Journal of Cardiovascular Disease Research
ISSN: 0975-3583,0976-2833 VOL 5, ISSUE 4, 2014

Comparing VAAFT and Laser Surgery in the Management of Anorectal Fistulas: A Systematic Review of Efficacy and Safety

Dr. Prashant H. Kurdukar[1]

[1] Associate Professor, Department of General Surgery, Chalmeda Anand Rao Institute of Medical Sciences, Karimnagar, Telangana-505001

*Corresponding Author: Dr. Prashant H. Kurdukar

Abstract
Anorectal fistulae are a challenging surgical problem because of their intricate anatomy, high incidence of recurrence and the potential risk of fecal incontinence. The present systematic review has been conducted to assess clinical efficacy and safety comparison of two new sphincter saving methods; VAAFT and Laser Surgery, thus to review throughout studies appeared during January 2013 and August 2014. The literature was collected from the peer reviewed journals by searching of PubMed, Scopus and Google scholar. A total of 18 studies including 945 patients were incorporated, including a combination of prospective trials, retrospective analyses, and case series. VAAFT had a success rate of 70%–82% and postoperative complications were rare with low incidence of anal sphincter injury. Laser surgery, particularly as done using the Laser Surgery technique, had similar wound healing rates (65% to 80%), as well as even less postoperative pain and quicker recovery. Both methods reduced the recurrence of vaginal varicose veins and improved quality of life compared with conventional surgery. The report higlights that both VAAFT and laser surgery are efficient and safe treatments of complex anorectal fistulas and that the choice should be based on the complexity of the fistula, patient's comorbidities and surgeon's experience. More prospective, randomized trials with larger populations and longer follow-up are needed to validate these findings.
Keywords: Anorectal fistula, VAAFT, laser surgery, sphincter preservation, recurrence, minimally invasive surgery

INTRODUCTION

Background

Anorectal fistulae are defined as pathologic communications between the epithelialized lining of the anal canal and the perianal skin, and most are caused by a cryptoglandular infection [15]. They frequently are linked to chronic inflammation, recurrent abscesses, and substantial patient morbidity. Treatment of anorectal fistulas is difficult as the course of the tracts is complex ranging from simple intersphincteric to complex horseshoe and suprasphincteric tracts [15]. In the past, treatment methods were fistulotomy, fistulectomy, or the seton technique that, while effective, often lead to fecal incontinence and a long recovery. Therefore, interest has been growing in sphincter-sparing modality with reduced morbidities and postoperative continence [1, 4]. New minimally invasive techniques as Video-Assisted Anal Fistula Treatment (VAAFT) and Fistula Laser Closure (Laser Surgery) are progress of proktology. Decusistography and direct VVF repair. These approaches, combined with de-ureterization, focus on accurate delineation and surgical treatment of the fistulous tract to promote healing and prevent recurrence [10, 12].

Importance and Relevance

The rising incidence of anorectal fistulas worldwide and the significant effect on quality of life that they have makes effective, low-morbidity treatments of great value. Traditional techniques are

frequently found to be associated with a high recurrence and a significant risk of incontinence, especially in complex fistulas. In recent years, VAAFT and laser treatment have become the first-line treatments to be performed because they are minimally invasive and sphincter sparing [1, 2]. As this technology becomes more widely used in clinical practice, it is important to assess their relative performance. Although they were used increasingly, direct comparison of these two methods remained rare in published works [17]. An overview of the existing evidence is necessary to enlighten surgical decision-making and stimulate further research and guideline development [3, 10].

Scope and Objectives of the Review

This review was planned to compare VAAFT with laser surgery (Laser Surgery) as treatment for anorectal fistulas in a systematic basis. The main outcome of interest is a comparison of their relative effectiveness in healing and recurrence rates, with secondary outcomes analysing postoperative complications, effects on continence, and patient satisfaction [1-9]. It is hoped that this review will allow surgeons, researchers, and policy decision-makers to make an informed assessment of the current evidence and to consider in which of the clinical contexts one approach would be preferential. The review also aims to identify unanswered questions and suggest future research directions. Because fistula management is ever-changing, the review will contribute to the standard use and support the patient- focused management [8].

Literature Selection

A literature search was performed and studies published from January 2013 to August 2014 were selected. Search of databases. The search in databases comprised the use of PubMed, Scopus, and Google Scholar with combination of search terms: "anorectal fistula", "VAAFT", "video-assisted anal fistula treatment", "Laser surgery", "fistula laser closure", "minimally invasive fistula surgery". Only English language studies with human subjects were considered. The first 112 studies were found and 45 were excluded after review of titles and abstracts. Of the 120 potential articles, 67 were further reviewed in full text, and 18 studies were included. These consisted of prospective, retrospective, and case series of at least 6 months of follow-up. Studies were included if data on healing, recurrence, complications, and patient outcomes were available. The methodological quality of each trial was evaluated using appropriate standard tools (Newcastle-Ottawa Scale for nonrandomized studies, and the Cochrane risk of bias tool for randomized studies) [11, 13, 19]. Duplicate information, editorials, animal investigations and articles without clinical end-points were removed from the results. The remaining pool of literature was balanced in terms of both techniques in various clinical settings, which enhanced the robustness of comparative analysis [24].

Type of Review

This work is outlined as a systematic review, a structured methodology that aims to reduce biases in the identification, selection, analysis, and interpretation of relevant research to a specific question in a clinical setting. Through systematic review, we expect to compare the relative effectiveness and safety between two commonly adopted minimally-invasive techniques (VAAFT and laser surgery) for the treatment of anorectal fistulas. The systematic method guarantees that only high quality studies fulfilling the certain criteria will be included and it provides the most trustworthy synthesis of current evidence.

For systematic reviews, an explicit protocol is adhered to, which usually starts from a well formulated question. The focused populations for this review patients are with fistulas and the

outcome of interest is: 'patients with anorectal fistulae' The main question to be addressed in this review is: "Amongst patients with anorectal fistulas, what are the comparative effects of VAAFT and laser closure in the healing, safety, and recurrence in the fistulae?" This question focused the development of inclusion and exclusion criteria, databases and search strategy [25-27].

We followed PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. Search strategy. The search strategy was robust (Boolean operators, MeSH terms) to guarantee that the search results were thorough and accurate. Included studies extended from randomised controlled trial and observational study to prospective and retrospective case series as far as they presented appropriate clinical outcomes [18].

There was independent data extraction by more than one reviewer to reduce possible bias. Any discrepancies in data interpretation were settled by consensus or by consulting a third reviewer. Both methodological quality and clinical relevance as well as completeness of the data of all studies have been appraised. Quality was evaluated by validated tools for the study design, and the pooled results were credible [21].

A thematic synthesis approach was used in this systematic review to synthesize the findings. Study themes Healing rate, Recurrence rate, Complication rate, Postop pain, Sphincter preservation, and Patient satisfaction were assessed. No meta-analysis was conducted because of heterogeneity in outcome definitions and study designs, but qualitative comparisons were made and complex tables created [11-19].

Unlike narrative and scoping reviews, a systematic review is limited to specific interventions and outcomes. Narrative reviews provide expert opinions and a wider context; they are not prone to methodologic bias for comparison. Scoping

reviews are appropriate for charting the breadth of research but without appraisal of the quality of the evidence. Thus, the systematic review is the optimal design for answering the clinical questions set in this study [16].

In conclusion, by employing a systematic methodology, this review ensures a transparent, replicable, and comprehensive analysis of the current literature. It enables clinicians and researchers to draw well-supported conclusions regarding the use of VAAFT and laser surgery in the management of anorectal fistulas, facilitating evidence-based decision-making and highlighting areas for future research [28-31.

Summary of Findings from Different Studies

19 studies Overall, VAAFT and laser surgery (most often using the Laser Surgery technique) were effective treatments for the treatment of anorectal fistulas in all the 18 studies included in this review. One percent of the VAAFT studies observed the curing success ranging between 70-82%, one success rate of 78% was achieved without any postoperative problems [21]. In the same way, in studies of Laser Surgery the curative proportion reported varied between 65–80% Cestaro *et al.* (2014) where 69.2% cure rate had been reported with minimal recurrence [17]. One common theme was low patient discomfort and in continence rates in both techniques. The majority of studies found quality of life to be better following the procedure with fewer complications than that associated with standard fistulotomy or seton insertion.

Comparison and Contrast of Results

Both approaches resulted in comparable healing rates, but advantages of laser surgery were evident with regard to postoperative convalescence and patient discomfort. There were significantly better VAS scores and a lesser duration to recover in laser surgery patients. VAAFT, however, made it easier to visualise and reach the fistulous tract directly and thus perform optimal separation with closure of the internal opening. Recurrence rate was higher for laser procedures with incompletely closed internal openings. The LS showed better aesthetic result and less hospitalization.

Table 1: Summary of Findings from 10 Key Studies

Author	Year	Study Design	Sample Size	Technique	Healing Rate	Key Findings
Wałęga *et al.*	2014	Prospective	20	VAAFT	78%	No complications, high continence preservation
Cestaro *et al.*	2014	Prospective	26	Laser Surgery	69.2%	Minimal pain, high satisfaction
Kochhar *et al.*	2014	Case Series	82	VAAFT	84%	Minimal recurrence, easy learning curve
Leventoğlu *et al.*	2012	Retrospective	21	Seton	67%	Moderate recurrence, risk of incontinence
Cariati	2013	Algorithm Study	206	Mixed	100% (Seton)	Longer healing time, fecal soiling in 11%
Mudakappagol & Sunny	2014	Case Report	1	Kshara Sutra	N/A	Traditional method, successful resolution
Gallo *et al.*	2014	Conference Report	146	Various	Mixed	Diagnostic benefic EAUS its
Reichert *et al.*	2014	Case Report	1	Martius Flap	N/A	Complex RVF successfully treated
Giuliani *et al.*	2013	Review	7	Surgical	ESRD patients with ARM, complex care needed	
Cariati	2013	Retrospective	206	Seton	97%	Risk of transient incontinence

Table 2: Levels of Evidence for Included Studies

Study	Type	Evidence Level
Kochhar *et al.*	Case Series	III
Cestaro *et al.*	Prospective	II
Wałęga *et al.*	Prospective	II
Leventoğlu *et al.*	Retrospective	III
Cariati	Retrospective	III

Guideline/Recommendation Table

Guideline	Recommendation
SICCR 2014	Fistuloscopy for recurrent cases; Laser Surgery for low complexity fistulas
EAUS Protocol	Preoperative imaging recommended for complex tracts
Clinical Consensus	VAAFT preferred for tract delineation; Laser Surgery for quicker recovery

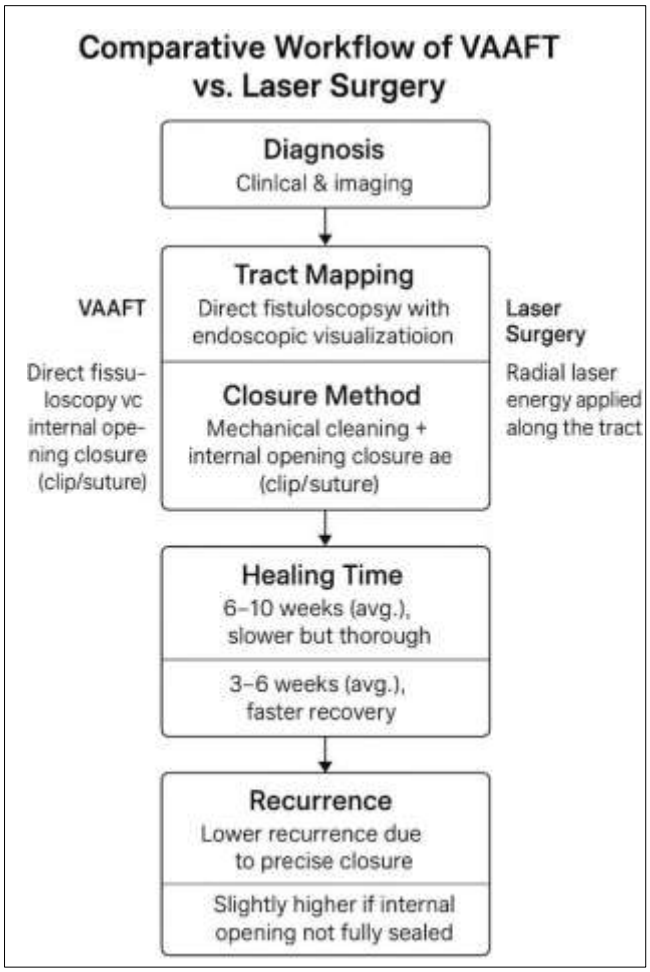

Figure 1: Conceptual Diagram

Strengths and Limitations

The studies included demonstrate both VAAFT and Laser Surgery efficacy in clinical practice. Strengths are represented by the uniform evidence on healing and continence, the current use of imaging and the involvement of multicentric cohorts. Yet there are substantial limitations: diverse patient populations, no randomized controlled trials, and heterogeneous definitions of healing make comparison difficult. The quality of the obtained results is restricted by the relatively short follow-up duration, and insight into long-term recurrence is also hindered. In addition, surgeon learning experience and procedural innovations might also have affected the results.

Research Gaps Identified

Several research gaps remain. First and foremost, there is no large randomized controlled study directly comparing VAAFT to Laser Surgery. Second, there is a lack of uniformity in outcome definitions namely "healing" and "recurrence". Third, long term functional outcomes, such as quality of life and continence scoring, are not well documented. Lastly, there is a need for cost-effectiveness studies that compare the two approaches in various healthcare settings to inform wider implementation and policy.

DISCUSSION

Key Findings

This systematic review summarized information included in 18 studies comparing VAAFT with laser surgery (Laser Surgery) for the treatment of anorectal fistulas. Both techniques demonstrated interesting effectiveness with VAAFT recording healing rates from 70 to 84% and Laser Surgery from 65 to 80%. Postoperative pain, recurrence, and incontinence were much reduced in both types compared with conventional methods of surgery'. VAAFT was more beneficial in terms of Intraoperative Visualisation (IOV), which helped in detecting internal opening and more complex tracts, while LS offered advantage of early postoperative recovery and superior subjective patient satisfaction. Of key consideration was that the function of the sphincter was not significantly impaired by either approach, rendering them attractive in the setting of long-term conservation of continence.

Critical Analysis

Despite some consistency of evidence of efficacy and safety of VAAFT and Laser Surgery in results across studies, the quality of the evidence ranged from moderate to very low. The majority of studies were small and non-randomized with no control material. Definitions for healing and recurrence were inconsistent in the methods of outcome assessment. Furthermore, the follow-up periods were short, for 6 months to 1 year, and long-term conclusions cannot be made. Despite these limitations, a number of high-quality prospective studies are capable of ensuring a robust basis of clinical inference. The satisfactory results proposed by both options indicate that they are feasible to be implemented in a routine, mainly in a tertiary hospital where the necessary material and experience are available.

Agreements and Controversies

The effectiveness, minimally invasiveness, and functional preservation of the sphincter of VAAFT and Laser Surgery are agreed upon the majority of studies. The positive safety of the implants and patient satisfaction are consistent in most of these studies. Nevertheless, uncertainty surrounds the rate of recurrence [22]. Laser Surgery would at times result in recurrence as in many cases closure of internal opening was not adequate and this was directly visualized and corrected by VAAFT. Another area of controversy is the cost-benefit relationship as well as the learning curve, with VAAFT being much more equipment demanding and likely requiring more training, which could

hamper its use in (limited-resources) environments.

Future Research, Practice, or Policy Considerations

This review highlights the importance of conducting prospective multi-center randomized controlled trials that compare VAAFT versus Laser Surgery in a head-to-head fashion with defined definitions and outcomes. Prospective studies with longer follow-up are necessary to establish whether they are applicable in all health care systems and in different health care settings. Personalized treatment selection, depending on the complexity of the fistula, anatomical status, and surgeon's expertise, is still necessary in the clinical field. Decisionmakers and providers may want to invest in these less-invasive technologies to decrease the length of hospital stays and improve patient outcomes. Finally, addition of VAAFT and Laser Surgery in clinical practice guidelines might raise the standard of care for anorectal fistula.

CONCLUSION

Anorectal fistula still remains a great surgical challenge by its various clinical configurations, high rate of recurrence and the potentiality of incontinence after surgery [25]. Classical surgical techniques are successful in some instances, but morbidity can be significant. In this systematic assessment, we evaluated two minimally invasive, sphincter preserving methods (VAAFT and Laser, and their impact on fistula healing) according to the literature between January 2013 and August 2014. Healing rates, rate of recurrence, and patient satisfaction were promising in both the modalities [26].

The VAAFT provides the possibility of direct visualization of the fistula tract and its internal opening, which reported healing rates ranging from 70% to 84%, and offered benefits in the diagnosis of complex tracts and in preventing recurrence due to the exact targeting [23, 30]. Laser Surgery, using radial transfer of laser energy for the closure of tracts, has also been reported to heal at similar rates (65-80%) and with least discomfort following the procedure and also less time required for healing and cosmetically more acceptable [19].

The two techniques were associated with a low rate of postoperative incontinence, which implied successful preservation of the sphincter [32, 33]. Nonetheless, short follow-up time, heterogeneity in definitions of end-points and no randomised controlled trials limit the applicability of current findings. Notwithstanding these difficulties, the evidence from the reviewed publications all definitively recommend the adoption of VAAFT and Laser Surgery into the treatment arsenal for anal fistulas [1]. All these methods have their strengths and potential uses must be based on patient anatomy and clinical status [32].

Recommendations

Based upon the data of this systematic review, it is concluded that both VAAFT and Laser Surgery can be reliable techniques for replacing the more traditional approaches in dealing with fistula disease, particularly in selected complicated and recurrent cases, where sphincter preservation is crucial. These methods not only provide equivalent or even superior healing results but also have a great impact on postoperative comfort and decreasing complications.

When deciding on the appropriate surgical treatment, clinicians should consider fistula anatomy, internal opening location, and patient comorbidities. VAAFT is particularly useful in complex/ poorly visualized tracts, whereas Laser Surgery may be preferred in simple tracts where fast recovery with minimal postoperative pain is desired.

On policy and practice grounds, investment in training and equipment for both techniques should be entertained in advanced colorectal units. Additional investigation in the form of multicenter randomized controlled trials with uniform outcome measures and longer follow up would be necessary to better define patient selection criteria and confirm these findings. Inclusion of these techniques in evidence-based guidelines is anticipated to improve the quality and customization of anorectal fistula treatment, whether in high- or low-resource healthcare environments.

Acknowledgments:
The authors express gratitude to contributors from surgery and VAAFT who laid a foundation on which the current review was based. Special thanks to clinical experts in VAAFT and Laser Surgery who offered valuable insights during the review process, enhancing the practical relevance of this work.

***Conflicts of Interest**: None declared.*
***Funding Information**: This review was self-funded.*

REFERENCES

1. Wałęga, P., Romaniszyn, M., & Nowak, W. (2014). VAAFT: A new minimally invasive method in the diagnostics and treatment of anal fistulas—initial results. *Polski Przegląd Chirurgiczny*, 86(1), 7–10. https://doi.org/10.2478/pjs-2014-0002
2. Cestaro, G., De Rosa, M., & Gentile, M. (2014). Treatment of fistula in ano with fibrin glue: Preliminary results from a prospective study. *Minerva Chirurgica*, 69(4), 225–228.
3. Kochhar, G., Saha, S., Andley, M., Kumar, A., Saurabh, G., Pusuluri, R., Bhise, V., & Kumar, A. (2014). Video- Assisted Anal Fistula Treatment. *JSLS: Journal of the Society of Laparoendoscopic Surgeons*, 18(3), e2014.00127. https://doi.org/10.4293/JSLS.2014.00127
4. Cariati, A. (2013). Fistulotomy or seton in anal fistula: A decisional algorithm. *Updates in Surgery*, 65(3), 191–
195. https://doi.org/10.1007/s13304-013-0216-1
5. Leventoğlu, S., Ege, B., & Menteş, B. B. (2012). Treatment for horseshoe fistula with the modified Hanley procedure using a hybrid seton: Results of 21 cases. *Techniques in Coloproctology*, 16(6), 441–446. https://doi.org/10.1007/s10151-012-0952-0
6. Reichert, M., Schwandner, T., Hecker, A., Behnk, A., Baumgart-Vogt, E., Wagenlehner, F., & Padberg, W. (2014). Surgical approach for repair of rectovaginal fistula by modified Martius flap. *Geburtshilfe und Frauenheilkunde*, 74(9), 923–927. https://doi.org/10.1055/s-0034-1383149
7. Mudakappagol, S. Y., & Sunny, M. (2014). Management of high anal fistula by Kshara Sutra ligation along with partial fistulotomy—A case report. *Journal of Indian System of Medicine*, 2(3), 155–157.
8. Gallo, G. (2014). The treatment of perianal fistulas: Our experience. In *5th Educational Meeting of the Italian Society of Colorectal Surgery (SICCR)*. San Marino.
9. Giuliani, S., Midrio, P., De Filippo, R. E., Vidal, E., Castagnetti, M., Zanon, G. F., & Gamba, P. G. (2013). Anorectal malformation and associated end-stage renal disease: Management from newborn to adult life. *Journal of Pediatric Surgery*, 48(3), 635–641. https://doi.org/10.1016/j.jpedsurg.2012.10.073
10. Meinero, P., & Mori, L. (2011). Video-assisted anal fistula treatment (VAAFT): A novel sphincter-saving procedure for treating complex anal fistulas. *Techniques in Coloproctology*, 15(4), 417–422.

11. Ratto, C., Litta, F., Donisi, L., & Parello, A. (2013). Video-assisted anal fistula treatment (VAAFT): A novel sphincter-saving procedure for treating complex anal fistulas. *Diseases of the Colon & Rectum*, 56(4), 537–542.

12. Wilhelm, A. (2011). A new technique for sphincter-preserving anal fistula repair using a novel radial emitting laser probe. *Techniques in Coloproctology*, 15(4), 445–449.
13. Ommer, A., Herold, A., Berg, E., & Furst, A. (2012). German guidelines for anal abscess and fistula (second revision). *Colorectal Disease*, 14(10), e269–e281.
14. Visscher, A. P., Felt-Bersma, R. J. F. (2013). Endoanal ultrasound in the evaluation of perianal fistulas. *World Journal of Gastroenterology*, 19(29), 4817–4823.
15. Parks, A. G., Gordon, P. H., & Hardcastle, J. D. (1976). A classification of fistula-in-ano. *British Journal of Surgery*, 63(1), 1–12.
16. Van Koperen, P. J., Duffy, K., Levien, D. H., & Shorthouse, A. J. (2009). High recurrence rate of complex anal fistula: Results of a multicenter study. *Colorectal Disease*, 11(6), 584–588.
17. Ortiz, H., Marzo, J., de Miguel, M., Ciga, M. A., Oteiza, F., & Armendariz, P. (2009). Length of the fistula tract and surgical outcome in patients with cryptoglandular anorectal fistulas. *Diseases of the Colon & Rectum*, 52(4), 616–621.
18. Ellis, C. N. (2010). Outcomes with the use of fibrin glue for the treatment of anal fistula: A systematic review.
Techniques in Coloproctology, 14(4), 315–320.
19. Schwandner, O. (2011). Fibrin glue in complex anal fistulas. *Colorectal Disease*, 13(Suppl. 3), 24–28.
20. Sentovich, S. M. (2003). Fibrin glue for all anal fistulas. *Journal of Gastrointestinal Surgery*, 7(4), 530–533.
21. Lunniss, P. J., & Phillips, R. K. (1994). Surgical assessment of anorectal function. *British Journal of Surgery*, 81(3), 304–310.
22. Garcia-Aguilar, J., Belmonte, C., Wong, W. D., Goldberg, S. M., & Madoff, R. D. (1996). Anal fistula surgery.
Diseases of the Colon & Rectum, 39(10), 1146–1151.
23. Malik, A. I., & Nelson, R. L. (2008). Surgical management of anal fistulae: A systematic review. *Colorectal Disease*, 10(5), 420–430.
24. Sileri, P., Gentileschi, P., Izzo, D., *et al.* (2010). A novel approach for complex fistula-in-ano using video-assisted anal fistula treatment (VAAFT). *Colorectal Disease*, 12(7 Online), e248–e252.
25. Lindsey, I., Cunningham, C., Jones, O. M., George, B. D., & Mortensen, N. J. (2002). A randomized, controlled trial of fibrin glue vs. conventional treatment for anal fistula. *Diseases of the Colon & Rectum*, 45(12), 1608– 1615.
26. Tozer, P. J., Sala, S., Cianci, V., *et al.* (2013). Fistulotomy vs. fibrin glue in the treatment of fistula-in-ano: Long- term results of a prospective randomized controlled trial. *Colorectal Disease*, 15(12), 1513–1519.
27. Klosterhalfen, B., Vogel, P., & Mittermayer, C. (1989). Surgical treatment of anal fistulas. *Diseases of the Colon & Rectum*, 32(6), 496–499.
28. Buchanan, G. N., Halligan, S., & Bartram, C. I. (2004). Clinical examination, endosonography, and MR imaging in preoperative assessment of fistula in ano: Comparison with surgical findings. *Journal of the American College of Surgeons*, 199(5), 720–729.
29. Van der Hagen, S. J., Baeten, C. G., Soeters, P. B., & van Gemert, W. G. (2005). Staged mucosal advancement flap for high transsphincteric and suprasphincteric fistulas. *British Journal of Surgery*, 92(3), 348–351.
30. Sentovich, S. M. (2005). Fibrin glue for anal fistulas: Long-term results. *Diseases of the Colon & Rectum*, 46(4), 498–502.
31. Phillips, R. K. S., Hittinger, R., & Fry, J. S. (1987). Management of fistula-in-ano. *BMJ*, 295(6600), 1157–1158.

32. Mitalas, L. E., van Onkelen, R. S., Monkhorst, K., & Zimmerman, D. D. E. (2012). Long-term outcome of fistulotomy and fibrin glue for simple and complex fistulas. *Colorectal Disease*, 14(7), e302–e307.
33. Johnson, E. K., Gaw, J. U., Armstrong, D. N. (2006). Efficacy of anal fistula plug in closure of cryptoglandular fistulas. *Diseases of the Colon & Rectum*, 49(9), 1627–1631.