

## A Prospective Comparative Study between Conventional Fistulectomy and Fistula Tract Laser Closure in Fistula in Ano in a Tertiary Care Hospital

Shubham Dixit<sup>1</sup>, Bhagchand Khorwal<sup>2</sup>, Amit Gushaiwal<sup>3</sup>, Nitesh Kumar<sup>4</sup>

<sup>1</sup>Resident, Department of General Surgery, JLN Medical College & Hospitals, Ajmer (Raj.)

<sup>2</sup>Associate Professor, Department of General Surgery, JLN Medical College & Hospitals, Ajmer (Raj.)

<sup>3</sup>Assistant Professor, Department of General Surgery, JLN Medical College & Hospitals, Ajmer (Raj.)

<sup>4</sup>Resident, Department of General Surgery, JLN Medical College & Hospitals, Ajmer (Raj.)

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Corresponding Author: Dr. Nitesh Kumar

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### Abstract:

**Introduction:** Perianal sepsis and anal fistulas present significant challenges in colorectal surgery, primarily affecting men aged 30 – 50 years.

**Aims & Objective:** This study compared conventional surgeries, such as fistulectomy, with minimally invasive laser ablation techniques (LAFT) to evaluate effectiveness and patient satisfaction, with the aim of optimizing treatment outcomes while preserving sphincter integrity.

**Material & Method:** A prospective comparative randomized hospital-based study conducted from July 2022 to June 2024, involving 48 patients aged 15-60. The participants underwent either conventional fistulectomy (with or without Seton) or laser ablation of the fistulous tract (LAFT) (isolated or with LIFT).

**Results:** LAFT provided several advantages: shorter operative time (35.75 minutes), reduced hospital stays (2.38 days), lower pain levels (mean VAS 3.37), and quicker recovery (3.6 days). Wound healing was also faster (2.91 weeks), with minimal postoperative complications and no cases of incontinence.

**Conclusion:** Although conventional fistulectomy had a lower recurrence rate, suggesting a higher primary success rate, the benefits of LAFT in terms of pain reduction and recovery time were significant. Therefore, while fistulectomy is effective for uncomplicated cases, LAFT presents a promising alternative that enhances patient satisfaction and outcomes, warranting its early incorporation in treatment protocols for anal fistulas.

**Keywords:** Fistula in ano, Laser Ablation of Fistula Tract (LAFT), Conventional Fistulectomy.

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### Introduction

Perianal sepsis and anal fistulas pose significant challenges in colorectal surgery, primarily due to the high recurrence rates and risks of incontinence. Defined by the American Society of Colon and Rectal Surgeons (ASCRS), an anal fistula is a tunnel connecting an internal anal canal opening to an external skin opening [1], most commonly affecting men aged 30 to 50 [2], with an annual incidence of approximately 8.6 per 1,00,000 [3]. Symptoms include pain, purulent or bloody discharge, pruritus ani (itching), and potential systemic issues if abscesses become infected [4].

Diagnosis involves physical examination, anoscopy, and application of Goodsall's rule [5] to predict the course of fistula. For complex cases, imaging techniques like MRI and endoanal ultrasound can enhance diagnostic accuracy to 100% [6,7]. Management focuses on eradicating the fistulous tract while preserving sphincter function, with the aim of achieving low recurrence rates, complete healing, and minimal complications. Surgical

options include traditional methods such as fistulotomy and fistulectomy [8], as well as newer approaches such as the LIFT procedure and laser ablation techniques. Laser Ablation of the Fistulous Tract (LAFT), developed by Wilhelm A in 2011, is a minimally invasive technique that uses laser technology to ablate tissue within the fistula canal while preserving anal sphincter integrity [9]. The ASCRS 2022 guidelines endorse these minimally invasive approaches, emphasizing their effectiveness in treating anal fistulas, promoting quicker recovery, and reducing the risk of complications, thereby improving overall patient outcomes [1].

**Aims and Objectives:** This study aimed to compare two surgical treatments for fistula in ano: conventional fistulectomy (with or without Seton) and laser ablation of fistula tract (with or without LIFT). Objectives include analyzing mean operative time, hospital stay, postoperative complications, recovery, wound healing duration, and recurrence

rates, as well as assessing patient demographics such as age, sex incidence, chief complaints, and types of fistula identified through MR Fistulogram.

**Material and Methods**

This prospective, comparative, randomized study included 48 patients admitted to the Department of General Surgery at the JLN Medical College and Hospital, Ajmer, from July 2022 to June 2024. After obtaining ethical approval along with written and informed consent, patient histories and clinical findings were documented while performing PR proctoscopy were documented. Also all patients underwent MR Fistulogram.

**Inclusion and exclusion criteria:** The study encompassed patients aged 15-60 with any type of fistula in ano, while those with complex fistulas, under 15 or over 60 years of age, or with contraindications to anesthesia were excluded.

Participants were randomly assigned to two groups:

- Group A (n=24) includes conventional fistulectomy (with or without Seton),
- Group B (n=24) underwent minimally invasive Fistula Tract Laser Closure (LAFT or LAFT with LIFT).

The Chi-square test was used to compare categorical variables between the groups. The unpaired t-test was used to compare continuous variables between the groups. Statistical significance was set at p value <0.05 was considered significant. The data were analysed using SPSS software version 16.0.s

**Methodology:**

**Laser Ablation of Fistula Tract (LAFT) [10]:** The LAFT procedure begins with the patient positioned

in the lithotomy, where a half-cut proctoscope is inserted. The internal opening of the fistula was identified by injecting hydrogen peroxide or methylene blue through an external opening. The fistula tract was then curettaged and irrigated with normal saline to prepare for treatment. A metal probe was passed from the external to the internal opening, followed by the insertion of a radial tip laser probe fiber (LASOTRONIX SMART 1470 nm). Laser ablation was performed using a 1470 nm diode laser set to 15 watts, delivering 100 joules of energy in continuous mode. The procedure started at the internal opening and moved outward at a rate of approximately 1 cm every 3 seconds. The external opening was widened to facilitate drainage, and if necessary, a single stitch was applied for transanal closure of the internal opening. Thus, hemostasis was achieved.

**Fistulectomy:** In the fistulectomy procedure, the patient is placed in the lithotomy position under spinal or saddle anesthesia. A proctoscope allows a probe to pass from the external to the internal opening, where induration is noted.

The fistulous track, unhealthy granulation tissue, and external openings were also excised. The wound is typically left open for healing by secondary intention, packing is applied, and the excised tissue is subjected to histopathological examination.

**Seton Technique:** Setons may be loose (silk) or cutting (prolene) and inserted to gradually cut through the sphincter muscle, promoting closure of the fistula over time.

**Results**

**Table 1: Age Wise Type of Fistula Distribution**

Age Group	15-30 Years		31-45 Years		46- 60 Years	
	Type of Fistula	No. of patients	Percent	No. of patients	Percent	No. of patients
Intersphincteric	8	16.6	10	20.8	8	16.6
Transsphincteric	6	12.5	9	18.75	3	6.25
Suprasphincteric	1	2	1	2	2	4.1
Recurrent	5	10.4	4	8.3	7	14.58

**Table 2: Mean Operative Time and Mean Hospital Stay**

		Mean Operative Time		Mean Hospital Stay	
		(Mean ± SD)	p value	Days	p value
Conventional (n=24)	With Seton (n=10)	47.1±6.04	< 0.0001 (HS)	6.3 ± 1.53	< 0.0001 (HS)
	Without Seton (n=14)	47.93±3.47		4.1± 1.56	
	Overall Mean±SD	47.58±4.61		5.04±1.57	
Minimal Invasive (n=24)	LAFT (n=20)	34.7±4.37		2.05±0.88	
	LAFT+LIFT (n=4)	41±4.16		4.0±0.82	
	Overall Mean±SD	35.75±4.87		2.38±1.13	

**Table 3: Post-Operative Complications**

Post-Operative Complications		Conventional (n=24)		Fistulectomy		Minimal Invasive (n=24)		Total	
		No. of patients	Percent	No. of patients	Percent	No. of patients	Percent	No. of patients	Percent
Incontinence	I Week	3	12.50	1	4.17	4	8.33		
	1 Month	1	4.17	0	0.00	1	2.08		
	6 Months	1	4.17	0	0.00	1	2.08		
Discharge from surgery site	I Week	0	0.00	1	4.17	1	2.08		
	1 Month	1	4.17	1	4.17	2	4.17		
	6 Months	2	8.33	3	12.50	5	10.42		

**Table 4: Comparison of Time Taken in Days for Resumption of Routine Activity**

Type of Surgery		Mean±SD (days)	Mean±SD (days)	P Value
Conventional n = 24	With Seton	7.86 ± 1.4	7.86 ± 1.2	<0.0001 (HS)
	Without Seton	7.8 ± 1.22		
Minimal Invasive n = 24	LAFT	3.65 ± 0.93	3.6 ± 0.98	
	LAFT+LIFT	3.59 ± 1.02		

**Table 5: Duration of Healing**

Duration of Healing	Conventional		Minimal Invasive		P value
	With Seton	Without Seton	LAFT	LAFT + LIFT	
	Mean±SD	Mean±SD	Mean±SD	Mean±SD	
Weeks	6.3 ± 0.82	4.92 ± 0.82	2.6 ± 0.75	4.5 ± 0.57	<0.0001
Overall mean (weeks)	5.08±0.82		2.91±1.01		

**Table 6: Recurrence Following Post Surgery**

Recurrence		Number	Percent	Total	Percent	P Value
Conventional	With Seton	1	2.08	3	12.50%	0.0833 (Chi Sq. 3)
	Without Seton	2	4.17			
Minimal Invasive	LAFT	5	10.42	5	20.83%	
	LAFT + LIFT	0	0.00			

## Discussion

The study found that age significantly impacted the type and recurrence of fistulas, with higher recurrence rates in patients aged 46-60 years. Intersphincteric fistulas were most common among younger patients, especially in the 31-45 age group, with a mean age of 37 years. Tumer et al. (2023) [11] reported similar findings, noting that 67.7% of intersphincteric cases occurred in the 35-45 age range, with older patients (50-64 years) frequently experiencing recurrent fistulas after previous surgeries (30.9%). In contrast, Wilhelm et al. (2017) [9] highlighted poor outcomes in elderly patients after post-surgery, while Bhat et al. (2022) [12] linked increased recurrence rates to the complexity of fistulas in older adults. These results suggest the need for close follow-up and potentially more intensive treatment for elderly patients with recurrent or complex fistulas.

The present study found that the mean operative time for conventional surgery was  $47.58 \pm 4.61$  minutes, nearly double that of minimally invasive

procedures, which averaged  $35.75 \pm 4.87$  minutes, with a significant difference ( $p < 0.0001$ ). In comparison, Porwal et al. (2022) [13] reported a higher mean operative time of 90.1 minutes (SD 16), indicating variability based on surgical complexity or techniques used. Conversely, El Sheikh et al. (2023) [14] observed a much shorter mean operative time of  $11.73 \pm 4.90$  minutes for FiLaC procedures, with times ranging from 5 to 23 minutes. These findings suggest that minimally invasive techniques not only reduce operative time but also potentially minimize intraoperative risks associated with longer surgeries.

The present study found that patients undergoing minimally invasive surgery experienced a significantly shorter mean hospital stay of  $2.38 \pm 1.13$  days, compared to  $5.04 \pm 1.57$  days for those in the conventional surgery group ( $p < 0.0001$ ). This substantial reduction underscores the advantages of minimally invasive procedures in promoting faster recovery and easing the burden on healthcare facilities.

In contrast, Porwal et al. (2022) [13] reported an even shorter average hospital stay of 24 hours (SD = 3.2), suggesting that some procedures allow for same-day discharge. El Sheikh et al. (2023) [14] observed a hospital stay of 1-2 days for patients undergoing FiLaC, whereas Ghose SS et al. (2020) [15] noted longer stays of 6-14 days for fistulectomy. These findings collectively highlight the efficacy of minimally invasive techniques in decreasing the length of hospital stay, which can enhance patient satisfaction, lower healthcare costs, and improve the availability of beds and staff for other patients.

This study evaluated postoperative complications during a six-month follow-up, focusing on incontinence and discharge. Conventional surgical methods have been associated with incontinence rates ranging from 15% to 25% [Ghose SS et al. (2020) [15]. In this study, only one case of incontinence was observed in the laser group, whereas four patients in the conventional fistulectomy group experienced transient gas and fluid incontinence, which resolved over time. Tumer et al. (2023) [11] reported no instances of incontinence in the laser group, supporting the finding of reduced complications associated with minimally invasive techniques.

Regarding discharge, the laser group showed occurrences of wound healing failure, influenced by factors such as persistent fistula tracts, tubercular pathology, and complex fistula types. The present study noted five cases of discharge in the laser group compared to three in the conventional group. Tumer et al. (2023) [11] found discharge rates of 4.6% in the fistulectomy group and 14.4% in the laser group, indicating a statistically significantly lower discharge rate in the fistulectomy group. These results underscore the advantages of minimally invasive procedures for reducing postoperative complications and promoting better recovery outcomes.

In the present study, patients who underwent minimally invasive surgery returned to routine activities with more frequency and within an average of 3.6 days. Among the respondents who underwent conventional surgery, 7.8 days were taken. This difference was statistically significant ( $p < 0.0001$ ); demonstrating that the minimally invasive technique was better at enabling the patient to return to normal life faster. This is in agreement with Porwal et al. (2022) [13], where the mean time taken to get back to normalcy was 5.4 days with a variation of 4 to 8 days. Also study conducted by Ghose SS et al (2020) [15] patient underwent fistulectomy had taken more days to return to routine activities 15-20 days.

The shorter time for the recovery and resumption of routine activity as was witnessed in the minimally

invasive group shows that these procedures are useful in reducing postoperative discomfort and thus improving the recovery process of the patient over the conventional methods.

In the present study, patients who underwent minimally invasive surgery were shown to be in better condition with a healing time of between 2.6 and 4.5 weeks compared with five-six weeks in participants who underwent conventional surgery. Likewise, the healing time was significantly shorter compared to previous studies because the procedures are less invasive and, therefore, cause minimal damage to the tissues. These results are in agreement with the study that was conducted and authored by Ghose SS et al. (2020) [15] in which the percentage of satisfactory healing within 21 days was 90% with the longest healing time of 32 days. Porwal et al. (2022) [13] reported a higher rate of wound healing, where the majority of the cases, 81.99 %, healed at 10 weeks post-operation, with few cases healing at 17 weeks. These variations in healing times could, therefore, be explained by differences in patient characteristics, nature and severity of fistulas, and surgical methods used in different studies. Overall, the improved healing indices in the minimally invasive group suggest that these methods may offer the advantages of early return to normal activity and decrease the cost implication of long term post-operative dependency.

In the present study recurrence rates were significantly higher in the isolated LAFT group than in the conventional surgery. This study shows that LAFT provides the benefits of less post-operative pain and a faster recovery period, but it has drawbacks that there is a higher risk of fistula recurrence. This is contrary to the research done by Porwal et al. (2022) [13] that revealed a recurrence rate of only 1.02%. However, they claimed that their surgical approach yielded more reliable outcomes than medical management by reporting a lower reoperation rate within one year of follow-up.

In our study the primary success rate for FiLaC i.e. without recurrence after 6 months of follow up was almost 80%, this rate is comparable to El-Sheikh et al. (2023) [14] results in 2023 with success rate of 74% and Brabender et al. (2020) [16] with success rate of 82% on 50 patients study. In the same regard, Ghose SS et al. (2020) [15] reported a relatively low recurrence rate of 2.22% in conventional fistulectomy which added to the variation in the long-term surgical outcome success rates among different techniques.

## Conclusion

Fistula surgery faces significant challenges and, lack a gold standard procedure. Fistulectomy is effective for straightforward cases, but combining Laser Ablation of the Fistula Tract (LAFT) with LIFT can enhance the success rates and reduce recurrence.

LAFT offers advantages such as shorter hospital stay and quicker recovery, leading to higher patient satisfaction. The precision of laser techniques may improve outcomes compared to traditional methods, making the early incorporation of laser ablation a valuable option for optimal patient care and pain-free results without incontinence.

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