

Twenty-year experience in the treatment of horseshoe perianal fistula by one-stage lay-open operation

Ahmed A. Abou-Zeid, Sherif A. Halim, Mostafa M.S. Ismail

Department of General Surgery, Faculty of Medicine, Ain Shams University, Cairo, Egypt

Correspondence to Ahmed A. Abou-Zeid, MD, FRCS (Ed), Professor of General Surgery, Faculty of Medicine, Ain Shams University, 11 El-Ensha Street, Nasr City, Cairo 11371 Egypt. Tel: +2 012 2746 1088; fax: +202 24 82922; E-mail: ahmedabouzaid@med.asu.edu.eg

Received: 7 January 2020

Accepted: 11 January 2020

Published: 27 April 2020

The Egyptian Journal of Surgery 2020, 39:476–482

Background

Perianal fistula is an abnormal hollow track or cavity that is lined with granulation tissue and that connects a primary opening inside the anal canal to a secondary opening in the perianal skin; secondary tracks may be multiple and can extend from the same primary opening. Horseshoe fistula is a type of trans-sphincteric fistula with multiple complex secondary tracks. Treatment of horseshoe fistula is challenging.

Aim

The aim was to describe the surgical technique that we use for the treatment of horseshoe perianal fistula and to study its effect on recurrence and continence.

Patients and methods

This is a single-center 20-year experience study in the management of horseshoe fistula. A total of 893 patients with horseshoe perianal fistula were enrolled into the study by retrospective method. The study is conducted in Ain Shams University Hospitals. All patients underwent single-stage lay-open technique. Follow-up continued till 2 years after surgery to detect recurrence and/or incontinence.

Results

After 6 months of follow-up, only 71 (7.95%) patients had recurrent fistula. Moreover, 26 patients were incontinent to stool and flatus, 39 patient to gases only, and 34 patients were complaining from staining of the underwear once per week using Wexner score. A total of 794 (88.9%) patients were completely continent to both stool and flatus.

Conclusion

Single-stage lay open is an effective technique to eradicate the complex horseshoe perianal fistula with minimal recurrence and acceptable degrees of incontinence.

Keywords:

fistula recurrence, horseshoe perianal fistula, incontinence, lay open

Egyptian J Surgery 39:476–482
© 2020 The Egyptian Journal of Surgery
1110-1121

Introduction

Perianal fistula is an abnormal hollow track lined with granulation tissue that connects an internal opening inside the anal canal to an external opening in the perianal skin. Secondary sidetracks are not infrequently present [1]. Most perianal fistulae result from infection in one of the perianal glands, which are normally present in the intersphincteric space, leading to the formation of perianal abscess. The abscess can then extend along the anatomical planes and spaces that naturally surround the anal canal, until it eventually drains in the perianal skin to cause perianal fistula [2,3]. Depending on the direction of extension of infection, Parks *et al.* [4] classified perianal fistula into four types: intersphincteric, trans-sphincteric, suprasphincteric, and extrasphincteric fistula. Symptoms of perianal fistula can affect the quality of life significantly [1].

Horseshoe fistula is a complex type of trans-sphincteric fistula that is caused by infection in the perianal gland present in the midline posteriorly. Infection in this particular site can extend along the deep postanal space

to reach the ischiorectal fossa in one or either side of the anal canal before it drains in the perianal skin. Because of the depth and complexity of the secondary tracks associated with horseshoe fistula, symptoms are usually severe, and the diagnosis can be difficult [5,6].

Surgery is the only treatment of perianal fistula. The goals of treatment are draining infection, eradicating all the fistulous tracks till the internal opening, and avoiding persistent disease while preserving anal sphincter function [7]. Specifically in horseshoe fistula, achieving these goals of treatment can be difficult, again because of the depth and complexity of its associated secondary tracks. The aim of the present study is to present a single-center 20-year experience in one-stage lay-open operation for the treatment of horseshoe perianal fistula and to discuss

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

the outcome of this procedure regarding fistula recurrence and incontinence.

Patients and methods

This is a retrospective analysis of the data of 1127 patients with horseshoe perianal fistula who were subjected to surgery in Ain Shams University Hospitals in the period from January 1997 till January 2017. Medical records of the patients were retrieved and revised to recruit detailed data about anatomy of the fistula, operative details, postoperative complications, fistula recurrence, and postoperative fecal incontinence. Data collection and analysis was performed in the period from February 2018 till June 2019. All patients underwent a single-stage lay-open procedure for the fistula. All patients were treated by the same surgical technique by the first two authors. A total of 234 patients were excluded from the study because of incomplete data, inadequate follow-up, or failure to meet the inclusion criteria; thus, the final cohort of this study is 893 patients (535 males; age range from 18 to 60 years, with mean age of 39.4 years). Follow-up for each patient extended for 2 years after surgery, at which time patients were discharged from follow-up.

Inclusion criteria

The following are the inclusion criteria:

- (1) Age between 15 and 65 years.
- (2) Patients diagnosed with horseshoe perianal fistula of cryptogenic origin.
- (3) Normal anal canal and perfect continence.
- (4) Patients fit for anesthesia.

Exclusion criteria

The following are the exclusion criteria:

- (1) Patient age younger than 15 years or older than 65 years.
- (2) Patients known to have any previous anal operation other than abscess drainage.
- (3) Patient with noncryptogenic horseshoe perianal fistula [malignancy, diverticulitis, trauma, Inflammatory Bowel Disease (IBD), etc.].
- (4) Multiparous female with multiple vaginal deliveries.
- (5) Patient unfit for surgery.

Ethical consideration

Ethical approval was obtained from the Research Ethics Committee of the Department of General Surgery, Ain Shams University.

Preoperative preparation

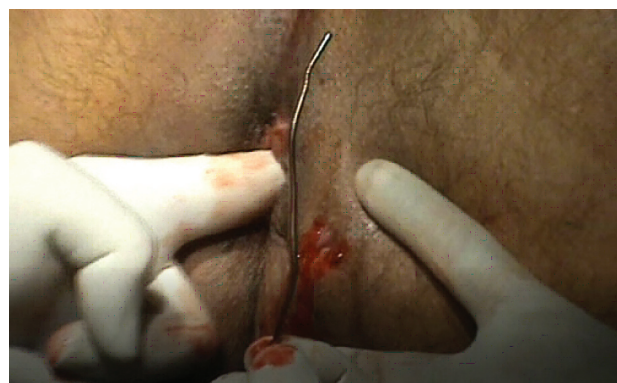
All patients had routine preoperative history taken to exclude any previous anal operations and to confirm the continence status using the Wexner scoring system. Proper clinical examination of the anal region and digital rectal examination were the main tools to diagnose horseshoe fistula and to detect its anatomy. The horseshoe track was felt as a cord-like structure encircling the anal canal in the postanal space at the level of anorectal junction. The supralelevator track, if present, was felt as induration on either side of the rectal wall at 3 and 9 o'clock positions. The internal opening might be felt as a dimpling or papilla at the level of anal valves at 6 o'clock position. MRI or examination under anesthesia (EUA) was used in case of uncertain diagnosis. Routine preoperative laboratory investigations were done. Patients received clear fluid at the night before surgery and were asked to evacuate their bowel the day of surgery.

Operative technique

Under general or regional anesthesia, the patient was put in the lithotomy position. After prepping and draping, another anal examination was done under anesthesia to confirm the preoperative diagnosis and to finally road map the fistula and its side tracks. Exact identification of the position of the internal opening was especially important before starting the procedure because this can be difficult later on after distortion of the anal canal and perianal spaces by surgery. Identification of the internal opening could be done by inspection, palpation, internal probing, or bubbling after air injection through the external opening (Fig. 1).

Taking the external opening of the fistula as a guide, surgery started by dissection and mobilization of the supralelevator track until its apex was reached above the level of the pelvic floor muscles (Fig. 2). The anal canal was then mobilized by making a posterior semilunar

Figure 1

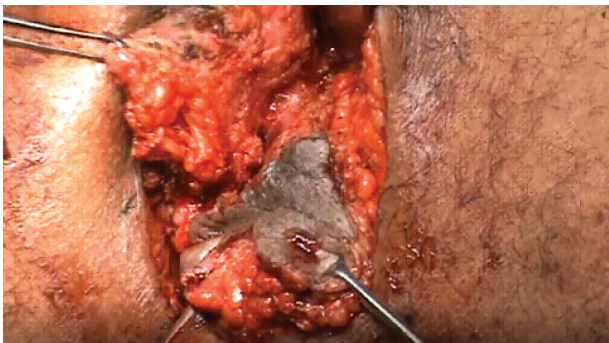


Length of the supralelevator as shown by the probe.

incision centered at 6 o'clock and continuing dissection behind the anal sphincters until the puborectalis muscle and the horseshoe track were reached at the top of the anal canal (Figs 3 and 4). Only after full mobilization of the supralelevator track and the anal canal could lay open of the tracks be started. The supralelevator track was first laid open at its anterior or lateral walls (Figs 5 and 6). Care should be taken to preserve the integrity of the medial wall of the supralelevator track to avoid disconnection of the horseshoe track from the supralelevator track, otherwise later probing of

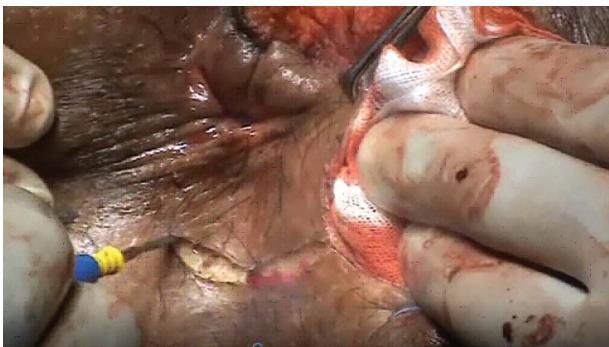
the horseshoe track would be impossible. The supralelevator track was curetted and washed with saline to show the mouth of the horseshoe track as pouting of granulation tissue along its medial wall. Cannulation of the horseshoe track was then done, and it was laid open and curetted (Figs 7 and 8). An anal speculum was then introduced in the anal canal, and a

Figure 2



Supralelevator track completely mobilized.

Figure 3



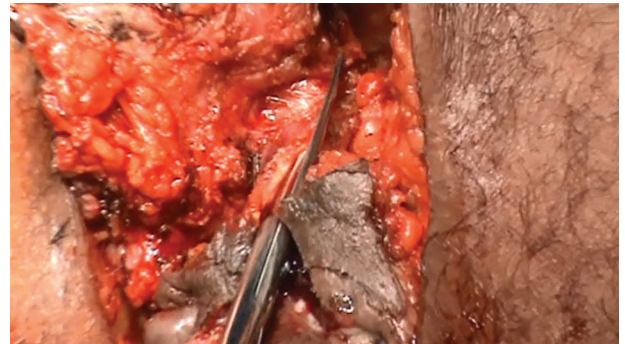
Mobilization of the anal canal by posterior semilunar incision.

Figure 4



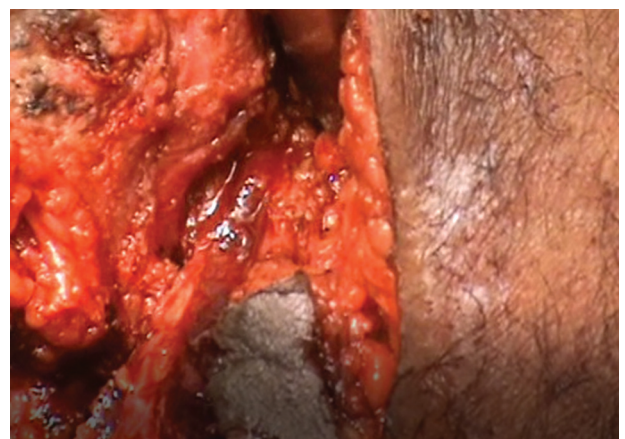
Anal canal completely mobilized.

Figure 5



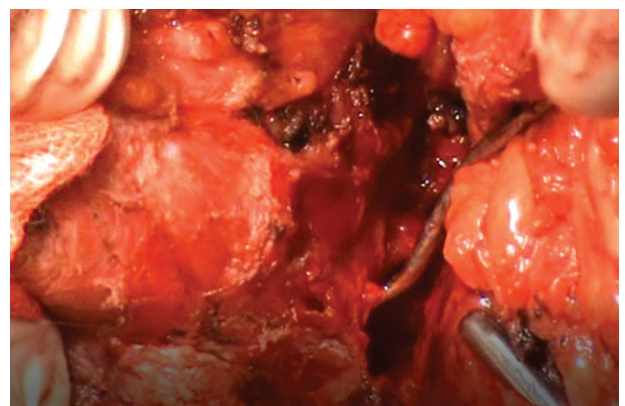
Lay open of supralelevator track at its anterior wall.

Figure 6



The supralelevator track laid open.

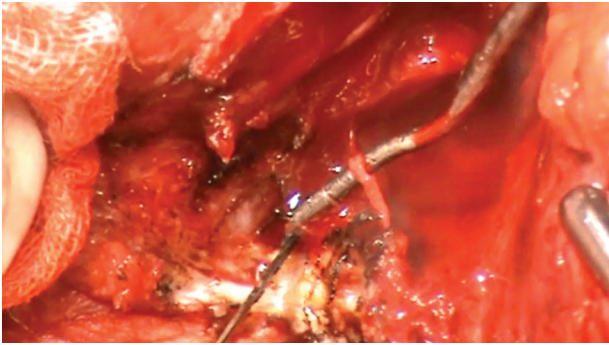
Figure 7



Probing of the horse shoe track from the medial wall of the supra-lelevator track.

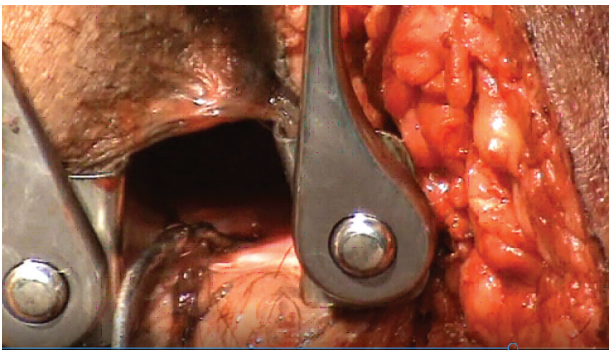
probe was inserted in the internal opening that was previously identified at the beginning of the procedure (Fig. 9). The probe was guided along the primary trans-sphincteric track by gentle manipulation until it appeared in the middle of the laid open horseshoe track. The trans-sphincteric track was then laid open and curetted. Any remaining side branches were again detected as pouting granulation tissue, and they were similarly treated (Figs 9 and 10).

Figure 8



Laid open horse shoe track.

Figure 9



Internal probing of the transsphincteric track.

Figure 10



All tracks laid open.

Finally, the mobilized supralelevator track was excised as well as any excess skin or fat to saucerize the wound. Care should be taken to avoid excision of any part of the sphincter at the edges of the wound. Hemostasis was secured, and packing of all deep spaces was done (Fig. 11).

Postoperative follow-up

The patients stayed overnight in the hospital. Before discharge, dressing was done to check for hemostasis and proper wound packing. Patients were discharged on pain killers and laxatives; antibiotics were not prescribed routinely. Patients were taught how to do home dressing, and they were instructed to do the dressing twice per day and after every motion.

Follow-up was done in the outpatient clinic weekly for 1 month, monthly for 6 months, and then at 1 and 2 years postoperatively. At each follow-up visit, the wound was checked for evidence of skin bridging or abscess formation. After complete healing, the patients were assessed for fistula recurrence and continence status. Incontinence was assessed using the Wexner scoring system. Recurrence was identified by persistent tracks, external opening, or any anal pain or discharge. MRI or EUA was done to confirm recurrence.

Results

Patients' complaints included anal discharge, pain, soiling of the underwear, and persistence of wound after abscess drainage. The duration of complaints ranged between 6 and 24 months. Comorbidities were recorded in 491 patients and included diabetes mellitus, hypertension, cardiac disease, chronic chest disease, chronic renal disease, and chronic viral and nonviral hepatic disease.

The description of the anatomy of the fistulae is shown in Table 1. A total of 221 patients had

Figure 11



Final wound shape.

Table 1 Description of horseshoe perianal fistulae

Fistula description	N (%)
Recurrent fistula	
Other institutes	172 (19.26)
Current institute	49 (5.49)
Diagnosis	
Clinical	645 (72.23)
EUA	183 (20.49)
MRI	65 (7.28)
External opening	
Anterior	62 (6.94)
Posterior	831 (93.01)
Right	369 (41.32)
Left	524 (58.68)
Suprlevator track	
1 track	579 (64.8)
2 tracks	178 (19.9)
Absent	136 (15.2)
Horse shoe track	
Complete	576 (64.5)
Half	317 (35.5)
Previous abscess drainage	
Yes	619 (69.3)
No	274 (30.7)

EUA, examination under anesthesia.

recurrent fistula. Overall, 172 patients were operated in other institutes, whereas 49 patients were operated in the authors' institute. Ninety six patients were operated for two times and 73 for more than one time. The maximum number of previous surgeries for horseshoe fistula was seven times. All patients with recurrent fistula were completely continent to stools and flatus.

Preoperative diagnosis of the type of fistula was possible in 645 patients. The rest of the patients ($n=248$) needed further intervention for proper diagnosis. Early in the study, we did EUA to confirm the diagnosis (before 2011), whereas later on, with the introduction of MRI, this modality was used more frequently in patients with uncertain diagnosis.

The same operative technique was used in all patients. In minority of patients ($n=76$), if the opening of the trans-sphincteric track in the horseshoe track was evident, external probing of the trans-sphincteric track was done.

The recorded postoperative complications (incontinence, recurrence, wound infection, incomplete wound healing, and postoperative bleeding) are shown in Table 2.

Among all patients and during their follow-up, postoperative complications occurred as follows:

Table 2 Follow-up period and postoperative recorded complications

Follow-up and postoperative complications	N (%)
Recurrence	71 (7.95)
Stool and flatus	26 (2.9)
Gases only	39 (4.4)
Staining	34 (3.8)
Wound Infection	
Yes	74 (8.3)
No	819 (91.7)
Delayed wound healing	
Yes	47 (5.3)
No	846 (94.7)
Postoperative bleeding	37 (4.14)

wound infection occurred in 74 (8.3%) patients after 1 month treated by antibiotics and daily dressing which may be done under anesthesia. Delayed wound healing was defined as incomplete healing after 6 months. All patients with incomplete wound healing had MRI to exclude fistula recurrence. Delayed wound healing occurred in 47 (5.3%) patients after 6 months. These patients were treated by surgical curettage; eight of them required debridement under anesthesia. Twelve of these patients proved to have recurrent fistula.

Incontinence of different degrees occurred in 99 (11.8%) patients. We could not correlate occurrence of incontinence to any of the fistula types, neither to whether the fistula was primary or recurrent. None of the patients who developed incontinence accepted to do sphincter repair as a solution to their problem.

In the follow-up period, 71 (7.95%) patients complained from recurrence in the form of presence of external opening and anal discharge and 822 (90.04%) patients had no recurrence symptoms. Thirty two patients complained of persistent pain, and fistula recurrence was excluded in all of them by MRI. Pain improved spontaneously after few weeks.

A total of 23 patients had recurrence in the form of recurrent horseshoe fistula, recurrent trans-sphincteric fistula ($n=35$), and recurrent subcutaneous or intersphincteric fistula ($n=13$). Overall, 29 patients were treated by lay open, 11 by seton, and 21 by rerouting. Ten patients refused further intervention.

Discussion

Horseshoe fistulae is a complex type of trans-sphincteric fistula characterized by the presence of a curved posterior track at the level of the puborectalis muscle and a suprlevator track that sometimes extends

high up in the ischioanal fossa above the level of the pelvic floor muscles [8]. Although many sphincter-saving operations have been proposed for the treatment of anal fistula, they all depend on dissecting, injecting, or manipulating a simple wide track that is neither kinked nor obstructed at any point [9,10], a prerequisite that is not applicable to the complex tracks of horseshoe fistula.

Lay-open operation, despite its associated risk of faecal incontinence, is the standard procedure for anal fistula that is associated with the least recurrence. Again fistula lay-open operation can be difficult in horseshoe fistula because of the multiplicity of secondary tracks and their presence in a deep narrow field that is surrounded by pelvic bones [11,12]. In the present study, we present a technique for lay open of horseshoe fistula that, we believe, makes this procedure much easier.

The key point for success of the present technique is the superficialization of all the deep secondary tracks of horseshoe fistula. This is achieved by preliminary dissection of the supralelevator track and mobilization of the anal canal anteriorly to expose the horseshoe track. The aim of superficialization is to facilitate the step of lay open. Without superficialization, lay open of the supralelevator and horseshoe tracks would have been done *in situ*. The opened tracks, in this situation, will be present in the bottom of a deep, narrow field with tough and bloody edges, conditions in which these tracks can barely be seen. Moreover, probing the horseshoe track in the medial wall of the apex of the supralelevator track will almost be impossible. After track superficialization, the deep supralelevator track is totally at hand and the horseshoe track is completely accessible; thus, lay open of the superficialized tracks is much easier.

On the contrary, the primary trans-sphincteric track in horseshoe fistula is short, and it has a relatively fixed position starting from the internal opening that is present at the level of the dentate line at 6 o'clock position, and opening in the middle of the horseshoe track. Theoretically, the transsphincteric track can be negotiated by external probing from the laid open horseshoe track. Practically, probing of the transsphincteric track from outside inward is difficult because the opening in the horseshoe track is usually deep and frequently it is inconspicuous. We took advantage of the fixed anatomy of the internal opening in horseshoe fistula, and we did internal probing from inside outward to negotiate the transsphincteric track. For this reason, locating the internal

opening was important at the very beginning of the operation. After internal probing, the primary transsphincteric track could be easily laid open.

In this study, fistula recurrence is higher than recurrence after lay open of ordinary transsphincteric fistula. Thus, the recurrence rate in the present study is 7.95%, whereas our recurrence rate after lay open of transsphincteric fistula is 3.7% (unpublished data). Inceoglu and Gencosmanoglu in 2003 studied the results of fistulotomy in horse shoe perianal fistula. They found no recurrence after a median of 35 (range: 6–78) months [13]. However, these results were applied on only 22 patients; we consider this as a small number to get dependable results. Other studies reported (9–21%) recurrence rate after lay open of horse shoe fistula [14,15]. Actually, during our search, we found no original study that included more than 50 patients with horseshoe perianal fistula.

We believe recurrence after lay open of horseshoe fistula is related to the deep wounds that are left behind at the end of the operation allowing for bridging of the skin and subcutaneous tissue with creation of new abscess cavities that can end in fistula recurrence. Although we monitor wound dressing regularly in our strict follow-up program, yet packing the deep wound can sometimes be difficult because of its associated pain. Recently, we are following a policy of doing wound dressings under anesthesia in the early postoperative period one or more times if this is found necessary, to undo any bridging in this critical period when the wound is solidifying and taking its final sloping shape.

At 2-year follow-up, 99 (11.1%) patients had different degrees of postoperative fecal incontinence, as measured by Wexner score. Other studies reported different degrees of incontinence (8–19%) [15,16]. Although lay open of the high arching transsphincteric track of horseshoe fistula is expected to be associated with higher incidence and higher degrees of incontinence, many factors contribute to the low rate of incontinence after lay open of horseshoe fistula: first, the unique anatomy of the horse shoe fistula with fixed position of the transsphincteric track at 6 o'clock position where the anal sphincter is augmented by the puborectalis muscle; second, the lay open procedure of the thick fibrous track keeps part of the muscle fibers approximated to the edges of the track; and finally, we avoided excision of any part of the divided, nonretracted sphincter in the final step of wound saucerization, to keep the edges of the divided

sphincter held together by the fibrous laid open track. Lay open operation for horseshoe can thus achieve an excellent cure rate at the expense of minor incontinence occurring in minority of patients. Quality-of-life studies showed that patient satisfaction was strongly related to fistula recurrence, difficulty holding gas, soiling of underwear, and accidental bowel movements. Patients with recurrence reported a higher dissatisfaction rate (61%) than did patients with anal incontinence (24%). Patient satisfaction was not significantly associated with age, sex, surgical procedure, or time since surgery [17,18].

Although this study is retrospective, we believe its strength comes from the big number of patients and that it is a single-institute experience.

Conclusion

We describe an effective single-stage lay-open technique for the treatment of a complex type of anal fistula. It is associated with minimal recurrence and accepted degrees of incontinence.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

- 1 Corman ML. Anal Fistula. Colon & Rectal Surgery. 5th ed. Philadelphia, PA: Lippincott Williams & Wilkins 2005. 11 1064–1087.

- 2 Belliveau P. Anal Fistula. Current Therapy in Colon and Rectal Surgery. Philadelphia, PA: BC Decker; 1990. 22–27
- 3 Corman ML. Anal Fisula in Colon and Rectal Surgery. Philadelphia, PA: J. B. Lippincott Company; 1984. 94–106
- 4 Parks AG, Gordon PH, Hardcastle JD. A classification of fistula-in-ano. Br J Surg 1976; 63:1–12.
- 5 Hämäläinen KPJ, Sainio AP. Incidence of fistulas after drainage of acute anorectal abscesses. Diseases of the colon & rectum 1998; 41: 1357–1361.
- 6 Ustynoski K, Rosen L, Stasik J, Riether R, Sheets J, Khubchandani IT. Horseshoe abscess fistula. Dis Colon Rectum 1990; 33:602–605.
- 7 Vasilevsky CA, Gordon PH. Benign anorectal: abscess and fistula. Wolff BG, Fleshman JW, Beck DE, Pemberton JH, Wexner SD, editors. The ASCRS Textbook of Colon and Rectal Surgery. New York, NY: Springer 2007. 13 273–309.
- 8 Morris J, Spencer JA, Ambrose NS. MR imaging classification of perianal fistulas and its implications for patient management. Radiographics 2000; 20:623–635.
- 9 Tyler KM, Aarons CB, Sentovich SM. Successful sphincter-sparing surgery for all anal fistulas. Dis Colon Rectum 2007; 50:1535–1539.
- 10 Meinero P, Mori L, Gasloli G. Video-assisted anal fistula treatment: a new concept of treating anal fistulas. Dis Colon Rectum 2014; 57:354–359.
- 11 Abbas MA, Jackson CH, Haigh PI. Predictors of outcome for anal fistula surgery. Arch Surg 2011; 146:1011–1016.
- 12 Van Koperen PJ, Wind J, Bemelman WA, Bakx R, Reitsma JB, Slors JFM. Long-term functional outcome and risk factors for recurrence after surgical treatment for low and high perianal fistulas of cryptoglandular origin. Dis Colon Rectum 2008; 51:1475–1481.
- 13 Inceoglu R, Gencosmanoglu R. Fistulotomy and drainage of deep postanal space abscess in the treatment of posterior horseshoe fistula. BMC Surg 2003; 3:10.
- 14 Browder LK, Sweet S, Kaiser AM. Modified Hanley procedure for management of complex horseshoe fistulae. Tech Coloproctol 2009; 13:301.
- 15 Pezim ME. Successful treatment of horseshoe fistula requires deroofing of deep postanal space. Am J Surg 1994; 167:513–515.
- 16 Hanley PH, Ray JE, Pennington EE, Grablowsky OM. Fistula-in-ano: a ten-year follow-up study of horseshoe-abscess fistula-in-ano. Dis Colon Rectum 1976; 19:507–515.
- 17 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.
- 18 Abou-Zeid AA, El-Anwar A. Short Form 36 quality of life after lay open of anal fistula. Egypt J Surg. 2015; 34:281–286.