

## REVIEW

## Modern Approaches to the Treatment of Anal Fistulas

Damir Karlovic<sup>1</sup>, Dorian Krsul<sup>1</sup>, Ante Jerkovic<sup>1</sup>, Ivica Cepic<sup>1</sup>, Marko Zelic<sup>1</sup>

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### ABSTRACT

The treatment of anal fistulas presents a challenge for surgeons because of their high incidence and recurrence rate, prolonged healing time, because we still do not have a single standardized technique that fits all, and last but not least, possible problems with some types of postoperative continence disturbance that may occur in cases of inadequate treatment. The most common symptoms that patients have who suffer from this disease are constant anal pain and soiling from the fistula tract which undoubtedly decreases the patient's quality of life. Most fistulas have cryptoglandular etiology, but also may be associated with Crohn's disease, trauma, radiation etc. This text gives an overview of modern approaches in anal fistula treatment with the emphasis on sphincter preserving techniques.

**Keywords:** anal fistula, sphincter preserving techniques, fecal incontinence

<sup>1</sup>. University Hospital Center, Rijeka, Croatia  
Department of Digestive Surgery

Damir Karlovic  
Email: [damir.karlovic@yahoo.com](mailto:damir.karlovic@yahoo.com)  
ORCID 0000-0001-9804-0198

## Introduction

An anal fistula is a communication between the perianal skin and the anal canal. It is filled with granulation tissue which supports chronic inflammation, resulting in constant pain and soiling, thereby decreasing the patient's quality of life. The incidence rate of anal fistulas is about 10 cases per 100,000 individuals, with a male to female ratio of 2:1<sup>1,2</sup>.

Historically, various classifications for anal fistulas have been proposed, of which the one most used is Parks' classification which classified fistulas into intersphincteric, transsphincteric, suprasphincteric and extrasphincteric<sup>3</sup>.

Using traditional surgical techniques, such as fistulotomy, fistulectomy or cutting seton, surgeons have noticed that some patients have some type of continence disturbance postoperatively, especially when the fistula tract passed through deeper parts of the sphincter complex and when the internal fistula opening was positioned more proximally in the anal canal.

Following lay open techniques (fistulotomy, fistulectomy), the incidence of flatus incontinence or liquid stool leakage was observed in 20–25% of the patients, while in the cutting seton group it was up to 12%<sup>4,5</sup>.

To simplify classification and to prevent possible postoperative continence disturbance, most colorectal surgeons nowadays use the simple classification which was introduced in 2005 by the American Society of Colon and Rectal Surgeons, dividing fistulas into two groups (simple and complex).

Simple fistulas are fistulas with a low risk of incontinence or recurrence. These fistulas are primary low (involving less than 30% of the external anal sphincter/anal canal length), transsphincteric or intersphincteric fistulas, single tract, and non-branched.

Complex fistulas involve a high risk of postoperative incontinence or recurrence. They include: high transsphincteric and high intersphincteric tracts that involve more than 30% of the anal canal length, suprasphincteric and extrasphincteric fistulas, fistulas associated with IBD, radiation, malignancy or

tuberculosis, anterior fistulas in females, and in patients with preexisting fecal incontinence or chronic diarrhea. Recurrent or branching fistulas (especially horseshoe extensions) are usually also described as complex, as well as high fistulas with collections and involvement of other organs (genitourinary, rectovaginal)<sup>6</sup>.

This simple classification into simple and complex fistulas helps surgeons to avoid using traditional techniques to prevent possible continence disturbance, but it does not help in the decision about which operative technique is best to use in the treatment of complex fistulas.

In this light, traditional surgical techniques for anal fistulas are now being used less, especially when a risk of some type of continence disturbance persists, and many new sphincter preserving techniques have been developed, of which most favorable will be discussed in this review.

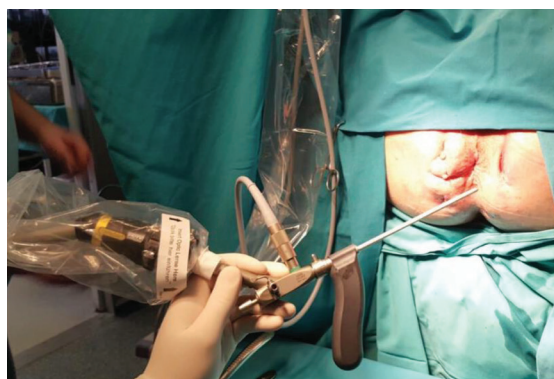
## Sphincter preserving techniques in anal fistula treatment

In last few decades many sphincter preserving techniques have been developed to decrease the risk of postoperative continence disturbance with different success and recurrence rates in the follow-up period. Some of these techniques are technique using fibrin glue, anal fistula plugs, Video-Assisted Anal Fistula Treatment (VAAFT), ligation of the intersphincteric fistula tract (LIFT), Fistula-Tract Laser Closure (FILAC), a Rectal Advancement Flap (RAF), treatment with platelet cells, and combinations of these techniques. In this review we will discuss techniques we (the authors) use most in everyday practice (VAAFT, LIFT, RAF or a combination of these) with good postoperative results<sup>7,8,9,10</sup>.

## Video-Assisted Anal Fistula Treatment (VAAFT)

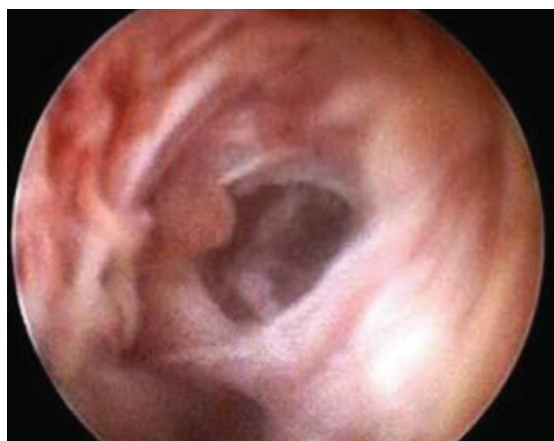
The Video-Assisted Anal Fistula Treatment (VAAFT) procedure is the only technique that enables visualization of and surgery for anal fistulas from within

the fistula tract. It was first described by the Italian surgeon Piercarlo Meinero in 2011, where he and others described the long and short-term results. This technique is performed under spinal or general anesthesia using a fistuloscope and specially designed equipment (Figure 1)<sup>11</sup>.



**Figure 1.** Fistuloscope during VAAFT procedure.

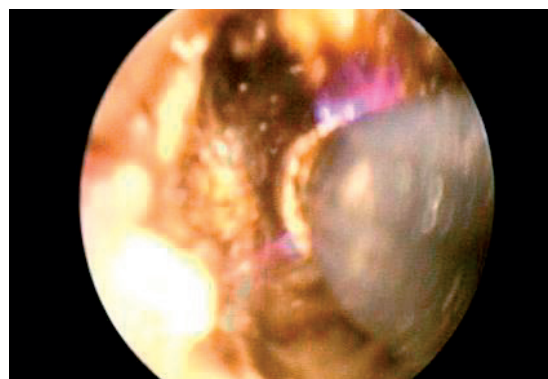
The VAAFT procedure is divided into two phases: diagnostic and surgical. The aim of the diagnostic phase is to visualize the entire fistula tract, possible secondary branching and to identify origin of fistula (internal opening) (Figure 2).



**Figure 2.** Intraoperative view of granulation tissue in fistula tract during diagnostic phase).

In the surgical phase, destruction of the main and any secondary fistula tracts and granulation tissue

is performed using a monopolar electrode introduced to the fistula tract through the working canal of the fistuloscope, making an acute wound which should heal through secondary intervention (Figure 3). This is followed by removal of necrotic detritus and secure closure of the internal opening.



**Figure 3.** Intraoperative destruction of granulation tissue with unipolar electrode during operative phase.

There have been numerous publications about this technique. VAAFT has been demonstrated to be safe and associated with good functional outcomes and very low incidence of complications<sup>11, 12, 13</sup>, as shown in a meta-analysis<sup>14</sup>. It showed a recurrence rate ranging from 7.5 to 33.3% with a weighted mean recurrence rate of 17.7%, which varied significantly depending on the method of closure of the internal fistula opening (mattress suture, stapler or rectal advancement flap)<sup>14</sup>.

This technique has benefits in comparison with some other techniques in relation to treatment of deeper parts of the fistula tract. Due to the design of the fistuloscope it is easy to reach the deeper parts of the fistula without creating wide wounds perianally, which enables faster recovery after surgery, diminished postoperative pain, and an earlier return to normal activities.

This technique should be reserved for complex anal fistulas, and not used for simple ones because they can be treated by simple fistulotomy.

Some other benefits of the VAAFT technique include the possibility of multiple repeated surgeries if the first fails because of the postoperative effect of fistula conversion from a complex one to a less complex one. Also in the case of surgery for suprasphincteric fistulas, modification of the approach can be used so that the fistuloscope is inserted through the internal opening as well as the external opening. In this way surgeons can explore the complete length of the fistula without creating large wounds.

There may also be some benefits for patients who suffer from anal fistulas associated with Crohn's disease if they are treated with this technique because they have amelioration of symptoms associated with chronic anal fistula, such as pain and soiling, thus significantly increasing the patient's quality of life<sup>15,16</sup>.

Following the use of this technique no cases of anal continence were documented.

### Rectal Advancement Flap (RAF)

The Rectal Advancement Flap (RAF) technique has many synonyms, such as endorectal, endoanal, transanal advancement flap, etc. Even though this technique is included in the group of sphincter preserving techniques, because it is reserved for treatment of complex anal fistulas to prevent the risk of postoperative continence disturbance, we cannot talk about it as a pure sphincter preserving technique. This is because, depending on the thickness of the flap it is performed by dissection of the anorectal mucosa and adjacent internal anal sphincter muscle, so the internal anal sphincter muscle does not stay intact. As a result, in some cases after performing this technique, depending on the thickness of the flap, patients may have some type of postoperative continence disturbance. This technique has benefits, especially in difficult cases, such as deep transsphincteric or suprasphincteric fistulas with large internal fistula openings, where there is a high risk of continence disturbance if they are treated with traditional

techniques, or even failure of the procedure if they are treated with some other type of sphincter preserving technique. The primary healing rate varies according to different data from 60-80%<sup>17-20</sup>.

When doing this technique as the first step the surgeon should excise the previously identified internal fistula opening in the anal canal. Later a rhomboid or U-shaped flap with a wide base side should be performed by dissecting the anorectal mucosa and adjacent internal anal sphincter muscle. Additional excochleation and irrigation of the whole fistula tract should be performed prior to suturing the flap in its place to cover the defect at the site where the previous internal fistula opening was excised (Figure 4).



**Figure 4.** Rectal advancement flap after sutured on place.

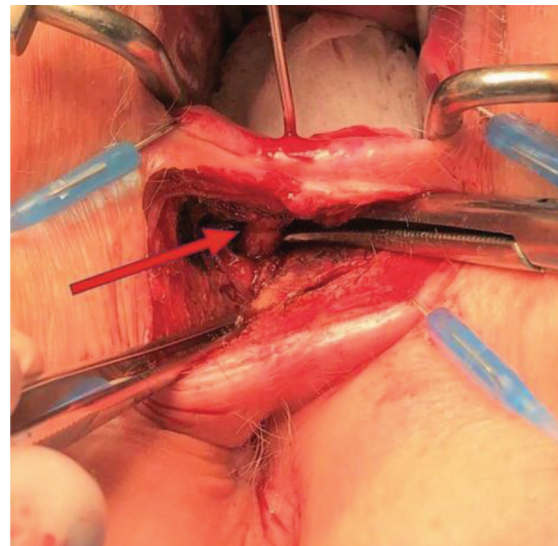
Some surgeons insist on placement of a loose seton for a period of a few months prior to performing a RAF to increase the healing rate, but there have not been any clear statistical findings about this<sup>21</sup>.



Smoking and obesity have been considered as some of the factors that could affect healing after this procedure because of their influence on microcirculation and inadequate blood supply to the postoperative flap<sup>22,23,24</sup>. Patients should also be advised to avoid sitting on hard surfaces and to avoid riding a bike at least 3 months postoperatively. Also to increase the effectiveness of the flap technique, the surgeon should create larger flaps, avoid tissue trauma with cautery, avoid excessive grasping, as well as excessive strain on the suture line.

### Ligation of the Intersphincteric Fistula Tract (LIFT)

This technique is a pure sphincter preserving technique because anal sphincters remain intact after it has been performed. It is primarily reserved for treatment of complex transsphincteric anal fistulas. This technique satisfied all the goals of anal fistula treatment, such as removal of an infected intersphincteric fistula tract (anal gland) by a direct approach on the intersphincteric plane, then closure of the internal fistula opening and eradication of the remaining fistula tract. This technique was first performed and published by the Thai surgeon Arun Rojanasakul in 2007<sup>25</sup>. When performing this technique, the surgeon should identify internal fistula opening in anal canal, then metal probe should be inserted through external fistula opening on the perianal skin through the internal fistula opening. A curvilinear incision on the anocutaneous border should be made, then the intersphincteric space can be entered and preparation of intersphincteric part of fistula tract performed, after which it should be excised. Curettage and irrigation of the remaining fistula tract from the external fistula opening to an external anal sphincter muscle should be performed with additional suturing of the remaining defect on the internal and external anal sphincter. The intersphincteric space is then reconstructed and the perianal wound sutured (Figure 5).



**Figure 5.** LIFT procedure: identification of fistula tract in the intersphincteric plane; red arrow showing fistula tract.

This procedure gives an overall success rate of 76.4 and 78 % respectively, with a low complication rate of 5.5–13.9% (such as wound dehiscence, bleeding and infection), according to the two meta-analyses available<sup>26,27</sup>.

Some other benefits of this technique are also the possible conversion of a complex transsphincteric fistula to a simple intersphincteric one in the case of failure. In the case of dehiscence of the suture line on the anocutaneous border, a loose seton should be placed through the wound and intersphincteric space, and through the internal fistula opening in the anal canal. It should be kept in place a few months prior to doing a simple fistulotomy without risk of fecal incontinence.

### Combination of two or more sphincter preserving techniques

To achieve better results in anal fistula treatment, and because we still do not have one single surgical option that fits all, many surgeons have started to combine different techniques in order to take

advantage of the strengths and overcome the weaknesses of each one.

Ideal treatment of anal fistulas is based on a few main principles which are: eradication of sepsis with promotion of secondary healing, identification and closure of the internal fistula opening if it persists, identification of the origin of the anal fistula which is in the intersphincteric space, and prevention of possible postoperative continence disturbance<sup>28</sup>.

The Indian surgeon Pankaj Garg, an expert in the field of anal fistulas, pointed to three principles that also should be followed for successful postoperative healing, which are:

1. ISTAC – the intersphincteric fistula tract acts like an abscess in the closed intersphincteric space.
2. DRAPED – draining all pus and ensuring continuous drainage (the intersphincteric fistula must be drained and continuous drainage should be ensured).
3. HOPTIC - healing occurs progressively until interrupted irreversibly by a collection<sup>29</sup>.

All these goals in anal fistula treatment can be met with fistulotomy in the case of simple fistula treatment. However, problems begin when the patient has a complex fistula.

In the case of treatment of complex fistulas, if Garg's principles are not followed, failure of the procedure can occur. This may be the reason why most sphincter preserving techniques still do not have healing results comparable to lay open techniques.

Many combinations of different techniques have been published. There are different combinations with the VAAFT technique. For example LIFT-VAAFT is used for treatment of complex transsphincteric fistulas with a long fistula tract, in order to excise the intersphincteric part of the fistula tract, with closure of the internal fistula opening from the intersphincteric space and additional fulguration of the granulation tissue in the remaining fistula tract from the external fistula opening using the VAAFT technique<sup>7</sup>. There have been reports combining the

VAAFT and FiLaC procedures with the same fundamental philosophy, or with RAF in order to close especially large internal openings that would not be suitable for closure with mattress sutures<sup>8,12,30</sup>.

BioLIFT combines LIFT with the insertion of a bioprosthetic graft in the intersphincteric plane. Another study combined LIFT and a human acellular dermal matrix as a bioprosthetic plug. Both studies reported a high success rate of more than 90% but with a small number of patients (fewer than 30)<sup>31,32</sup>.

The Rectal Advancement Flap (RAF) was also combined with an injection of a porcine dermal collagen implant through an external opening in a study with 24 patients, with a success rate of 82.5% over a 14-month follow-up period<sup>33</sup>. There have been publications of combinations of RAF and autologous platelet rich plasma (APRP), also with a high primary healing rate<sup>34-36</sup>.

For now, as there is no evidence to the contrary, we can continue to combine different sphincter preserving techniques to achieve better results depending on the type of fistula and the surgeon's preference.

## Conclusion

Treatment of anal fistulas, especially in complex cases, presents a huge challenge for surgeons. Even though it is sometimes one of the first operations that residents perform, we should ask ourselves, if we do not talk only about seton placement or treatment of superficial fistula, who should actually operate on patients who suffer from this problem? Access to treatment should be based on an individual approach because every fistula is different. Complex cases and treatment with sphincter preserving techniques should be reserved for experienced surgeons who have a huge number of cases per year.

In the treatment of anal fistulas we should follow Garg's goals and principles mentioned earlier to achieve better results and to avoid the worst complication that can occur, which is fecal incontinence. Surgeons should use a technique with which they are familiar, taking the individual situation into account.

Combinations of different surgical techniques give good results and healing rates, but also we need more studies and exchanges of experience between experts in this field.

### Disclosure of interest

The authors have no conflict of interest.

### References

1. Hamalainen KP, Sainio AP. Incidence of fistulas after drainage of acute anorectal abscesses. *Dis Colon Rectum*. 1998;41:1357-1361.
2. Mappes HJ, Farthmann EH. *Anal abscess and fistula*. Munich: Zuckschwardt; 2001.
3. Parks AG, Gordon PH, Hardcastle JD. A classification of fistula-in-ano. *Br J Surg*. 1976;63:1-12.
4. Atkin GK, Martins J, Tozer P, Ranchod P, Phillips RKS. For many high anal fistulas, lay open is still a good option. *Tech Coloproctol*. 2011;15:143-150.
5. Ritchie RD, Sackier JM, Hodde JP. Incontinence rates after cutting seton treatment for anal fistula. *Colorectal Dis*. 2009;11:564-571.
6. Whiteford MH, Kilkenny J 3rd, Hyman N, Buie WD, Cohen J, Orsay C, Dunn G, Perry WB, Ellis CN, Rakinic J, Gregorcyk S, Shellito P, Nelson R, Tjandra JJ, Newstead G. Practice parameters for the treatment of perianal abscess and fistula-in-ano (revised). Standards Practice Task Force; American Society of Colon and Rectal Surgeons. *Dis Colon Rectum*. 2005;48:1337-42. Doi: 10.1007/s10350-005-0055-3. PMID: 15933794
7. Karlović D, Kršul D, Bačić Đ, Zelić M. Video-assisted anal fistula treatment in combination with ligation of the intersphincteric fistula tract in the treatment of complex transsphincteric fistulas—A video vignette. *Colorectal Disease*. 2020;22:1204-1201.
8. Zelić M, Karlović D, Kršul D, Bačić Đ, Warusavitarne J. Video-assisted anal fistula treatment (VAAFT) for treatment of complex cryptoglandular anal fistulas with 2 years follow up period—Our experience. *Journal of Laparoendoscopic & Advanced Surgical Techniques. Part A*. 2020;30:13.
9. Kršul D, Karlović D, Bačić Đ, Zelić M. Sphincter Preserving Techniques in Anal Fistula Treatment. In: JCBa a, editor. *Current Topics in Colorectal Surgery*. Rijeka: IntechOpen; 2021.
10. Karlović D, Kršul D, Jerković A, Bačić Đ, Zelić M. Anal Fistula: Contemporary View of Complex Problem. In: Vannelli A, editor. *Benign Anorectal Disorders - An Update [Working Title] [Internet]*. London: IntechOpen; 2022 [cited 2022 Mar 30]. Available from: <https://www.intechopen.com/online-first/80541doi:10.5772/intechopen.102752>
11. Meinero P, Mori L. Video-assisted anal fistula treatment (VAAFT): A novel sphincter-saving procedure for treating complex anal fistulas. *Techniques in Coloproctology*. 2011;15:417-422.
12. Schwandner O. Video-assisted anal fistula treatment (VAAFT) combined with advancement flap repair in Crohn's disease. *Tech Coloproctology*. 2013;17:221-225.
13. García-Aguilar J, Davey CS, Le CT, Lowry AC, Rothenberger DA. Patient satisfaction after surgical treatment for fistula-in-ano. *Dis Colon Rectum*. 2000;43:1206-1212.
14. Emile SH, Elfeki H, Shalaby M, Sakr A. A Systematic review and meta-analysis of the efficacy and safety of video-assisted anal fistula treatment (VAAFT). *Surg Endosc*. 2018;32:2084-2093.
15. Schwandner O. Video-assisted anal fistula treatment (VAAFT) combined with advancement flap repair in Crohn's disease. *Techniques in Coloproctology*. 2013;17:221-225.
16. Adegbola SO, Sahnun K, Tozer PJ, Strouhal R, Hart AL, Lung PFC, et al. Symptom amelioration in Crohn's perianal fistulas using video-assisted anal fistula treatment (VAAFT). *Journal of Crohn's & Colitis*. 2018;12:1067-1072.
17. Elting AW. X. The Treatment of Fistula in Ano: With Especial Reference to the Whitehead Operation. *Ann Surg*. 1912;56:744-752.

18. Balciscueta Z, Uribe N, Balciscueta I, Andreu-Bal-lester JC, Garcia-Granero E. Rectal advancement flap for the treatment of complex cryptoglandular anal fistulas: a systematic review and meta-analysis. *Int J Colorectal Dis.* 2017;32:599-609.
19. Dubsky PC, Stift A, Friedl J, Teleky B, Herbst F. Endorectal advancement flaps in the treatment of high anal fistula of cryptoglandular origin: fullth-ickness vs. mucosal-rectum flaps. *Dis Colon Rec-tum.* 2008; 51:852-857.
20. Khafagy W, Omar W, El Nakeeb A, Fouda E, Yousef M, Farid M. Treatment of anal fistulas by partial rectal wall advancement flap or mucosal ad-vancement flap: a prospective randomized study. *Int J Surg.* 2010;8:321-325.
21. Mitalas LE, van Wijk JJ, Gosselink MP, Doorne-bosch P, Zimmerman DD, Schouten WR. Set-on drainage prior to transanal advancement flap repair: useful or not? *Int J Colorectal Dis.* 2010;25:1499-1502.
22. Zimmerman DD, Delemarre JB, Gosselink MP, et al. Smoking affects the outcome of transanal mucosal advancement flap repair of transsphinc-teric fistulas. *The British Journal of Surgery.* 2003;90:351-354.
23. Ellis CN, Clark S. Effect of tobacco smoking on ad-vancement flap repair of complex anal fistulas. *Dis-eases of the Colon and Rectum.* 2007;50:459-463.
24. Schwandner O. Obesity is a negative predictor of success after surgery for complex anal fistula. *BMC Gastroenterology.* 2011;11:1-5.
25. Rojanasakul A. LIFT procedure: A simplified technique for fistula-in-ano. *Techniques in Colo-proctology.* 2009;13:237-240.
26. Hong KD, Kang S, Kalaskar S, Wexner SD. Liga-tion of intersphincteric fistula tract (LIFT) to treat anal fistula: systematic review and meta-analysis. *Tech Coloproctol.* 2014;18:685-691.
27. Emile SH, Khan SM, Adejumo A, Koroye O. Li-gation of intersphincteric fistula tract (LIFT) in treatment of anal fistula: An updated systematic review, meta-analysis, and meta-regression of the predictors of failure. *Surgery.* 2020;167:484-492.
28. Limura E, Giordano P. Modern management of anal fistula. *World Journal of Gastroenterology.* 2015;21:12-20.
29. Garg P. A new understanding of the principles in the management of complex anal fistula. *Medical Hypotheses.* 2019;132:109329.
30. Yao Y-B, Xiao C-F, Wang Q-T, Zhou H, Dong Q-J, Cao Y-Q, Wang C. VAAFT plus FiLaC™: a combined procedure for complex anal fistula. *Tech Coloproctol.* 2021;21. doi: 10.1007/s10151-021-02411-0.
31. Ellis CN. Outcomes with the use of bioprosthetic grafts to reinforce the ligation of the intersphinc-teric fistula tract (BioLIFT procedure) for the management of complex anal fistulas. *Dis Colon Rectum.* 2010;53(10):1361e4.
32. Han JG, Yi BQ, Wang ZJ, Zheng Y, Cui JJ, Yu XQ, et al. Ligation of the intersphincteric fistula tract plus a bioprosthetic anal fistula plug (LIFT-Plug): a new technique for fistula-in-ano. *Colorec-tal Dis.* 2013;15(5):582e6.
33. Sileri P, Boehm G, Franceschilli L, Giorgi F, Per-rone F, Stolfi C, et al. Collagen matrix injection combined with flap repair for complex anal fistula. *Colorectal Dis.* 2012;14(Suppl. 3):24e8.
34. Moreno-Serrano A, García-Díaz JJ, Ferrer-Márquez M, Alarcón Rodríguez R, Álvarez-García A, Re-ina-Duarte Á. Using autologous platelet-rich plas-ma for the treatment of complex fistulas. *Rev Esp Enferm Dig (Madrid).* 2016;108:123-128.
35. Göttgens KW, Vening W, van der Hagen SJ, van Gemert WG, Smeets RR, Stassen LP, Baeten CG, Breukink SO. Longterm results of mucosal ad-vancement flap combined with plateletrich plasma for high cryptoglandular perianal fistulas. *Dis Col-on Rectum.* 2014;57:223-227.
36. Göttgens KWA, Smeets RR, Stassen LPS, Beets GL, Pierik M, Breukink SO. Treatment of Crohn's disease-related high perianal fistulas combining the mucosa advancement flap with platelet-rich plasma: a pilot study. *Tech Coloproctol.* 2015; 19:455-459.