects were asked at every appointment. Healing was measured visually, and it was considered to be complete when the fissure vanished. A pain score scale was used to measure the pain, with scores ranging from 0 (almost pain free) to IV (severe agony).

Statistical Design: SPSS 20.0 for Windows (SPSS Inc., Chicago, IL, USA 2011) was utilized to gather, tabulate, and statistically analyze all of the data. The mean ± SD was employed to convey quantitative data, while absolute frequencies (number) and relative frequencies (%) were utilized to express qualitative data. To compare two independently distributed, normally distributed variables, the t test was used. When comparing percentages of categorical variables, the Fisher's exact test or the Chi-square test were utilized. Every exam had two sides. Statistical significance (S) was defined as a p-value < 0.05, while statistical insignificance (NS) was defined as a p-value > 0.05.

### 3. Results

Table 1. Data on the demographics of the examined populations

VARIABLES	LASER GROUP GROUP A N=40	LIS GROUP GROUP B N=40	P VALUE
AGE(YEARS) (MEAN ± SD)	47 ± 4.5	45.5 ± 5.0	0.168
SEX			
MALE. N (%)	27(66.7%)	32(80%)	0.842

FEMALE. N (%)	13(33.3%)	8(20%)	1.625
WEIGHT (KG) (MEAN ± SD)	73.1 ± 10.4	71.9 ± 11.2	0.620

The mean age was found 47 (± 4.5 SD) in group A and for group B the Mean ± SD of age was 45.5 ± 5.0. Regarding demographic data, there is no statistically substantial distinction between the two categories.

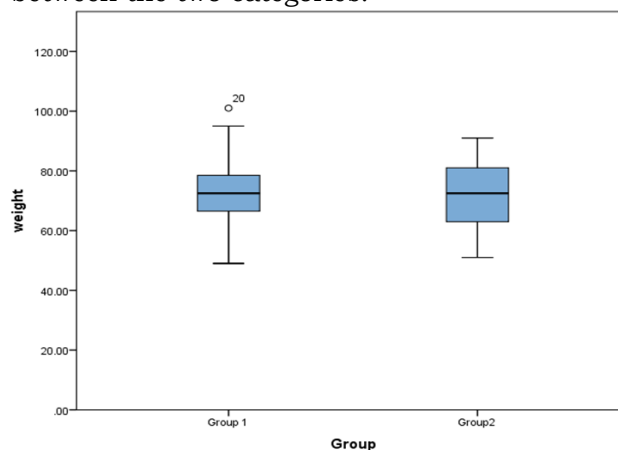


Figure 3. Box plot showing weight distribution among the study population reports that the Mean ± SD of weight was 73.1 ± 10.4 in group A and for group B it was 71.9 ± 11.2.

Table 2. Clinical presentation of the study population

CLINICAL SYMPTOMS	LASER GROUP GROUP A N=40	LIS GROUP GROUP B N=40	P VALUE
ANAL PAIN N(%)	35 (87.5)	36 (90)	0.891
ANAL DISCHARGE N(%)	12 (30)	10 (25)	0.791
ANAL BLEEDING N(%)	3 (7.5)	5 (12.5)	0.682

Table 2 showed that Despite the fact that anal pain affected 87.5% of cases in group A and 90% of cases in group B, discharge affected 30% of cases in group A and 25% of cases in group B, and blood affected 7.5% of cases in group A but 12.5% of cases in group B, there was no statistical substantial distinction between the two groups in terms of clinical symptoms.

Table 3. comparison between the two groups regarding Operative characteristics.

OPERATIVE CHARACTERISTICS	LASER GROUP GROUP A N=40	LIS GROUP GROUP B N=40	P VALUE
INTRAOPERATIVE AMOUNT OF BLOOD LOSS/ ML (MEAN ± SD)	7.5 ± 5	13 ± 10	<0.001*
OPERATIVE TIME (M) (MEAN ± SD)	13.10 ± 2.73	21.63 ± 5.25	<0.001*



The operative time was significant lesser in Group A. There was highly statistically substantial distinction regarding Intraoperative amount of blood loss and healing duration (p value <0.001).

Table 4. Comparison between the two groups regarding Postoperative characteristics

POSTOPERATIVE CHARACTERISTICS	LASER GROUP GROUP A N=40	LIS GROUP GROUP B N=40	P VALUE
MEAN HEALING DURATION/DAY (MEAN ± SD)	12 ± 11	19 ± 20	<0.001*
NO. OF POSTOPERATIVE INFECTED CASES	0(0)	2(5)	0.085

Laser technique shows statistically significant lower Mean healing duration than the LIS group. On the other hand, there was no substantial distinction regarding No. of post-operative infected cases (p value >0.05)

Table 5. comparison between the two groups as regard Postoperative pain.

POSTOPERATIVE PAIN	LASER GROUP GROUP A N=40	LIS GROUP GROUP B N=40	P VALUE
DAY ONE PAIN N(%)	18 45%	36 90%	0.095
DAY 7 PAIN N(%)	2 5%	8 20%	0.088
TWO WEEKS PAIN N(%)	0 0%	4 10%	0.058
DAY 30 PAIN N(%)	0 0%	0 0%	0.000

Pain at day 1 and day 7 it was associated significantly with open group then laser group was significantly lower, then at 2 week it was associated only with open group and at 30 day no significant difference was founded among groups, and all groups significantly improved regard pain.

#### 4. Discussion

Chronic anal fissure is frequently accompanied by recurrent pain, particularly during defecation and leakage per anus, both of which have a detrimental impact on the quality of life experienced by the patient.<sup>6</sup> On occasion, it may progress to a perianal abscess or fistula in the anus, which strengthens the case for surgical intervention. The anal fissure exhibits a broad distribution and occurs within 10–15% of proctologic consultations on average,<sup>7</sup> where youthful and middle-aged individuals comprise the majority, with an equal distribution of males and females.<sup>8</sup>

When anal fissure and associated symptoms persist for more than six weeks and are accompanied by visible transverse internal anal

sphincter fibers, sentinel skin tag, anal papillae, anal polyp, and indurated margins, a chronic anal fissure is diagnosed.<sup>9</sup>

The surgical intervention employed to eliminate the chronic longitudinal rupture of the anus, along with the fibrotic tissue, sentinel skin tags, and anal polyp, is diathermy fissurectomy. Despite the potential to eliminate fibrotic tissue, the surgical procedure leads to an excruciatingly painful incision. Fissurectomy, while frequently performed in conjunction with lateral internal sphincterotomy, can also be executed independently.<sup>10</sup>

Although internal sphincterotomy is associated with a considerable risk of anal incontinence (1:200 for fecal incontinence and 1:20 for permanent flatus incontinence), it continues to be the preferred method for managing postoperative pain and facilitating wound healing.<sup>11</sup>

In order to mitigate the significant incidence of incontinence associated with internal sphincterotomy while also promoting effective postoperative pain management and prompt wound healing, we investigated the potential of scanner-assisted CO laser technology, which is extensively utilized in specialized fields like colposcopy.<sup>12</sup>

Surgical procedures achieve a high degree of selectivity and prevent thermal injury to adjacent healthy tissues in this manner. In addition, the coagulation capability of the laser can be enhanced as necessary through the adjustment of scanning and emission mode configurations.<sup>13</sup>

Generally speaking, laser surgery is a less invasive method that shortens hospital stays, lessens pain, edema, and discomfort after surgery, and produces fewer problems, as well as quicker, more effective wound healing.<sup>14</sup>

Alam et al. aimed to evaluate the outcome and efficiency of laser surgery for treating hemorrhoids and anal fissures. They found that out of 120 patients' maximum 49 (40.83%) patients belonged to the 31-40 years age group, which was subsequently followed by 25 (20.83%) in the ≤30 years age group. 20 (16.67%), 19 (15.83%), and 7 (5.83%) patients belonged to the 41-50 years, >60 years, and 51-60 years age groups, respectively.<sup>15</sup>

This study revealed that the mean ± SD) of HR was 64 ± 14 and 62 ± 15 in groups A and B, respectively. The mean ± SD of SBP was 125 ± 5.3, 125 ± 5.3 in groups A, B. Mean ± SD of Temp was 37.1 ± 0.6, 37.2 ± 0.4 in groups A, B respectively, 87.5% of cases suffered from anal pain, 30% suffered from discharge and 7.5% suffered from bleeding. There is no statistically substantial variation between the two groups regarding vital signs and clinical symptoms. The operative time was significantly lesser in Group A.

Yahya et al. reported that the open group had a

substantially longer duration than the laser group, with mean operating times of  $29.53 \pm 4.05$  minutes (range 33.58-25.48) and  $14.60 \pm 3.13$  minutes (range 11.47-17.73) respectively.<sup>16</sup>

In this study, there was highly statistically substantial variation as regards the Intraoperative amount of blood loss and healing duration (p-value <0.001). On the other hand, there was no significant difference regarding No. of postoperative infected cases (p-value>0.05).

Confirming our results, Giani et al. reported that At the conclusion of the follow-up period, there was a statistically significant decrease in pain and anal itching. However, there was also a drop in bleeding, burning, maximal pain, and REALIS score. Reepithelization turned out to be very quick and successful: during a one-month follow-up, 22 of 29 cases (75.9%) showed full healing, while 5 cases exhibited partial reepithelization.<sup>17</sup>

Talaat et al. showed that laser-closed lateral internal sphincterotomy was associated with minimal discomfort, little postoperative pain, and early return to daily activities. The itching was present in 5 cases and treated by local soothing agents; there was no incontinence nor recurrence recorded in all of our patients.<sup>18</sup>

Alam et al. performed the same technique as ours for anal fissure. They performed laser hemorrhoioplasty and closed laser LIS on 120 patients complaining of anal fissures and hemorrhoids. The most frequently reported complications were bleeding in 63 (52.5%) cases, pain in 55 (45.8%), and itching in 21 (22%). They concluded that diode laser surgery was a minimally invasive procedure that can be done even as a day-care procedure and offers several advantages over traditional surgery. Laser effectively treated hemorrhoids and anal fissures, improved symptoms, and reduced postoperative pain.<sup>15</sup>

Our results were supported by Haidaran et al., who reported that Two categories were used to examine the efficacy of laser LIS: postoperative complications and pain score. On day seven, every patient had a pain score of one or lower on a scale of one to ten. Within two years, three patients (1.27%) had recurrent bleeding and discomfort; they received conservative treatment. At the latest follow-up, none of the patients experienced incontinence. After surgery, six patients (2.5%) had only mild mucus discharge for three months.<sup>19</sup>

#### 4. Conclusion

Based on this study, Findings concluded that the sole drawback to the laser approach, which is a safe, minimally invasive surgery for treating chronic anal fissures, is its high cost. Other benefits include short hospital stays, minimum

postoperative discomfort, and an early return to regular activities.

#### Disclosure

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

#### Authorship

All authors have a substantial contribution to the article

#### Funding

No Funds : Yes

#### Conflicts of interest

There are no conflicts of interest.

#### References

- Essani R, Papaconstantinou HT. Fissure-in-Ano. In Shackelford's Surgery of the Alimentary Tract, Elsevier. 2 Volume Set 2019 Jan 1 (pp. 1864-1870).
- Nayar S, Joshi M, Jamal Q, Khurana S. A review of recent advances in the surgical management of anal fissures. International Surgery Journal. 2023 Jun 28;10(7):1262-1267.
- Mathur N, Qureshi W. Anal fissure management by the gastroenterologist. Curr Opin Gastroenterol. 2020;36(1):19-24.
- Tozer P. Anal fistula. Colorectal Surgery-E-Book: Colorectal Surgery-E-Book. 2023 Jul 5:175.
- Gautam Roy P, Bhardwaj R, Goel A. Health and Social Concerns in Elderly Men. Gerontological Concerns and Responses in India. 2021:69-98.
- Sailer M, Bussen D, Debus ES, Fuchs KH, Thiede A. Quality of life in patients with benign anorectal disorders. Br J Surg. 1998;85(12):1716-1719.
- Newman M, Collie M. Anal fissure: diagnosis, management, and referral in primary care. Br J Gen Pract. 2019;69(685):409-410.
- Mapel DW, Schum M, Von Worley A. The epidemiology and treatment of anal fissures in a population-based cohort. BMC Gastroenterol. 2014;14:129.
- Chong PS, Bartolo DC. Hemorrhoids and fissure in ano. Gastroenterol Clin North Am. 2008;37(3):627-ix.
- SIMPSON, Eric. Wish You Were Still Here: The Scottish Seaside Holiday. Amberley Publishing Limited, 2013.
- Nyam DC, Pemberton JH. Long-term results of lateral internal sphincterotomy for chronic anal fissure with particular reference to incidence of fecal incontinence. Dis Colon Rectum. 1999;42(10):1306-1310.
- Lindsey I, Jones OM, Cunningham C, Mortensen NJ. Chronic anal fissure. Br J Surg. 2004;91(3):270-279.
- Picciariello A, Lobascio P, Spazzafumo L, et al. The REALISE score: a new statistically validated scoring system to assess the severity of anal fissures. Tech Coloproctol. 2021;25(8):935-940.
- Martellucci J, Rossi G, Corsale I, Carrieri P, D'Elia M, Giani I. Myoxinol ointment for the treatment of acute fissure. Updates Surg. 2017;69(4):499-503.
- Alam A. Laser surgery for treatment of haemorrhoid and anal fissure and its outcome. Sch J App Med Sci. 2021 May; 5:663-669.
- Yahya WN, Refaat DO, AbdElhady WA, Elsayed WA. Comparison between laser hemorrhoidoplasty procedure and conventional open surgical hemorrhoidectomy. The Egyptian Journal of Hospital Medicine. 2022 Jan 1;86(1):112-116.
- Iacopo G, Tommaso C, Chiara L, et al. Scanner-Assisted CO2 Laser Fissurectomy: A Pilot Study. Front Surg. 2021;8:799607.
- Talaat M, Hazem A, Abdel-Hady H, Elsheikh MM. Outcomes of Diode Laser in Treatment of Common Anal Surgical Lesions (Haemorrhoids, Chronic Fissure and Fistula): A Prospective Study. Asian Journal of Research in Surgery. 2022 Oct 12;7(3):21-40.
- Haidaran A. CO2 Laser Therapy for Chronic Anal Fissure Resistant to Non-Invasive Treatment: A Single Centre Experience. Indian Journal of Public Health Research & Development. 2022 Apr 12;13(2):203-209.