










# Ligation of Intersphincteric Fistula Tract (LIFT) for the Treatment of Anal Fistula: A Prospective Observational Study

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J Coloproctol 2023;43(1):24–29.

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## Abstract

**Background** The ligation of intersphincteric fistula tract (LIFT) technique avoids postoperative anal continence disturbances and preserves quality of life.

**Methods** A total of 70 patients with anal fistula (AF) were treated in the Day Surgery Unit. The LIFT technique was the primary treatment in 63 patients. The other had previously undergone placement of a loose seton (two-step approach). The mean follow-up was 66.8 months. Statistical analysis was performed using contingency tables, the chi-square test, and the Student T-test.

**Results** The use of LIFT was successful in 40 patients (57.1%). However, 6 patients (8.6%) presented persistence of postoperative intersphincteric fistula, being successfully treated by fistulotomy. There were no differences in this technique's success rate between high and low AF ( $p = 0.45$ ). The success rate of one-step LIFT, however, was significantly higher ( $p = 0.03$ ). No disturbances of continence were observed.

**Conclusions** The LIFT technique has a role in the treatment of AF, is suitable for ambulatory surgery, and has a low complications rate. A two-step approach is not always needed.

## Keywords

- ▶ anal fistula (AF)
- ▶ ligation of intersphincteric fistula tract (LIFT)

## Introduction

The treatment of anal fistula (AF) is still a challenge for colorectal surgeons. The surgical approach should focus not only on the disappearance of the fistulous tract but also in avoiding septic complications, symptomatology, and recurrence by preserving fecal continence. This balance between AF healing and anal continence impairment has long since been the aim of all surgical techniques.<sup>1</sup>

It is widely accepted that the best treatment for AF is fistulotomy,<sup>2,3</sup> particularly in cases where the fistula tract

comprises less than one third of the external sphincter. Thus, fistulotomy may be dangerous in cases with high transphincteric fistulas, and it is contraindicated in suprasphincteric fistuli.<sup>3</sup> A high risk of postoperative incontinence may be considered in women, patients with previous fecal continence disturbances, and in certain fistula locations, even in low transphincteric fistulas.<sup>3</sup> Good results have been obtained by fistulotomy plus sphincteroplasty in many groups, but this technique is not widespread among the surgical community.<sup>3</sup> Furthermore, the use of cutting setons

received  
December 12, 2022  
accepted after revision  
January 23, 2023

DOI <https://doi.org/10.1055/s-0043-1764195>.  
ISSN 2237-9363.

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Thieme Revinter Publicações Ltda., Rua do Matoso 170, Rio de Janeiro, RJ, CEP 20270-135, Brazil

results in an unacceptably high rate of incontinence (around 38%).<sup>3,4</sup> The use of both instillation of sealant substances (fibrin glue and other sealants) and fistula plugs alone is being abandoned due to poor results in long term follow-up analyses.<sup>5</sup> Rectal advancement flap has been proposed to be the treatment of choice, but it is technically challenging so there is a risk of affecting anal continence and its recurrence rates are high (close to 50%).<sup>6-8</sup> The newest approaches, such as VAAFT (Video Assisted Anal Fistula Treatment), FiLaC (Fistula tract Laser Closure) and OTSC (Over The Scope Clip closure), are performed by less than 10% of surgeons and results are still being studied in order to reach conclusions.<sup>3</sup>

Rojanasakul described, in 2007, the ligation of intersphincteric fistula tract (LIFT) technique.<sup>9</sup> The aim of this surgical procedure was to avoid anal sphincter impairment with a simple ligation of the fistula tract. Their results after a 3-month follow-up were excellent, with a healing rate of 94% and no postoperative continence disturbances. Thus, the technique was considered to be ideal for all the cases where fistulotomy was not technically possible.

The aim of this study was to understand our results when performing the LIFT technique in the treatment of AF. The secondary objective was the analyses of any factors which could lead to surgical complications and therefore influence negatively in the evolution of our patients.

## Methods

Our report is based on an observational study carried out by the Colorectal Surgery Unit of the Department of General Surgery at the Hospital of Mataró (Barcelona, Spain).

Between January 2011 and December 2018, data of patients who underwent LIFT treatment for AF was collected and recorded. The inclusion criteria were age over 18 and single tract fistula of cryptoglandular origin. The only exclusion criterion was presence of inflammatory bowel disease. Patients with recurrent fistula who had previously received treatment were not excluded.

From the total of 70 patients included in the study, there were 36 men (51.4%) and 34 women (48.6%). The average age was 55.1 years  $\pm$  13.9 for men and 45.4  $\pm$  13.9 for women. All patients underwent a preoperative endoanal EUS (Endoscopic UltraSound). Ultrasound diagnosis and surgical examination allowed fistula classification. We used the classification proposed by Denis et al.,<sup>10</sup> which is a modification of the Parks classification.<sup>11</sup> ►Table 1 shows the patient's fistula type.

For 63 patients (90%), the LIFT technique was their first treatment for AF. However, when EUS suggested the exist-

**Table 2** Treatment and surgical techniques

Treatment	Number	%
First	32	45.7
Seton	31	44.3
Total	63	90
Second	7	10

tence of a complex fistula tract and/or any intermediate cavities, the placement of a loose seton before the LIFT procedure was considered (31 patients, 49.2%), converting treatment into a two-step procedure (►Table 2). The goal was to create the simplest fistula tract possible, and the surgical procedure included the curettage of both cavities and fistula tract. The other patients had previously received surgical treatment for their AF, with the following surgical techniques being used: fistulotomy (2 cases), fibrin glue (1 case), advancement flap (1 case), or a previous LIFT technique (3 cases).

The patients' anal continence was evaluated preoperatively using the Wexner scale.<sup>12</sup> All patients recorded ratios under 2, with the exception of two patients: one with a score of 4, and the other with a score of 14.

All surgical procedures were performed at the Day Surgery Unit by five colorectal surgeons having expert knowledge in treating AF. The surgical technique used was similar to that described by Rojanasakul.<sup>9</sup> The operations were carried out in the lithotomy position, under spinal anesthesia. Preoperative antibiotic prophylaxis was administered in a single dose (gentamicin 80 mg and metronidazole 500 mg). After internal fistula opening and identification, a metallic probe was passed from the external opening to the internal one. Where the latter was difficult to find, a saline solution instillation was performed through the fistula tract from the external opening to facilitate endoanal exit of the fluid. The intersphincteric groove was identified and a circumanal incision was made overlying the fistula tract. The tract was isolated from both sphincters by blunt dissection. Two absorbable sutures were used for fistula tract ligation, with sufficient distance between them, with one being placed as close as possible to the internal sphincter. A section of the tract between ligations was performed, and saline solution was again used to test complete fistula tract ligation. The intersphincteric plane was closed in two layers, using interrupted absorbable sutures. A curettage of the external orifice of the fistula was always performed.

The mean follow-up was of 66.8 months, and standard deviation (SD)  $\pm$  26.8 months (22–81). All the patients were evaluated at 3, 6, and 12 months after the surgery as a minimum. When suppuration was still present 6 months after surgery, recurrence was suspected and a new EUS was performed. During analysis of the results of the LIFT procedure, patients were divided into 3 categories: those with recurrence, those with postoperative intersphincteric fistula, and those who were asymptomatic after surgery. There were no losses to follow-up. The rate and characteristics of

**Table 1** Fistula classification

Fistula classification	Number	%
Intersphincteric	2	2.9
Transsphincteric	67	95.8
Low	44	62.9
High	23	32.9
Suprasphincteric	1	1.4

**Table 3** One-year follow-up results: success and recurrence

Results	Number	%
Healing	40	57.1
Intersphincteric fistula	6	8.6
Recurrence	26	34.3

recurrence were compared. The impact of the two-step technique on the result was also considered. Statistical analysis was performed using the contingency tables, the Chi-square test, and the Student T-test.

## Results

The one-year follow-up results are shown in ►Table 3. There were no gender-based differences, but the women included in the study were significantly younger than the men ( $p=0.0046$ ). The success rate of the LIFT technique was 57.1%, but 6 patients (8.6%) presented an intersphincteric fistula between the internal orifice and the circumanal incision, with all of them being successfully treated by simple fistulotomy. Therefore, the overall healing rate reached 65.7%.

There were 38 patients (54.2%) still suffering from suppuration at 6-months of follow-up and EUS confirmed fistula persistence, including the six patients with intersphincteric fistulas. Finally, 5 patients (7.1%), who were asymptomatic at 6 months, showed recurrence after 1 year.

There were no differences in LIFT procedure success between high (24 patients) and low AF (46 patients), as shown in ►Table 4. Follow-up results of patients treated by a one-step<sup>13</sup> or a two-step approach<sup>14</sup> are compared in ►Table 5. The success rate of the one-step technique was significantly higher ( $p=0.03$ ). Taking only high AF into account (►Table 6), comparison was made between patients who had previously been treated by placement of a seton (16 patients), and those who had not (8 patients). The results also showed a significantly higher success rate for the one-step technique ( $p=0.03$ ).

No changes in postoperative continence were observed with respect to the preoperative score. There was a single complication: a postoperative abscess in the external fistula opening, despite curettage and the orifice being left open

**Table 4** Fistula classification and healing

	Fistula healing	Recurrence	<i>p</i> -value
High	12	12	0.45
Low	18	28	

**Table 5** Two-step approach

	Fistula healing	Recurrence	<i>p</i> -value
Seton	13	18	0.03
No seton	27	12	

**Table 6** Seton and high fistula healing

	Fistula healing	Recurrence	<i>p</i> -value
Seton	5	11	0.03
No seton	7	1	

(1.4%). None of the patients treated in the Day Surgery Unit were admitted into the hospital.

## Discussion

The results of our observational prospective study suggest that the LIFT technique could be a safe surgical procedure for the treatment of AF, with both low morbidity and good healing rates.

However, we wanted to comment on some limitations to our study. First, the number of surgeons performing the surgeries (five) could have favored some variability of the treatment from a technical point of view, but could also have allowed to create a real picture of LIFT results. Furthermore, the predominance of low transphincteric AF in our series could probably have facilitated the practice of a LIFT procedure, but the key point of the technique is intersphincteric tract ligation and section, which is not related to the fistula level.

Rojanasakul's report indicated a success rate of 94% after 3 months of follow-up.<sup>9</sup> This study is not the first to attempt treatment AF by intersphincteric tract section. In 1993, Lun-niss et al. reported a 53% success rate by approach, ligation, and section of the intersphincteric fistula tract.<sup>15</sup> His results showed a very high rate of fistula healing, which has not been reproduced by other authors, with the exception of Parthasarathi and Cols, who reported a healing rate of 94.1%.<sup>16</sup> Several studies have produced results around 70% in terms of the healing rate,<sup>17-19</sup> and even over 80%.<sup>20-22</sup> Our results are far below those stated above, being of 65.7%, including cases where intersphincteric fistulotomy was required. The results obtained in other studies are varied, reporting success rates above 50%, and always below 70%.<sup>23-25</sup>

The definition of recurrence and persistence of symptoms is unclear in the literature. We agree with Araujo et al.<sup>19</sup> that defines a successful AF treatment as the complete healing of both the original external opening and the surgical access (intersphincteric incision). Placer et al.<sup>26</sup> expressed the same opinion. When complete healing does not happen, fistula persistence should be suspected. Tan<sup>27</sup> divides recurrence/persistence as follows: Group I A suppurative intersphincteric wound; Group II Intersphincteric fistula; Group III Fistula recurrence. Several studies consider the intersphincteric fistula, which can be treated by fistulotomy, to be included in the healed fistulas group.<sup>20</sup> In fact, we have done so when calculating overall healing rate.

Several authors consider the LIFT technique as simple and easy to perform, and this makes it extremely attractive for surgeons.<sup>1,28</sup> In our opinion, for cases where fistulotomy is not feasible because it could lead to postoperative continence

impairment or a worsening of the condition, LIFT should be considered for fistula treatment. It should also be performed by experienced colorectal surgeons or, at least, under their direct supervision. After opening the intersphincteric space, fistula tract identification and dissection can be difficult. Subsequently, ligation and section of the tract is sometimes required, depending on the height and depth of the fistula. Treatment failures may be related to an ineffective ligation. The distance between ligatures should allow complete fistula tract section without knot damage. In a recent international survey on the management of AF, 75% of surgeons had experience in performing LIFT procedures, including several technical variations.<sup>3</sup>

The main reason for choosing the LIFT technique for the treatment of AF is to avoid postoperative anal continence disturbances and to preserve quality of life. Following this premise, we have obtained excellent results in postoperative anal continence, measured by the Wexner scale,<sup>12</sup> being in no case worse than prior to the treatment. This has been widely reported in the literature,<sup>1,17,18,20,26,29-36</sup> although several authors noted low postoperative incontinence<sup>37,38</sup> or gas incontinence in approximately 5% of patients.<sup>39,40</sup> With regard to quality of life, it appears to be similar to how it was preoperatively,<sup>1</sup> or it may even show improvement.<sup>36</sup>

Results of the studies published to date are extremely heterogeneous. Systematic reviews and meta-analyses<sup>13,34,37,41-43</sup> show a success rate of between 70 and 80%, without continence and with a very low rate of postoperative complications, but with a wide range of follow-up times. A meta-analysis carried out by Stellingwerf et al.<sup>38</sup> with the aim to evaluate differences between advancement flap and LIFT techniques (74.6 vs. 69.1%) did not find statistically significant differences. As Kontovounisios et al. suggested,<sup>44</sup> prospective, randomized, controlled trials with homogeneity and clear objective parameters will be needed to substantiate the findings. A prospective randomized trial conducted by Madbouly et al. showed no differences between LIFT (74.3%) and advancement flap (65.7%) in terms of fistula healing at the 1-year follow-up.<sup>1</sup> The rate of postoperative complications in our study was low (1.4%), as has been reported in previous studies.<sup>18,23,34</sup> Hemorrhoidal thrombosis, suppuration and anal pain have been reported up to 9% of patients undergoing LIFT technique. However, other authors have recorded rates of 13.9%,<sup>37</sup> 11%,<sup>24</sup> and even up to 20%.<sup>45</sup>

There is also a huge variation in follow-up time among studies in the literature. A systematic review from Kontovounisios et al.<sup>44</sup> reported a decrease in success rates over time, but our results improved slightly from 6-months to 1-year follow-up. In several studies the follow-up is under 1-year<sup>14,17,23,29,30,41</sup> but in others it is longer.<sup>20,24,31-33,39</sup> The minimal period of follow-up time is 1-year.

Local and systemic factors leading to failure of LIFT have been described. Local factors include intermediate cavities or sinus in the fistula tract,<sup>16</sup> posterior situation and fistula complexity,<sup>26,38</sup> multiple fistula tracts,<sup>16,36</sup> the height of the internal opening,<sup>25</sup> previous fistula surgery,<sup>24,38</sup> and the Crohn disease.<sup>38</sup> Only diabetes mellitus has been reported as a systemic factor impacting on recurrence.<sup>16</sup> However,

other authors have not found any factor related to postoperative fistula persistence.<sup>36</sup>

Several attempts have been made to improve LIFT results. Technical modifications such as unroofing the fistula tract from internal opening to intersphincteric groove, dissection along the fistula tract (around 75% success rate),<sup>14,31</sup> purse-string suture around the fistula (83.5% success rate),<sup>33</sup> or fistulectomy of the distal part of the fistula tract from the external sphincter (87.2% success rate).<sup>32</sup> Along with the LIFT technique, the use of a bioprosthetic plug has been reported<sup>29,39,40</sup> with the fistula healing rate ranging from 68.8 to 95%, but with a short median follow-up. Moreover, two randomized clinical trials compared simple LIFT with LIFT plus plug, and the results obtained favored the LIFT plus plug technique with success rates of over 90%.<sup>30,46</sup> In a recent retrospective analysis, Zwiép et al. concluded that BioLIFT achieved better healing rates than LIFT alone,<sup>45</sup> 75 versus 58%.

The preoperative use of a seton has been controversial,<sup>47</sup> although there are studies that favor it.<sup>36</sup> The reason for using a seton would be to achieve a more fibrous fistula tract in order to facilitate dissection without cavities, but this concept is still under discussion.<sup>26</sup> We also routinely use prophylactic antibiotics, although we know it is controversial.<sup>25</sup> Moreover, we treated all our cases in an ambulatory surgery setting, a concept which a recent retrospective study<sup>48</sup> also favors.

## Conclusion

In conclusion, the results of our study suggest that LIFT has a positive role in the treatment of AF. It is a valuable surgical technique, suitable for ambulatory surgery, with a low rate of postoperative complications, including anal continence disturbances. A two-step approach is not always necessary.

## Highlights

- The main reason for choosing the LIFT technique for the treatment of AF is to avoid postoperative anal continence disturbances and to preserve quality of life.
- A two-step approach by placing a preoperative seton exists, but its indication is controversial.
- The LIFT technique had a success rate of 57.1% in our series and there were no differences between high and low AF.
- No changes in postoperative continence were observed with respect to the preoperative score.
- All patients were treated in the Day Surgery Unit.

### Authors' Contributions

-L.A. Hidalgo-Grau has substantially participated in the conception of the work, analysis and interpretation of data, drafting the work, final approval of the version to be published and agreed to all aspects of the work.

-N. Ruiz-Edo has substantially participated in the conception of the work, acquisition of data, drafting the work, final approval of the version to be published and agreed to all aspects of the work.

-O. Estrada-Ferrer has substantially participated in the conception of the work, acquisition and analysis of data, revising the work, final approval of the version to be published and agreed to all aspects of the work.

-EM García-Torralbo has substantially participated in the conception of the work, acquisition and analysis of data, revising the work, final approval of the version to be published and agreed to all aspects of the work.

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-P. Clos-Ferrero has substantially participated in the conception of the work, acquisition and analysis of data, revising the work, final approval of the version to be published and agreed to all aspects of the work.

-E. Bombuy-Giménez has substantially participated in the conception of the work, acquisition and analysis of data, revising the work, final approval of the version to be published and agreed to all aspects of the work.

**Availability of Data and Material**  
Not applicable.

**Code Availability**  
Not applicable.

**Ethics Approval**  
Not applicable.

**Consent to Participate**  
Not applicable.

**Consent for Publication**  
Not applicable.

**Funding**  
Not applicable.

**Conflict of Interests**  
The authors have no conflict of interests to declare.

**Acknowledgements**  
We are grateful to all members of the colorectal surgery unit and general surgery residents for their work and support. We also give special thanks to Jane Perkins for her help with the English.

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