

## **Laser therapy for fistula in another versus surgical treatment comparative study in Al Diwaneyah city**

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### **ABSTRACT**

Fistula-in-ano is an abnormal communication between the anal canal or rectum and the perianal skin, which causes a chronic inflammatory response. Fistulectomy is the gold standard in the treatment of anal fistulas. patients treated with a Fistulectomy are at risk of developing postoperative anal sphincter dysfunction. The "laser therapy of fistula in ano" is another option of management of fistula in ano. The study was conducted to assess the efficiency of laser therapy in Fistulectomy.

A clinical trial study was enrolled patients complaining from anal fistula. The study conducted in Aldiwanyia teaching hospital and in private hospital. Patients of either sex with variable types of fistula were enrolled between June 2017 to December 2020. One hundred patients were assigned into two group according to type of treatment, first group 50 patients were undergone laser therapy and second group 50 patients were surgical treatment for fistula.

The mean age of sample was  $46.3 \pm 9.4$  and male to female ratio 2.3:1. Fifty three percent of patients presented with intersphincter type of fistula and 24% transphincter types as in table two. Many patients show more than one clinical feature, 39% show discharge, 58% presented with pain and 47% with swelling. Success seen in laser procedure were 84% recurrence seen in 12% whereas in surgical procedure 72% cured rate and 22% recurrence of fistula was happened during period of follow up.

Pain was the common complication post operative in both procedures, 42% in laser and 76% in surgery, 2% show urinary retention in laser therapy of fistula in ano and 16% in surgery, bleeding was presented in surgical treatment than laser procedure and incontinence only seen in surgical treatment.

The laser therapy procedure for anal fistula therapy is a safe, effective, minimally invasive, sphincter-preserving procedure with a high success rate.

### **INTRODUCTION**

Fistula-in-ano is an abnormal communication between the anal canal or rectum and the perianal skin, which causes a chronic inflammatory response. The most common cause is nearly always by a previous anorectal abscess(Deeba S et al., 2008). There is usually a history of recurrent abscess that ruptured spontaneously or was surgically drained. The occurrence of such abscess is mostly secondary to infection of an anal gland (Cryptoglandular hypothesis of Eisenhammer) (Babu AK et al., 2015).

Tuberculosis, lymphogranuloma inguinale, inflammatory bowel disease like Crohn's or ulcerating proctocolitis can also lead to development of anal fistula. Fistulae have been reported following external injury or probing an abscess or low anal fistula(Yadu Set al., 2018). A fistula may develop in chronic anal fissure. A colloid carcinoma of

the rectum can manifest itself through an anal fistula. Occasionally ingested foreign bodies, such as fish or chicken bones may penetrate the rectum. Impalement injury after falling astride a sharp object or as a result of a road traffic accident may result in a high anorectal fistula(Vasilevsky CA., 2007).

Anal fistulas are 2–6 times more prevalent in males than females, with the condition occurring most frequently in patients in their 30s and 40s(Babu AK et al., 2015).

The chief complaint of anorectal fistula is intermittent or constant drainage or discharge. There is usually a history of previous pain, swelling and recurrent abscess that ruptured spontaneously or was surgically drained. There may be a pink or red elevation exuding pus, or it may have healed(Siddharth Ret al., 2015).

Digital rectal examination remains the main stay of diagnosis in anorectal fistula cases. Commonly done investigations in fistula-in-ano are Fistulography, Sigmoidoscopy, Colonoscopy , Endo anal/ endorectal ultrasound, Magnetic Resonance Imaging (MRI), Computerized Tomography Scan (CT scan), A barium enema/small bowel series, Fistuloscopy. But thorough physical examination is most needed(Yadu Set al., 2018).

### Types

Depending on their relationship with the internal and external sphincter muscles, fistulae are classified into five types(Kumar VH et al., 2015):

1.Extrasphincteric fistulae begin at the rectum or sigmoid colon and proceed downward, through the levator ani muscle and open into the skin surrounding the anus.

2.Suprasphincteric fistulae begin between the internal and external sphincter muscles, extend above and cross the puborectalis muscle, proceed downward between the puborectalis and levator ani muscles, and open an inch or more away from the anus.

3.Transsphincteric fistulae begin between the internal and external sphincter muscles or behind the anus, cross the external sphincter muscle and open an inch or more away from the anus. These may take a 'U' shape and form multiple external openings. This is sometimes termed a 'horseshoe fistula.

4.Intersphincteric fistulae begin between the internal and external sphincter muscles, pass through the internal sphincter muscle, and open very close to the anus.

5.Submucosal fistulae pass superficially beneath the submucosa and do not cross either sphincter muscle(ShawkiS et al., 2011).

### Treatment

Fistulectomy is the gold standard in the treatment of anal fistulas, but the recovery rate is >90%(Hall JF et al., 2014). However, patients treated with a Fistulectomy are at risk of developing postoperative anal sphincter dysfunction. This risk is higher in

women and patients with complex fistulas, preoperative incontinence, recurrence, or past anorectal surgery(Jordán J et al., 2010).

For this reason, various “sphincter-sparing” techniques including the use of fibrin glue and anal fistula plugs (AFP), the anorectal advancement flap (ARAF), and ligation of the intersphincteric fistula tract (LIFT) have been described to minimize concerns about functional outcomes in the surgical treatment of fistulas(Adegbola SO et al., 2017).

The laser therapy of fistula in ano is another way of management of fistula in ano. The laser therapy of fistula in ano a technique as previously described uses a radial-emitting laser fibre for endofistular therapy and may be supplemented in selected cases with a mucosal advancement anoplasty for control of the internal fistula opening. The laser therapy approach is designed to destroy both the crypt gland and the additional epithelial layer of the fistula track simultaneously by a photothermal effect with coincident obliteration of both the internal and external fistula orifices(Wilhelm A ,2011).

This procedure involved completely removing the entire length of the fistula tract and closing the internal opening of the fistula using a laser diode source and a radial laser probe. The most important feature of laser therapy is that the laser tip used does not damage the sphincters and other structures. The laser therapy approach was designed to simultaneously eliminate both the anal gland/crypt and the epithelial layer of the fistula via photothermal effect, while also closing both the internal and external fistula openings. The main causes of fistula recurrence in other techniques such as bioprosthetic plugs and fibrin plugs include overlooked or untreated internal openings, insufficient drainage of the intersphincteric space, overlooked side tracts, and/or residues of fistula epithelium and granulation tissue(Seow-En I et al., 2016; Grolich T et al 2014; Wałęga P et al., 2014).

## **PATIENTS AND METHOD**

### **Study design**

A clinical trial study was enrolled patients complaining from anal fistula. The study conducted in Aldiwanyia teaching hospital and in private hospital. Patients of either sex with variable types of fistula were enrolled between June 2017 to December 2020. A recording demographic data, complete history, physical examination and fistulogram was done for every patient.

One hundred patients were assigned into two group according to type of treatment, first group 50 patients were undergone laser therapy and second group 50 patients were surgical treatment for fistula.

Exclusion criteria included a superficial fistula that could be treated by fistulectomy without compromising anal sphincter function and any fistula related to malignancy.

All patients gave informed consent to undergo the modified laser procedure and agreed to participate in regular follow-up assessments.

Data prospectively entered into the database included patient demographics, past surgical treatments, fistula type, previous fistula drainage, operative time and intra and postoperative morbidity.

#### Patient assessment

Preoperatively all patients were assessed by digital examination, proctoscopy and fistulogram. If patients had a recurrent fistula they referred to pelvic MRI to search about potentially high secondary multiple tracks or abscess formation

#### Surgical procedure

Before surgery all patient were administered prophylactic antibiotics for short term, ceftriaxon 1g and metronidazole 500 mg intravenous. General anesthesia or spinal anesthesia was used for patients in surgical treatment of fistula.

The patient was placed in the lithotomy position. Anal examination was performed and a Parks' anal retractor was inserted. The external opening was injected with methylene blue or hydrogen peroxide to visualize and locate the internal opening. A guide-wire was inserted into the fistula track. The fistula track was gently rubbed using the guide. Particular care was taken to avoid widening the fistula track during debridement. It was then gently irrigated saline. A plastic hollow 8F catheter was inserted into the fistula track using the guide-wire. A 300-lm radial-emitting disposable laser fiber was then inserted into the 8F catheter with its tip emerging at the internal orifice, ready to be activated. The fiber delivered laser energy homogeneously at 360°, and, by applying continuous laser energy, the fistula track was closed whilst withdrawing the fiber at a speed of 1 mm/s. a diode laser at 980 nm (ARC laser) was used.

Diode laser energy causes coagulation and shrinkage of the fistula track around the radial emitting laser fiber by interacting with water and blood. In addition, complete sterilization of the fistula track is achieved. A wavelength of 980 nm allows the fistula to shrink with the use of less power, thus reducing the potential for thermal damage of the tissue around the fistula track.

#### Follow up

Follow up was scheduled in the outpatient clinic at 1 and 2 weeks and 1, 3, 6 and 12 months postoperatively. However, patients were instructed to return to the outpatient clinic at any time should symptoms recur. Postoperative clinical evaluation included physical examination and proctoscopy.

The patient was considered as cured on closure of the external opening in the absence of drainage, pain or perianal swelling. Patients were deemed to have failed treatment if there was no evidence of closure of the external opening at the 3-month follow up.

A successful outcome was defined by the complete healing of the surgical wound and external opening for at least 6 months.

#### RESULT

The mean age of sample was 46.3±9.4 and male to female ratio 2.3:1. The sample divided to five categories according to age, twenty five percent of sample were age between ≤30 years, 34% in age group from 41-50 years and 14% the age range from 51-60 years. Seventy percent of patients were male and 30% were female, as shown in table one. Fifty three percent of patients presented with intersphincter type of fistula

and 24% transphincter types as in table two. Many patients show more than one clinical feature, 39% show discharge, 58% presented with pain and 47% with swelling, show in table 3.

Table 1 (Age and male to female ratio)

Age	No.	Percent
≤30 years	25	25%
31-40 years	24	24%
41-50 years	34	34%
51-60 years	14	14%
>60 years	3	3%
Total	100	
Male	70	70%
Female	30	30%

Table 2 (types of fistula )

Parks classification	Number	Percent
Intersphincteric	53	53%
Transsphincteric	24	24%
Suprasphincteric	13	13%
Extrasphincteric	10	10%

Table 3 (presentation of fistula in ano )

Clinical presentation	Number	Percent
Discharge	39	39%
Pain	58	58%
Swelling	47	47%
Perianal irritation	9	9%
Past history of perianal abscesses	21	21%

Outcome of these procedures were show in table 4. Cured patients in laser procedure were 84% recurrence seen in 12% whereas in surgical procedure 72% cured rate and 22% recurrence of fistula was happened during period of follow up.

Pain was the common complication post-operative in both procedures, 42% in laser and 76% in surgery, 2% show urinary retention in laser therapy and 16% in surgery , bleeding was presented in surgical closure than laser procedure and incontinence only seen in surgical treatment, as seen in table 5.

Table 4 (outcome of laser therapy in comparism with surgical procedure).

Out come	laser therapy	Surgical treatment
cured	42(84%)	36(72%)
Failed	2(4%)	3(6%)
Recurrence	6(12%)	11(22%)
	50	50

Healing time		
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Table 5 (complications of laser therapy and surgical procedure ).

Complication	laser therapy	Surgical
Urinary retention	1	8
Bleeding	3	7
Pain	21	38
Incontinence	0	4
Surgical site infection	1	1

## DISCUSSION

Treatment of perianal fistulas has always been challenging, balancing between long-term effectiveness (with higher success rates when using more aggressive surgical techniques) and the risk of postoperative sphincter dysfunction (Giamundo P et al.,2015).

Laser therapy device has shown good primary results in both cryptoglandular and Crohn's anal fistulas and even better if used for a second time. However, some authors admit that the laser procedure alone may be insufficient in closing the internal fistula opening, which may be implicated in fistula recurrence (Wilhelm A et al., 2017).

Laser therapy is a promising sphincter-saving procedure for anal fistula that seems to have a high success rate and low morbidity. It is not technically demanding and allows for quick recovery(Amato A et al ., 2015) .

our study reported the success rate in laser procedure were 84% recurrence seen in 12%, in other studies of laser therapy show success in healing anorectal fistulas is 71–82%with a mean of 30 months in the study with longer observation time(Giamundo P et al., 2015).

More over, in a meta-analysis, by Elfeki H et al., (2020) reported the mean primary success rate was reported to be 67.3% .

Giamundo P, et al (2014), reported primary healing was observed in 25 (71.4%) patients. There were eight (23%) failures and two recurrences at 3 and 6 months after the operation. No patient reported incontinence postoperatively.

Dönmez et al, (2018), show higher success rate 88.89% of patients were recovered.

In a retrospective clinical study including 50 patients, Öztürk et al., (2014). reported an 82% success rate with the laser therapy with an average follow-up period of 12 months. In a similar study, Wilhelm et al.29 In their study including 117 cases and representing 5 years of experience with laser therapy, determined a 64.1% recovery rate after one application and average follow-up period of 25.4 months. The success rate in recurrent cases was 88% after the second session of treatment.

We achieved a success rate of 84% in our study, we attribute this difference to the lower number of complex fistula cases in this study compared to other studies.

It is interesting to note that the above mentioned success rates refer to all types of fistula combined (according to Parks classification), thus making laser therapy near-ideal treatment for both simple and complex anal fistulas(Chand M et al., 2017).

Some studies reported success rates (fistula healing) in fewer than 50% of patients(de Bonnechose G et al 2020; Serin KR et al 2020).

In our result, pain was the common complication post-operative in both procedures, 42% in laser and 76% in surgery, 2% show urinary retention in laser therapy and 16% in surgery , bleeding was presented in surgical closure than laser procedure and incontinence only seen in surgical treatment, it close to results of study by A.L. Carvalho et al., 2017.

Giamundo et al., (2015) 9 reported few complications following laser treatment eight (8/43, 18%)patients with temporary pain and anismus postoperatively and three (3/43, 7%) patients with moderate bleeding after laser therapy treatment. All of these resolved without intervention.

Similarly, Laretta et al(2018) reported four patients with minor postoperative complications (two with fever, one with severe pain and one with moderate bleeding) that resolved spontaneously.

Brabender et al., (2020) show limited complications in this cohort with only 3 cases ofpostoperative infection, and no cases of fecal incontinence. Postoperative pain was the most common complaint and was reported by 8 patients (44%).

Elfeki H et al., 2020 reported seven patients (22.6%) had hemorrhage, 3 (9.7%) had surgical site infection, and only 1 (3.2%) patient showed urinary retention. Recurrence was seen in 3 patients (9.7%).

Laser therapy requires more costly equipment compared to other sphincter-sparing procedures; however, the diode laser platform is easily portable and has many other surgical applications, such as the treatment of varicose veins. Therefore, the machine can be shared by different specialists in an institution, thus reducing the overall costs. It is also worth noting that disposable diode radial lasers are moderately expensive, but still cheaper than most fistula plugs(Dönmez et al, 2018).

## **CONCLUSION AND RECOMMENDATION**

In light of the results of our study, laser therapy is a safe treatment method for anal fistulas and does not require additional surgical closure of the internal orifice. This procedure has a high success rate and low morbidity. Because it is sphincter-sparing and preserves anal continence, this procedure should be promoted as one of the options for the treatment of complex anal fistulas, especially in patients with weak sphincters.

## Reference

- Amato A, Bottini C, De Nardi P, Giamundo P, Lauretta A. Evaluation and management of perianal abscess and anal fistula: a consensus statement developed by the Italian Society of Colorectal Surgery (SICCR). *Tech Coloproctol*; 2015; 19: 595-606.
- Adegbola SO, Sahnan K, Pellino G, Tozer PJ, Hart A, Phillips RKS, Warusavitarne J, Faiz OD. Short-term efficacy and safety of three novel sphincter-sparing techniques for anal fistulae: a systematic review. *Tech Coloproctol* 2017;21:775-782.
- Alexandre Lopes de Carvalho, Eduardo Fonseca Alves Filho, Rogerio Souza Medrado de Alcantara, Marcelo da Silva Barreto. FILAC – Fistula – Tract Laser Closure: a sphincter-preserving procedure for the treatment of complex anal fistulas. *J Coloproctol (Rio de Janeiro)*. 2017;37(2):160–162 .
- Babu AK, Naik MB, Babu MR, Madhulikia M. Seton - as a gold standard treatment for high fistula in ano. *J Evidence Based Med Healthcare*. 2015;2(11):1687-93.
- Brabender DE, Moran KL, Brady M, Carmichael JC, Mills S, Pigazzi A, Stamos MJ, Jafari MD. Assessing the effectiveness of laser fistulectomy for anal fistula: a retrospective cohort study. *Tech Coloproctol*. 2020 Oct;24(10):1071-1075. doi: 10.1007/s10151-020-02281-y. Epub 2020 Aug 8. PMID: 32770423.
- Chand M, Tozer P, Cohen RC, (2017) Is FiLaC the answer for more complex perianal fistula? *Tech Coloproctol* 21: 253-255.
- De Bonnechose G, Lefevre JH, Aubert M, et al. Laser ablation of fistula tract (LAFT) and complex fistula-in-ano: “the ideal indication” is becoming clearer.... *Tech Coloproctol*. 2020;24(7):695–701. doi:10.1007/s10151-020-02203-y10.
- Deeba S, Aziz O, Sains PS, Darzi A. Fistula-in-ano: advances in treatment. *Am J Surg*. 2008;196(1):95-9.
- Dönmez T, Hatipoğlu E. Closure of fistula tract with filac™ laser as a sphincter preserving method in anal fistula treatment. *Turk J Color Dis*. 2018.
- Elfeki H, Shalaby M, Emile SH, Sakr A, Mikael M, Lundby L.. Asystematic review and meta-analysis of the safety and efficacy of fistula laser closure. *Tech Coloproctol* 2020;24:265-74.
- Giamundo P, Esercizio L, Geraci M, Tibaldi L, Valente M. Fistula-tract Laser Closure (FiLaC): long-term results and new operative strategies. *Tech Coloproctol*;2015;19: 449-453.

Giamundo P, Geraci M, Tibaldi L, Valente M. Closure of fistula-in-ano with laser-FiLaC™: an effective novel sphincter saving procedure for complex disease. *Colorectal Dis* 2014;16:110-115.

Grolich T, Skricka T, Robek O, Kala Z, Hemmelova B, Hrivnak R. Role of video assisted anal fistula treatment in our management of fistula-in-ano. *Acta Chir Iugosl* 2014;61:83-85.

Hall JF, Bordeianou L, Hyman N, Read T, Bartus C, Schoetz D, Marcello PW. Outcomes after operations for anal fistula: results of a prospective, multicenter, regional study. *Dis Colon Rectum* 2014;57:1304-1308.

Han JG, Wang ZJ, Zheng Y. Ligation of Intersphincteric Fistula Tract vs Ligation of the Intersphincteric Fistula Tract plus a bioprosthetic anal fistula plug procedure in patients with transsphincteric anal fistula: early results of a multicenter prospective randomized trial. *Ann Surg*;2016; 264:917–922.

Lauretta A, Falco N, Stocco E, Bellomo R, Infantino A. Anal fistula laser closure: the length of fistula is the achilles' heel. *Tech Coloproctol*. 2018;22(12):933–939.

Jordán J, Roig JV, García-Armengol J, García-Granero E, Solana A, Lledó S. Risk factors for recurrence and incontinence after anal fistula surgery. *Colorectal Dis* 2010;12:254-260.

Kumar VH, Chetan PR, Naveen PR. A clinico-pathological study of fistula-in-ano. *Sch J App Med Sci*. 2015;3(3F):1471-76.

Oztürk E, Gülcü B. Laser ablation of fistula tract: a sphincter-preserving method for treating fistula-in-ano. *Dis Colon Rectum* 2014;57:360-364.

Serin KR, Hacim NA, Karabay O, Terzi MC. Retrospective analysis of primary suturing of the internal orifice of perianal fistula during FiLaC procedure. *Surg Laparosc Endosc Percutan Tech*. 2020;30 (3):266–269.

Seow-En I, Seow-Choen F, Koh PK. An experience with video-assisted anal fistula treatment (VAAFT) with new insights into the treatment of anal fistulae. *Tech Coloproctol* 2016;20:389-393.

Siddharth R, Kumar GA, Sreedhar S. Clinical study of fistula in ano. *J Evol Medical Dent Sci*. 2015;4(86):15082-87

Shawki, Sherief; Wexner, Steven D (2011-07-28). "Idiopathic fistula-in-ano". *World Journal of Gastroenterology*. **17** (28): 3277–3285

Wałęga P, Romaniszyn M, Nowak W. VAAFT: a new minimally invasive method in the diagnostics and treatment of anal fistulas--initial results. *Pol Przegl Chir* 2014;86:7-10.

Wilhelm A. A new technique for sphincter-preserving anal fistula repair using a novel radial emitting laser probe. *Tech Coloproctol* 2011;15:445-449.

Wilhelm A, Fiebig A, Krawczak M. Five years of experience with the FiLaC™ laser for fistula-in-ano management: long-term follow-up from a single institution. *Tech Coloproctol* 2017;21:269-276.{5

Wolicki A, Jäger P, Deska T, Senkal M. Sphincter-saving therapy for fistula-in-ano: long-term follow-up after FiLaC®. *Tech Coloproctol*. 2020;25(2):177–184. doi:10.1007/s10151-020-02332-4.

Yadu S, Toppo A. Clinical presentation and outcome of fistula in ano cases. *Int Surg J* 2018;5.

Vasilevsky CA, Gordon PH. Benign anorectal: Abscess and Fistula. *The ASCRS textbook of colon and rectal surgery*. New York, NY: Springer; 2007:192-214