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Primary open treatment of sacrococcygeal pilonidal disease

Not only is sacrococcygeal pilonidal disease painful for patients, it also has a significant socioeconomic impact. Problems with wound healing and recurrence have led to development of numerous surgical therapies. Although the choice of surgical procedure is ultimately dictated by the surgeon's preference, relevant pros and cons of the three open methods are presented herein.

Sacrococcygeal pilonidal disease occurs when a loose hair penetrates intact natal cleft skin to form a midline sinus. Other hairs follow and a chronic foreign body reaction ensues and typically discharges cephalad and to one side, forming a lateral/secondary opening. By causing pain and purulent discharge, it has a high socioeconomic impact, particularly given that it typically affects young adults who are engaged in education, forming relationships, beginning employment or taking part in active military service. Despite uncertainty regarding classification, the diagnosis is almost always clinically straightforward. The only known cure is surgical.

The operation performed is a matter of surgeon preference, which is driven by a combination of training and personal experience. Briefly, each element of the disease may be excised individually or in combination: overlying skin alone (e. g. deroofing), midline sinuses/pits with debridement of the tracks and cavity/cyst (e. g. Gips technique, Bascom pit picking, endoscopic pilonidal sinus treatment), or the entire disease process including a variable amount of healthy nearby skin and fat. The defect may be left open (primary open treatment), closed in the midline, closed totally off midline with an advancement flap (e. g. Bascom cleft lift, Karydakis) or closed with a complex flap which crosses the midline (e. g. Limberg, perforator flap) [1].

A multitude of surgical techniques have arisen, predominantly due to dissatisfaction with early wound failure. Ultimately, it is being recurrence free (not the type of surgery) which determines patients' long-term satisfaction [2].

The first meta-analysis of randomized clinical trials of surgical treatment of pilonidal disease steered surgeons towards open management by showing slower healing (6–15 days) but half the recurrence rate with excision and healing by secondary intention vs. all methods of closed management [3]. However, a subsequent meta-analysis concluded that off-midline primary closure is preferred over midline closure techniques [4]. While it may sound appealing, postoperative shaving increases long-term recurrence [5].

Bascom famously reminded surgeons that "During World War II, the Surgeon General forbade wide excision as treatment for pilonidal disease because it hospitalized 79,000 troops for an average of 55 days" [6] to avoid "post-operative casualties" [7]. However, techniques which require secondary wound healing remain the most frequently performed procedures around the world [8]. The goal of this review is to summarize the different open techniques, focusing not so much on the non-standardized surgical techniques but rather on early clinical outcomes and recurrence. Where available, pooled results from a meta-analysis are presented. Otherwise, results of individual studies are shown.

Open management falls into the following categories, in order of increasing complexity (**Fig. 1a–c**):

- deroofing (unroofing)
- marsupialization
  - superficial
  - deep
- wide local excision

Stauffer et al. [12] performed merged data analysis of 740 studies (89,583 patients published from 1833 to 2017) and found (**Fig. 2**):

- recurrence rates increase as the length of follow-up increases
- recurrence rates in randomized controlled trials (RCTs) are higher than in non-RCTs
- at 10 years follow-up (RCT & non-RCT), recurrence rates were:
  - Karydakis/Bascom II 3%
  - Limberg/Dufourmentel 11%
  - marsupialization 16%
  - primary open treatment 20%

Deroofing

Abramson described deroofing (unroofing) in 1957 [13]. This technique involves laying open of the pilonidal tracts without excision or closure. Often done under local anaesthesia, the pilonidal tracts are simply cut open over an artery forceps inserted through a midline sinus, but the sinus is not excised [14]. Excision of nonviable tissue [15] or a limited part of the lateral wall (saucerization) may be added to prevent early skin closure [14]. The base may be cauterized [15]. The tracts are laid open without tissue being excised—the end result is shown in **Fig. 1a**. Various wound care measures are recommended but there is no

Fig. 1 ▲ **a** Deroofing (unroofing). (Used under Creative Commons Attribution-NonCommercial-Share Alike 4.0 License from Reference [9]). **b** Marsupialization. (Used under Creative Commons Attribution-NonCommercial-Share Alike 4.0 License from Reference [10]). **c** Wide local excision. (Used with permission from Reference [11])

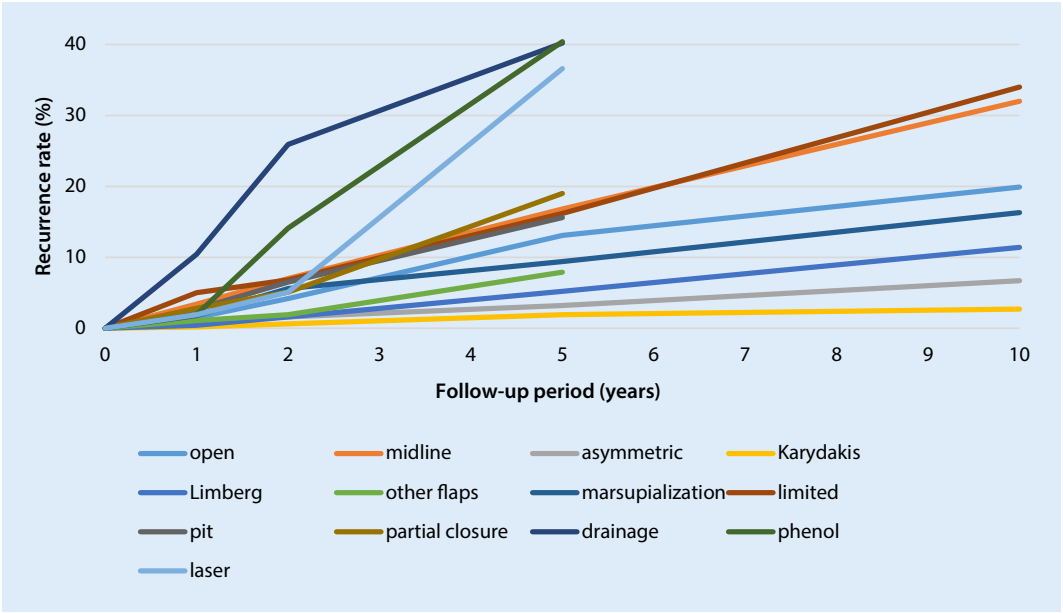

Fig. 2 ◄ Procedure-specific recurrence rates. (Redrawn with data from Reference [12])

consensus (alginate dressings are often used).

In a four-way comparison of postoperative wound care (three per day of one of the following: sitz baths, normal saline cleaning, cleaning with povidone iodine and 3% hydrogen peroxide cleaning), hydrogen peroxide was associated with the best outcomes (quickest healing, lowest pain, earliest return to work and lowest recurrence rate), while normal saline performed the worst [16]. Scarring was not observed [16].

Garg et al. [14] performed a meta-analysis of 13 papers describing deroofing (1445 patients) including acute abscess as well as chronic primary and recurrent disease. Mean operating time was 35 min. Pooled complication rate was 1.4%. Mean healing time ranged from 3 to 10 weeks but return to work was quite early (day 8). The overall recurrence rate was 4.5% with variable follow-up (ranging from 5 weeks to 10 years). The highest recurrence rate was 10% (11/109) at 1 year [17].

Garg et al. expressed surprise that deroofing (with curettage) has not become the first-line procedure for acute and chronic pilonidal disease because it is easy to perform and the recurrence rate appears consistently low [14].

Marsupialization

Buie described marsupialization in 1937 [18], which may be used for chronic and acute pilonidal disease. Two versions are described: all tracts are excised down to the sides and fibrous pilonidal cavity base (superficial) or down to the sacrococcygeal fascia (radical/deep). All hair and granulation tissue is removed. Either way, the adjoining buttock skin is then sutured directly to the base of the wound. Healing occurs by wound contraction and re-epithelialization. Neumeister (1963) described deep excision to post-sacral fascia as he was dissatisfied with "slow healing … due to a scarred … poor base for epithelialization" [19]. To enable deep marsupialization, the adjacent skin may need adequate mobilization.

In one study following superficial marsupialization, wound healing occurred between 2 and 17 weeks (mean 6 weeks) but return to work was earlier (on day 11) [20]. Superficial marsupialization may result in less postoperative pain than deep marsupialization [20]. Bleeding and early skin edge bridging are recognized complications [21]. Wound infection and dehiscence are uncommon [21]. The fixed scar may be painful [19].

Superficial excision with marsupialization took Oncel et al. 32 min [22].

The short-term recurrence rate varies from 0% at 15 months [20] to 10% at 4 months [22]. Long-term follow-up is scarce—Rouch et al. describe one recurrence (4.3%) over a median of 6.3 years follow-up in 23 adolescents undergoing deep marsupialization [23]. This is in keeping with Stauffer et al. (**Fig. 2**) showing that long-term recurrence after marsupialization is lower than after wide open excision [12].

Wide local excision

Wide local excision was one of the earliest techniques, but the historical wide en block deep excisions have been abandoned [24]. Typically under general anaesthesia, all tissue involved by pilonidal disease is elliptically excised down to the sacrococcygeal fascia taking care to achieve uninvolved margins. Excision with diathermy was advocated by Rogers et al. as far back as 1938 [24]. A combination of clinical assessment, lacrimal probes and methylene blue dye may be used to determine the extent of disease/excision. A sufficiently wide wound is required to avoid retention of secretions which would otherwise occur in a conical/wedge-shaped wound [25]. Haemostasis is achieved prior to packing. Various packing techniques are used including negative-pressure wound therapy (NPWT). Anti-anaerobic antibiotics [25] and hydrogen peroxide [16] may speed up wound healing.

NPWT speeds up wound healing via two mechanisms: microstrain (promotion of perfusion, reduction of oedema and stimulation of cellular activity) and macrostrain (drawing wound edges together and removal of exudate) [26]. The only RCT on wide local excision found wound healing was quicker during the initial 2 weeks but there was no difference in time to complete closure with NPWT vs. control [27]. NPWT can be used until complete wound closure or for the first 3–10 days to condition the wound towards faster healing. Metronidazole 10% ointment applied into the wound twice daily may restart wound healing especially in slow-to-heal wounds.

Surgical times are typically around 20 min [28]. Early surgical complications include bleeding and infection [24]. The open wound then heals by secondary intention by granulating up and re-epithelializing. The healed scar may undergo maceration, longitudinal cracking, bridging, epithelial pouching and late abscess formation [24].

While healing times of 5 weeks [29] to 7 [30] may be acceptable to the surgeon, some of these midline wounds do not heal. At 45 months follow-up, Gendy et al. [31] found that a remarkable 26% of patients (9/34) did not achieve wound healing. The patient is typically blamed for delayed wound healing (inadequate care with dressing changes [32], poor wound care [7] and lack of depilation [33]).

Having reviewed 160 studies of primary open treatment (with 10,166 patients included), Stauffer et al. found short-term recurrence acceptable at 2% (1 year) but this increased ten-fold to 20% by 10 years [12]—the highest of the open procedures reviewed here. It is therefore time to abandon routine elective wide local excision with open management. Perhaps this technique should be limited to grossly infected/inflamed pilonidal disease? But even in this setting, it may be

Abstract · Zusammenfassung

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Abstract

Background. Surgical management of sacrococcygeal pilonidal disease ranges from pit/sinus procedures through excision with healing by secondary intent to various flap techniques. Short- and long-term outcomes differ between surgeons and techniques.
Objective. An overview of primary open treatment of sacrococcygeal pilonidal disease, including technique, wound complications and recurrence is presented.
Materials and methods. Relevant articles were identified from PubMed.
Results. Of the three primary open treatment procedures (deroofing, marsupialization and wide local excision), marsupialization may have the lowest recurrence rate. Primary open treatment has a significant rate of non-healing as well as recurrence.
Conclusion. Primary open treatment is widely practiced but wound healing may be a challenge for the patient and recurrence a challenge for the surgeon.

Keywords
Pilonidal sinus · Surgical flaps · Wound healing · Pain · Recurrence

Die primär offene Behandlung des sakrokokzygealen Pilonidalsinus

Zusammenfassung

Hintergrund. Die chirurgische Behandlung des sakrokokzygealen Pilonidalsinus umfasst multiple Techniken – von der Sinusexzision mit primär offener Behandlung bis hin zu verschiedenen Lappenplastiken. Kurz- und Langzeitergebnisse sind wesentlich vom Chirurgen und der von ihm angewandten Technik abhängig.
Ziel der Arbeit. Ziel der vorliegenden Studie ist es, einen Überblick über die Methoden der primär offenen Behandlung des Pilonidalsinus einschließlich Technik, Komplikationen und Rezidivraten zu geben.
Material und Methoden. Relevante Artikel sind aus der Datenbank PubMed entnommen und zusammengefasst worden.
Ergebnisse. Von den 3 primär offenen Methoden Entdachung, Marsupialisation und weit offener Exzision weist die Marsupialisation die niedrigste Rezidivrate auf. Bei der primär offenen Behandlung nach weiter lokaler Exzision besteht eine signifikante Rate an ausbleibenden Heilungen und Rezidiven.
Schlussfolgerung. Die primär offene Behandlung mit weiter Exzision wird zwar oft angewendet, kann aber in der Wundbehandlung eine Herausforderung für den Patienten und bei Rezidiven eine Herausforderung für den Chirurgen bedeuten.

Schlüsselwörter
Pilonidalsinus · Chirurgische Lappen · Wundheilung · Schmerzen · Rezidive

better to deroof [34], allow the inflammatory process to settle and then perform excision with off-midline closure.

Practical conclusion

Three open methods of managing pilonidal disease are described—deroofing, marsupialization and wide excision—in order of preference for elective surgery. If a difficult abscess forces the surgeon to operate, deroofing should be the first step, followed by definite surgery after 4–12 weeks, as the recurrence rate is lower. Timing of the second operation is still to be determined, but the abscess needs to have resolved and local tissue inflammation reduced to a minimum. If the use of methylene blue or other dyes indicates extensive fistulating disease, any excision towards the anus should be kept as minimal as possible, as this is the most problematic region to heal. The three open methods described are appealing to surgeons as they are technically straightforward and have low rates of early wound complications. Most wounds heal over 2 to 4 months; however, a significant minority do not heal, necessitating prolonged wound care and additional surgery. In those that do heal, long-term recurrence remains a real possibility. Excision with off-midline closure avoids the financial and social cost of prolonged wound care and revision surgery, both of which are common sequelae of open management.

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Compliance with ethical guidelines

Conflict of interest A. P. Wysocki routinely performs the Anderson modified Karydakis flap for primary and recurrent pilonidal disease. A. P. Wysocki was a sponsored speaker at the Acelity™ Asia Wound Forum in 2018. Acelity™ is a manufacturer of negative-pressure wound therapy devices.

This article does not contain any studies with human participants or animals performed by any of the authors.

References

1. Wysocki AP (2018) Flaps for pilonidal sinus disease. Turkiye Klin J Gen Surg-special Top 11(2):124–129
2. Doll D et al (2015) Recurrence-free survival, but not surgical therapy per se, determines 583 patients' long-term satisfaction following primary pilonidal sinus surgery. Int J Colorectal Dis 30(5):605–611
3. McCallum I, King PM, Bruce J (2009) Healing by primary versus secondary intention after surgical treatment for pilonidal sinus. Cochrane Database Syst Rev 4:CD6213
4. Enriquez-Navascues JM et al (2014) Meta-analysis of randomized controlled trials comparing different techniques with primary closure for chronic pilonidal sinus. Tech Coloproctol 18(10):863–872
5. Petersen S et al (2009) Long-term effects of postoperative razor epilation in pilonidal sinus disease. Dis Colon Rectum 52(1):131–134
6. Bascom J, Bascom T (2002) Failed pilonidal surgery: new paradigm and new operation leading to cures. Arch Surg 137(10):1146–1150 (discussion 1151)
7. Barnett LA (1944) Pilonidal cyst: the postoperative problem. Am J Surg 64:338–345
8. Iesalnieks I et al (2016) German national guideline on the management of pilonidal disease. Langenbecks Arch Surg 401(5):599–609
9. Jain V, Jain A (2012) Use of lasers for the management of refractory cases of hidradenitis suppurativa and pilonidal sinus. J Cutan Aesthet Surg 5(3):190–192
10. Yildirim D et al (2010) Combined single step definitive treatment in acute pilonidal sinus abscess. J Surg Sci 1:24–26
11. Sasse KC et al (2013) Accelerated healing of complex open pilonidal wounds using MatriStem extracellular matrix xenograft: nine cases. J Surg Case Rep 2013(4):rjt025. https://doi.org/10.1093/jscr/rjt025
12. Stauffer VK et al (2018) Common surgical procedures in pilonidal sinus disease: a meta-analysis, merged data analysis, and comprehensive study on recurrence. Nature Sci Rep 8(1):1–27
13. Abramson DJ (1957) Modified marsupialization operation for pilonidal sinus; an ambulatory treatment using lidocaine as a local anesthesia. U S Armed Forces Med J 8(4):513–518
14. Garg P, Menon GR, Gupta V (2016) Laying open (deroofing) and curettage of sinus as treatment of pilonidal disease: a systematic review and meta-analysis. Anz J Surg 86(1):27–33
15. Tavangari FR et al (2017) Outcomes of unroofing with limited excision and structured postoperative care for Pilonidal disease. Am Surg 83(10):1045–1049
16. Shirah BH, Shirah HA (2017) Effect of surgical wound care methods of the lay open technique on the outcome of chronic sacrococcygeal pilonidal sinus management. Wound Med 16:1–6
17. Gidwani AL et al (2010) Incise and lay open: an effective procedure for coccygeal pilonidal sinus disease. Ir J Med Sci 179(2):207–210
18. Buie LA (1937) Practical Proctology. W. B. Saunders Co. Ltd, Philadelphia
19. Neumeister CA (1963) A modification of the marsupialization operation for pilonidal disease. South Med J 56:730–732
20. Karakayali F et al (2009) Unroofing and marsupialization vs. rhomboid excision and Limberg flap in pilonidal disease: a prospective, randomized, clinical trial. Dis Colon Rectum 52(3):496–502
21. Abramson DJ (1960) A simple marsupialization technic for treatment of pilonidal sinus: long-term follow up. Ann Surg 151:261–267
22. Oncel M et al (2002) Excision and marsupialization versus sinus excision for the treatment of limited chronic pilonidal disease: a prospective, randomized trial. Tech Coloproctol 6(3):165–169
23. Rouch JD et al (2016) Short- and long-term results of unroofing and marsupialization for adolescent pilonidal disease. Jama Surg 151(9):877–879
24. Rogers H, Dwight RW (1938) Pilonidal sinus: observations on one hundred forty cases treated by cautery excision. Ann Surg 107(3):400–418
25. Marks J et al (1985) Pilonidal sinus excision—healing by open granulation. Br J Surg 72(8):637–640
26. KCI (2013) Science behind the therapy—wound healing begins at the cellular level. https://www.kci-medical.ie/IE-ENG/sciencebehindthetherapy. Accessed 22 Aug 2018
27. Biter LU et al (2014) The use of negative-pressure wound therapy in pilonidal sinus disease: a randomized controlled trial comparing negative-pressure wound therapy versus standard open wound care after surgical excision. Dis Colon Rectum 57(12):1406–1411
28. Abou Ashour H, Abelshahid M (2015) Outcome of karydakis lateral flap versus open technique in the treatment of pilonidal sinus. Egypt J Surg 34(4):251–257
29. Hosseini M, Heidari A, Jafarnejad B (2013) Comparison of three surgical methods in treatment of patients with pilonidal sinus: modified excision and repair/wide excision/wide excision and flap in RASOUL, OMID and SADR hospitals (2004–2007). Indian J Surg 75(5):395–400
30. Varnalidis I et al (2014) Pilonidal sinus: a comparative study of treatment methods. J Med Life 7(1):27–30
31. Gendy AS et al (2011) A comparison of the cleft lift procedure vs wide excision and packing for the treatment of pilonidal disease in adolescents. J Pediatr Surg 46(6):1256–1259
32. Dunphy JE, Matson DD (1942) The treatment of Pilonidal sinus. Surg Gynecol Obstet 75:737
33. Yoldas T et al (2013) Recurrent pilonidal sinus: lay open or flap closure, does it differ? Int Surg 98(4):319–323
34. Doll D et al (2013) Incision and drainage preceding definite surgery achieves lower 20-year long-term recurrence rate in 583 primary pilonidal sinus surgery patients. J Dtsch Dermatol Ges 11(1):60–64