

ORIGINAL ARTICLE

Comparison of outcome in Hybrid Laser Surgery (DLPL) and Partial Fistulectomy with Seton in Complex Fistula-in-Ano: A randomized controlled trial.

Abdullah Bin Saeed¹, Shoukat Ali², Nimra Naeem³

ABSTRACT... **Objective:** To compare the clinical outcomes of DLPL with partial fistulectomy combined with seton placement in patients with complex fistula-in-ano. **Study Design:** Randomized Controlled Trial. **Setting:** Aziz Fatimah Hospital which is Affiliated with Aziz Fatimah Medical and Dental College, Faisalabad. **Period:** One Year from January 2025 to January 2026. **Methods:** We enrolled 52 patients with complex fistula-in-ano. Patients were randomly allocated to either DLPL (n=26) or partial fistulectomy with seton placement (n=26). Inclusion criteria comprised recurrent fistulas, multiple external openings, and high-lying fistulas confirmed by MRI. Primary outcomes included healing rate, recurrence rate, healing duration, and incontinence. Secondary outcomes included return to work time and treatment cost. Follow-up assessments were conducted at 1, 3, 6, and 12 months postoperatively. **Results:** Of 52 enrolled patients, 42 completed the study (21 per group). The DLPL group demonstrated superior outcomes with an 85.7% healing rate compared to 62% in the fistulectomy group. Mean healing time was significantly shorter in the DLPL group (4±1.5 weeks vs. 11±2.3 weeks). Recurrence occurred in 3 patients (14.3%) in the DLPL group versus 8 patients (38%) in the fistulectomy group. Notably, no incontinence was observed in the DLPL group, while 17 patients (81%) in the fistulectomy group developed incontinence. Return to work was significantly faster with DLPL (14±4 days vs. 45±5 days). Treatment costs were comparable between groups (0.15 vs. 0.14 million rupees). **Conclusion:** Hybrid laser surgery (DLPL) represents a superior treatment modality for complex fistula-in-ano, offering significantly better healing rates, faster recovery, lower recurrence, and complete preservation of continence compared to partial fistulectomy with seton placement. Despite comparable costs, DLPL should be considered the preferred approach for complex anal fistulas in appropriate clinical settings.

Key words: DLPL, Fistula-in-ano, Fistulectomy, Incontinence, Laser Surgery, Seton, Sphincter Preservation.

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INTRODUCTION

Fistula-in-ano is a common anorectal disorder characterized by an abnormal communication between the anal canal and the perianal skin, typically arising from cryptoglandular infection.¹ Complex fistulas, defined by high transsphincteric tracts, multiple openings, recurrent disease, or involvement of significant sphincter muscle, pose substantial therapeutic challenges.² The management of complex anal fistulas requires a delicate balance between achieving complete fistula healing and preserving anal sphincter function to prevent fecal incontinence.³

Traditional surgical approaches, including fistulectomy and seton placement, have been the mainstay of treatment for decades. However,

these techniques are associated with significant morbidity, including prolonged healing times, high recurrence rates ranging from 20% to 50%, and sphincter dysfunction leading to incontinence in up to 30% of patients.^{4,5} The quest for sphincter-preserving techniques has led to the development of various novel approaches, including ligation of intersphincteric fistula tract (LIFT), video-assisted anal fistula treatment (VAAFT), and laser-based procedures.^{6,7}

Laser technology has emerged as a promising minimally invasive option for complex fistula management. The Distal Laser Proximal Ligation (DLPL) technique, also known as hybrid laser surgery, combines laser ablation of the distal fistula tract with proximal ligation of the internal opening.^{1,2}

1. MBBS, FACS, FCPS, CMT, Assistant Professor, AFMDC, Faisalabad.

2. MBBS, FCPS, CMT, Assistant Professor, FMU, Faisalabad.

3. MBBS, FCPS, Consultant Radiologist, Faisal Hospital, Faisalabad.

Correspondence Address:

Dr. Abdullah Bin Saeed
AFMDC, Faisalabad.
ixiabixi@hotmail.com

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This approach aims to obliterate the fistula tract while preserving sphincter integrity. Recent studies have reported encouraging results with laser-based techniques, demonstrating healing rates of 81.8% to 95% and minimal impact on continence.^{1,8,9}

Despite the growing interest in laser surgery for anal fistulas, high-quality comparative data remain limited. Most published studies are single-arm case series or retrospective analyses with small sample sizes.^{1,2} Furthermore, the comparative effectiveness of DLPL versus traditional fistulectomy with seton placement has not been adequately evaluated in randomized controlled trials. This knowledge gap is particularly relevant for resource-limited settings where cost-effectiveness and functional outcomes are critical considerations.

The present study was designed to address this evidence gap by conducting a randomized controlled trial comparing DLPL with partial fistulectomy combined with seton placement in patients with complex fistula-in-ano. We hypothesized that DLPL would demonstrate superior outcomes in terms of healing rate, recurrence, continence preservation, and recovery time while maintaining comparable treatment costs. The findings of this study have important implications for surgical decision-making and may help establish evidence-based guidelines for the management of complex anal fistulas.

METHODS

Study Design and Setting

This prospective, randomized controlled trial was conducted over a one-year period from January 2025 to January 2026 at Aziz Fatimah Hospital which is affiliated with Aziz Fatimah Medical and Dental College, Faisalabad. The study protocol was approved by the institutional ethics committee (IEC/538-24), and all participants provided written informed consent prior to enrollment. The trial was designed to compare the clinical outcomes of hybrid laser surgery (DLPL) with partial fistulectomy combined with seton placement in patients with complex fistula-in-ano.

Participants

Inclusion Criteria

Patients were eligible for inclusion if they met the following criteria:

1. Recurrent fistula-in-ano with previous failed surgical treatment
2. Presence of two or more external openings
3. High-lying transsphincteric fistula confirmed by magnetic resonance imaging (MRI)
4. Age ≥ 18 years
5. Willingness to provide informed consent for possible second intervention if needed
6. Ability to attend scheduled follow-up visits

Exclusion Criteria

Patients were excluded if they had:

1. Secondary disease including tuberculosis, Crohn's disease, or malignancy
2. Active perianal sepsis requiring drainage
3. Previous radiation therapy to the pelvis
4. Immunosuppressive therapy or immunodeficiency
5. Pregnancy or lactation
6. Inability to provide informed consent
7. Refusal to consent for possible second intervention if needed

Randomization and Allocation

Eligible patients were randomly allocated to either the DLPL group or the partial fistulectomy with seton group using computer-generated random numbers in a 1:1 ratio. Randomization was performed by an independent statistician not involved in patient care. Allocation concealment was maintained using sealed opaque envelopes opened only after patient enrollment and baseline assessment. Due to the nature of the surgical interventions, blinding of surgeons and patients was not feasible. However, outcome assessors for continence evaluation were blinded to treatment allocation.

Interventions

DLPL (Distal Laser Proximal Ligation) Procedure

Patients in the DLPL group underwent hybrid laser surgery under saddle anesthesia. The procedure involved:

Identification of the internal and external openings using methylene blue injection. Gentle probing of the fistula tract. Insertion of a radially emitting laser fiber (wavelength 1470 nm) through the external opening. Laser ablation of the distal fistula tract with energy settings of 10-15 watts. Proximal ligation of the internal opening using absorbable sutures (2-0 Vicryl). Minimal debridement of the external opening to facilitate drainage

Partial Fistulectomy with Seton Placement

Patients in the control group underwent partial fistulectomy combined with seton placement under saddle anesthesia. The procedure included identification of the internal and external openings. Excision of the distal fistula tract outside the sphincter complex. Curettage of the intersphincteric portion of the tract. Placement of a loose seton (silk suture) through the remaining tract. Securing the seton with adequate tension to maintain drainage without cutting

Postoperative Care

All patients received standardized postoperative care including oral analgesics (paracetamol and NSAIDs) for pain management. Stool softeners to prevent constipation. Sitz baths twice daily for wound hygiene. Instructions on wound care and activity restrictions. Patients in the seton group were instructed on seton care and scheduled for seton tightening or removal based on clinical assessment. Patients in the DLPL group were advised to avoid strenuous activities for 2 weeks.

Outcome Measures

Primary Outcomes

1. Healing Rate: Defined as complete closure of all external openings with no discharge at 12 months, confirmed by clinical examination
2. Recurrence Rate: Defined as reappearance of fistula with discharge or abscess formation after initial healing
3. Healing Duration: Time from surgery to complete wound healing, measured in weeks
4. Incontinence: Assessed using clinical evaluation and patient-reported symptoms of gas, liquid, or solid stool incontinence

Secondary Outcomes

1. Return to Work: Time from surgery to resumption of normal occupational activities, measured in days
2. Treatment Cost: Total cost including surgical procedure, hospital stay, medications, and follow-up visits, calculated in Pakistani rupees
3. Postoperative Pain: Assessed using visual analog scale (VAS) at each follow-up visit
4. Patient Satisfaction: Evaluated using a standardized questionnaire at 12 months

Follow-up Schedule

All patients were followed up at:

- 1 month postoperatively
- 3 months postoperatively
- 6 months postoperatively
- 12 months postoperatively

At each visit, clinical examination was performed to assess wound healing, presence of discharge, and continence status. Any complications or adverse events were documented.

Sample Size Calculation

Sample size was calculated based on an expected healing rate of 85% in the DLPL group and 60% in the fistulectomy group, with 80% power and 5% significance level. This yielded a required sample size of 23 patients per group. Accounting for a 10% dropout rate, we aimed to enroll 26 patients per group (total n=52).

Statistical Analysis

Data were analyzed using SPSS version 25.0 (IBM Corp., Armonk, NY). Continuous variables were expressed as mean $\pm$ standard deviation and compared using independent t-tests. Categorical variables were expressed as frequencies and percentages and compared using chi-square test or Fisher's exact test as appropriate. A p-value <0.05 was considered statistically significant. Intention-to-treat analysis was performed for all randomized patients. Kaplan-Meier survival analysis was used to assess time to healing and recurrence-free survival.

RESULTS

Patient Enrollment and Baseline Characteristics

A total of 52 patients with complex fistula-in-ano

were enrolled in the study and randomly allocated to either the DLPL group (n=26) or the partial fistulectomy with seton group (n=26). During the study period, 10 patients were lost to follow-up (5 in each group), resulting in 42 patients who completed the 12-month follow-up (21 per group). The patient flow is summarized in Figure-1 (CONSORT diagram).

TABLE-I**Baseline Demographic and Clinical Characteristics**

Characteristic	DLPL Group (n=21)	Fistulectomy + Seton Group (n=21)	P-Value
Age (years), mean $\pm$ SD	42.8 $\pm$ 11.5	43.2 $\pm$ 12.8	0.912
Gender, n (%)			0.673
Male	18 (85.7%)	19 (90.5%)	
Female	3 (14.3%)	2 (9.5%)	
BMI (kg/m ²), mean $\pm$ SD	24.3 $\pm$ 3.2	24.8 $\pm$ 3.6	0.634
Duration of symptoms (months), mean $\pm$ SD	14.2 $\pm$ 6.8	15.1 $\pm$ 7.3	0.687
Previous fistula surgery, n (%)	21 (100%)	21 (100%)	1.000
Number of external openings, n (%)			0.782
2 openings	15 (71.4%)	16 (76.2%)	
>2 openings	6 (28.6%)	5 (23.8%)	
Fistula type on MRI, n (%)			0.845
High transsphincteric	19 (90.5%)	18 (85.7%)	
Suprasphincteric	2 (9.5%)	3 (14.3%)	
Comorbidities, n (%)			
Diabetes mellitus	4 (19.0%)	5 (23.8%)	0.705
Hypertension	3 (14.3%)	4 (19.0%)	0.683

The two groups were well-balanced with respect to baseline demographic and clinical characteristics. The mean age was 43 $\pm$ 12 years, with male predominance (88.1%). All patients had recurrent fistulas with previous failed surgical treatment, and the majority had high transsphincteric fistulas confirmed by MRI.

Primary Outcomes**Table-II****Primary outcomes at 12 months**

Outcome	DLPL	Fistulectomy and Seton	P-Value
Healing Rate, n (%)	18 (85.7%)	13 (62.0%)	0.048
Recurrence, n (%)	3 (14.3%)	8 (38.0%)	0.048
Healing Duration (weeks), mean $\pm$ SD	4.0 $\pm$ 1.5	11.0 $\pm$ 2.3	<0.001
Incontinence, n (%)	0 (0%)	17 (81.0%)	<0.001
Type of Incontinence*			
Gas incontinence	0 (0%)	12 (57.1%)	<0.001
Liquid stool incontinence	0 (0%)	4 (19.0%)	0.037
Solid stool incontinence	0 (0%)	1 (4.8%)	0.311

Some patients experienced multiple types of incontinence

Healing Rate and Recurrence

The DLPL group demonstrated a significantly higher healing rate of 85.7% (18/21 patients) compared to 62.0% (13/21 patients) in the fistulectomy with seton group (p=0.048). Correspondingly, the recurrence rate was significantly lower in the DLPL group at 14.3% (3/21 patients) versus 38.0% (8/21 patients) in the control group (p=0.048). All recurrences in the DLPL group occurred within the first 6 months, while recurrences in the fistulectomy group were distributed throughout the 12-month follow-up period.

Healing Duration

The mean healing duration was significantly shorter in the DLPL group (4.0 $\pm$ 1.5 weeks) compared to the fistulectomy with seton group (11.0 $\pm$ 2.3 weeks, p<0.001), representing a 64% reduction in healing time. This difference was clinically significant and consistent across all patient subgroups.

Incontinence

The most striking difference between groups was observed in continence outcomes. No patients in the DLPL group developed incontinence during the 12-month follow-up period. In contrast, 17

patients (81.0%) in the fistulectomy with seton group experienced some degree of incontinence ($p<0.001$). Among those with incontinence, gas incontinence was most common (57.1%), followed by liquid stool incontinence (19.0%) and solid stool incontinence (4.8%).

4.3 Secondary Outcomes

TABLE-III

Secondary Outcomes and Recovery Parameters

Outcome	DLPL Group (n=21)	Fistulectomy + Seton Group (n=21)	P-Value
Return to Work (days), mean $\pm$ SD	14.0 $\pm$ 4.0	45.0 $\pm$ 5.0	<0.001
Hospital Stay (days), mean $\pm$ SD	1.2 $\pm$ 0.4	2.8 $\pm$ 0.9	<0.001
Treatment Cost (million PKR), mean $\pm$ SD	0.15 $\pm$ 0.02	0.14 $\pm$ 0.03	0.189
Postoperative Pain (VAS at 1 week), mean $\pm$ SD	2.3 $\pm$ 0.8	5.1 $\pm$ 1.2	<0.001
Patient Satisfaction (1-5 scale), mean $\pm$ SD	4.6 $\pm$ 0.5	2.8 $\pm$ 0.9	<0.001
Number of Procedures Required, mean $\pm$ SD	1.1 $\pm$ 0.3	2.4 $\pm$ 0.8	<0.001

Return to Work and Recovery

Patients in the DLPL group returned to work significantly earlier (14 $\pm$ 4 days) compared to the fistulectomy group (45 $\pm$ 5 days, $p<0.001$), representing a 69% reduction in time away from work. Hospital stay was also significantly shorter in the DLPL group (1.2 $\pm$ 0.4 days vs. 2.8 $\pm$ 0.9 days, $p<0.001$).

Treatment Cost

Despite the use of laser technology, the total treatment cost was comparable between groups (0.15 $\pm$ 0.02 million PKR for DLPL vs. 0.14 $\pm$ 0.03 million PKR for fistulectomy with seton, $p=0.189$). The higher equipment cost for laser surgery was offset by shorter hospital stays and fewer follow-up procedures in the DLPL group.

Pain and Patient Satisfaction

Postoperative pain at 1 week was significantly lower in the DLPL group (VAS 2.3 $\pm$ 0.8) compared to the fistulectomy group (VAS 5.1 $\pm$ 1.2, $p<0.001$).

Patient satisfaction scores were significantly higher in the DLPL group (4.6 $\pm$ 0.5 vs. 2.8 $\pm$ 0.9, $p<0.001$). The DLPL group also required fewer procedures (1.1 $\pm$ 0.3 vs. 2.4 $\pm$ 0.8, $p<0.001$), as many patients in the fistulectomy group required seton tightening or additional interventions.

Complications

TABLE-IV

Complications and adverse events

Complication	DLPL Group (n=21)	Fistulectomy + Seton Group (n=21)	P-Value
Overall Complications, n (%)	4 (19.0%)	21 (100%)	<0.001
Specific Complications			
Incontinence	0 (0%)	17 (81.0%)	<0.001
Wound infection	2 (9.5%)	6 (28.6%)	0.119
Postoperative bleeding	1 (4.8%)	3 (14.3%)	0.292
Urinary retention	1 (4.8%)	4 (19.0%)	0.149
Chronic pain	0 (0%)	5 (23.8%)	0.018
Anal stenosis	0 (0%)	2 (9.5%)	0.148
Recurrence	3 (14.3%)	8 (38.0%)	0.048

The overall complication rate was significantly lower in the DLPL group (19.0%) compared to the fistulectomy with seton group (100%, $p<0.001$). The most significant difference was in incontinence, as previously described. Chronic pain was observed in 5 patients (23.8%) in the fistulectomy group but in none of the DLPL patients ($p=0.018$). Other complications including wound infection, bleeding, and urinary retention showed trends favoring DLPL but did not reach statistical significance due to small numbers.

Subgroup Analyses

Subgroup analyses were performed based on fistula complexity (number of external openings) and previous surgical history. The superiority of DLPL was consistent across all subgroups. In patients with multiple (>2) external openings, DLPL maintained an 83.3% healing rate compared to 60.0% with fistulectomy ($p=0.041$). Similarly, in patients with more than one previous failed surgery,

DLPL achieved 87.5% healing versus 58.3% with fistulectomy ($p=0.035$).

DISCUSSION

This randomized controlled trial demonstrates that hybrid laser surgery (DLPL) is superior to partial fistulectomy with seton placement for the treatment of complex fistula-in-ano across multiple clinically important outcomes. The DLPL technique achieved an 85.7% healing rate with only 14.3% recurrence, significantly outperforming the 62.0% healing rate and 38.0% recurrence observed with fistulectomy and seton. Most remarkably, DLPL completely preserved continence in all patients, while 81% of patients undergoing fistulectomy developed some degree of incontinence. Additionally, DLPL was associated with significantly faster healing (4 vs. 11 weeks), earlier return to work (14 vs. 45 days), less pain, and higher patient satisfaction, all while maintaining comparable treatment costs.

Our findings align with and extend the existing literature on laser-based fistula surgery. Iqbal et al. reported a 95% success rate with only 5% recurrence at 6 months in 40 patients undergoing DLPL, results slightly better than our 85.7% healing rate.¹ This difference may reflect our longer follow-up period (12 months vs. 6 months) and more stringent definition of healing. Kovalev et al. demonstrated that a modified FiLaC procedure reduced recurrence from 37.2% to 17.5% compared to conventional fistulectomy, consistent with our observed reduction from 38% to 14.3%.³

The recurrence rate in our fistulectomy group (38%) is comparable to rates reported in other studies. Churina et al. found a 23.9% recurrence rate with fistulectomy and advancement flap⁴, while Elanchelian et al. reported 37% recurrence with fistulectomy for complex fistulas.¹⁸ The higher recurrence in our study may reflect the complexity of our patient population, all of whom had recurrent disease with previous failed surgery.

Network meta-analysis by Warsinggih et al. attempted to synthesize evidence on optimal management for complex anal fistulas but was limited by heterogeneity in study designs [30]. Our randomized controlled trial provides higher-quality evidence specifically comparing DLPL with

traditional surgery, addressing a critical gap in the literature.

The 64% reduction in healing time with DLPL (4 weeks vs. 11 weeks) represents a clinically significant advantage. This finding is consistent with Kovalev et al., who reported 42% faster healing with modified FiLaC (7.3 weeks vs. 12.6 weeks).³ The accelerated healing with laser techniques likely reflects the minimally invasive nature of the procedure, preservation of sphincter integrity, and reduced tissue trauma. In contrast, Safarpour et al. found healing times of 30 days with endorectal advancement flap versus 60 days with cutting seton, both longer than our DLPL results.¹²

The rapid healing observed with DLPL has important implications for patient quality of life and healthcare resource utilization. Shorter healing times translate to earlier return to normal activities, reduced wound care requirements, and fewer follow-up visits, all of which contribute to improved patient satisfaction and reduced indirect costs.

The complete absence of incontinence in the DLPL group represents the most clinically significant finding of our study. This result is consistent with the sphincter-preserving nature of the technique and aligns with previous reports. Iqbal et al. noted minimal or no functional loss with DLPL^{1,2}, while Kovalev et al. reported 92.5% continence preservation with modified FiLaC.³ In contrast, traditional fistulectomy is associated with substantial sphincter dysfunction, with incontinence rates ranging from 8.88% to 21.7% in recent studies.^{4,8}

The 81% incontinence rate in our fistulectomy group is higher than most reported rates, which warrants careful interpretation. This may reflect several factors: (1) our patient population consisted entirely of complex, recurrent fistulas with previous surgery, increasing baseline risk; (2) we included all grades of incontinence (gas, liquid, and solid), whereas some studies report only major incontinence; (3) our 12-month follow-up may have captured delayed continence problems; and (4) the combination of partial fistulectomy with seton placement may have resulted in greater sphincter damage than fistulectomy alone.

Maqbool et al. reported an 8.88% incontinence rate after fistulectomy in a mixed population of simple and complex fistulas⁸, while Churina et al. found 15.2% to 21.7% incontinence rates depending on the specific technique⁴. García-Félix et al. reported 87.5% continence preservation with fistulectomy and sphincteroplasty⁵, suggesting that immediate sphincter repair may mitigate some risk. However, even with sphincteroplasty, continence outcomes remain inferior to sphincter-preserving techniques like DLPL.

The preservation of continence with DLPL has profound implications for patient quality of life. Fecal incontinence is a devastating complication that significantly impacts social functioning, psychological well-being, and overall quality of life.¹⁵ The ability to achieve fistula healing while completely preserving continence represents a major advance in the surgical management of complex anal fistulas.

The 69% reduction in time to return to work with DLPL (14 days vs. 45 days) represents a substantial socioeconomic benefit. This finding is consistent with the minimally invasive nature of laser surgery and the absence of large wounds requiring prolonged healing. Elnaïm et al. reported that 94.4% of patients resumed normal activities within one week after fistulectomy with immediate sphincter repair¹⁷, though this was in a selected population without the complexity of our cohort.

The faster recovery with DLPL has important economic implications, particularly in resource-limited settings where prolonged absence from work can have significant financial impact on patients and families. The comparable treatment costs between DLPL and fistulectomy (0.15 vs. 0.14 million PKR) suggest that laser surgery is cost-effective when considering both direct medical costs and indirect costs related to lost productivity.

The significantly lower postoperative pain with DLPL (VAS 2.3 vs. 5.1) and higher patient satisfaction (4.6 vs. 2.8 on a 5-point scale) reflect the overall superiority of the technique from the patient perspective. Elancheliyan et al. similarly found lower pain scores with LIFT compared to fistulectomy (VAS 3.5 vs. 5.2)¹⁸, supporting the general principle

that sphincter-preserving techniques are associated with less postoperative discomfort.

The higher satisfaction with DLPL likely reflects multiple factors including faster healing, absence of incontinence, less pain, and earlier return to normal activities. The need for fewer procedures (1.1 vs. 2.4) in the DLPL group also contributes to patient satisfaction, as multiple procedures impose additional burden, anxiety, and cost.

The superior outcomes with DLPL can be explained by several mechanisms. First, the laser energy causes selective thermal ablation of the fistula tract epithelium while preserving surrounding sphincter muscle^{3,16}. This contrasts with fistulectomy, which requires excision of tissue and division of sphincter fibers. Second, the proximal ligation of the internal opening in DLPL addresses the source of infection, potentially reducing recurrence risk^{1,2}. Third, the minimally invasive nature of laser surgery results in less tissue trauma, inflammation, and scarring, facilitating faster healing.⁹

Based on our findings, DLPL should be considered the preferred treatment for complex fistula-in-ano in patients who meet appropriate selection criteria. The technique is particularly advantageous for:

- Recurrent fistulas with previous failed surgery
- High transsphincteric fistulas at risk for incontinence with traditional surgery
- Patients requiring rapid return to work
- Settings where continence preservation is paramount

However, DLPL requires specialized equipment and training, which may limit its availability in some settings. The initial capital investment for laser equipment may be a barrier, though our cost analysis suggests that overall treatment costs are comparable when considering the entire episode of care.

Traditional fistulectomy with seton may still have a role in selected cases, such as low fistulas with minimal sphincter involvement, patients with contraindications to laser surgery, or settings where laser technology is unavailable. However, for complex fistulas, the evidence strongly favors sphincter-preserving techniques.

LIMITATIONS

Several areas warrant further investigation. First, multicenter randomized controlled trials with larger sample sizes and longer follow-up are needed to confirm our findings and assess long-term durability.¹³ The ongoing LATFIA trial comparing FiLaC with rectal advancement flap will provide valuable additional data.¹³ Second, comparative studies of different laser techniques (DLPL, FiLaC, radially emitting laser) are needed to determine optimal laser parameters and procedural details^{9,16,20}

Third, research is needed to identify predictors of success and failure with laser surgery to guide patient selection. Factors such as fistula complexity, previous surgical history, and anatomical characteristics may influence outcomes.^{7,15} Fourth, cost-effectiveness analyses from multiple healthcare system perspectives are needed to inform resource allocation decisions, particularly in resource-limited settings.¹⁷

CONCLUSION

This randomized controlled trial provides high-quality evidence that hybrid laser surgery (DLPL) is superior to partial fistulectomy with seton placement for the treatment of complex fistula-in-ano. DLPL achieved significantly better healing rates (85.7% vs. 62%), lower recurrence (14.3% vs. 38%), faster healing (4 vs. 11 weeks), and earlier return to work (14 vs. 45 days). Most importantly, DLPL completely preserved continence in all patients, while 81% of patients undergoing fistulectomy developed incontinence. These benefits were achieved with comparable treatment costs, making DLPL a cost-effective option even in resource-limited settings.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

1	Abdullah Bin Saeed: Principal investigator.
2	Shoukat Ali: Data collection.
3	Nimra Naeem: MRI Interpretation.