

# Minimally Invasive Surgical Technique for Pilonidal Sinus Disease: Bridge and Core Procedure

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## Abstract

**Objectives:** This study examined the outcomes of the Bridge-and-Core procedure, a novel surgical approach for Pilonidal sinus disease (PSD). PSD is a chronic inflammatory condition that predominantly affects the sacrococcygeal region, with various reported surgical techniques.

**Methods:** This retrospective study included all patients who underwent the procedure at our institution between November 2015 and October 2023. Data were collected on patient demographics, presenting complaints, duration of symptoms, surgical details, hospital stay duration, time to independent ambulation, post-operative complications, and recurrence. Follow-up was conducted through physical and/or telephone interviews to assess outcomes.

**Results:** Fourteen patients (10 males, 4 females; mean age: 19.2, range 13-26 years) underwent the Bridge-and-Core procedure. Pain and discharge were the most frequent symptoms (n =9). All patients achieved independent ambulation on the first postoperative day, and the hospital stay ranged from 1 to 2 days. Follow-up was achieved with all 14 patients (mean follow-up: 57 months; range: 1-98 months). The mean time to return to work was 46 days. Wound infection was reported in two patients (14.3%), and recurrence was observed in two patients (14.3%).

**Conclusion:** The Bridge-and-Core procedure appears to be a feasible and well-tolerated option for the surgical management of PSD, with favorable early outcomes.. However, larger long-term studies are required to assess recurrence, and future studies should focus on optimizing the surgical technique and defining patient selection criteria to further improve outcomes compared with established approaches.

**Keywords:** Pilonidal sinus disease, surgical technique, Bridge-and-Core, minimally invasive surgery, pilonidal sinus excision

## Introduction

Pilonidal sinus disease is a chronic condition that is predominantly localized in the sacrococcygeal region, typically presenting as an abscess or sinus tract containing hair.<sup>1,2</sup> It is theorized that pilonidal disease is an acquired disease that occurs due to hair deposition in the sinus tract, provoking inflammation and granuloma formation.<sup>3,4,5</sup> Although PSD most commonly affects adolescents and young adults, particularly males, its epidemiology is well established, and it remains a significant clinical and socioeconomic burden.<sup>5,6</sup>

PSD management can be broadly classified into non-operative and operative interventions. Historically, excision with secondary healing or flap reconstruction has been widely practiced, but recurrence and prolonged wound care remain significant challenges.<sup>6</sup> Recent surgical trends have shifted toward minimally invasive, tissue-sparing approaches designed to reduce postoperative pain, hospital stays, and recurrence rates.

Systematic reviews and meta-analyses have evaluated modern techniques such as endoscopic pilonidal sinus treatment (EPSiT/VAAPS) and laser ablation, reporting recurrence rates of 2%-8% and faster return to normal activities compared with traditional excision.<sup>7-9</sup> These methods share the common goal of minimizing tissue disruption while achieving complete sinus removal.

In this context, the Bridge-and-Core procedure was developed as a simple, minimally invasive technique that preserves healthy skin and subcutaneous tissue while only removing the diseased pilonidal sinus tract, facilitates rapid recovery, and aims to lower recurrence risk. This study presents its outcomes and compares them with existing evidence on minimally invasive approaches.<sup>1</sup>

## Methods

This retrospective descriptive study evaluated the outcomes of the Bridge-and-Core procedure for pilonidal sinus disease (PSD). All patients diagnosed with PSD who underwent the procedure between November 2015 and October 2023 were included. Both primary and recurrent PSD cases were included. Patients presenting with acute pilonidal abscesses and those operated on with other techniques were excluded from this study. After obtaining ethical approval, electronic medical records were reviewed to collect data on patient demographics (age and sex), medical comorbidities, presenting symptoms, symptom duration, surgery details (date), hospital stay duration, time to independent ambulation (without assistive devices), and post-operative complications.

To ensure a thorough assessment of patient recovery and outcomes, telephone interviews were conducted with patients who had not had a recent in-person visit. After obtaining informed consent for participation, the interview addressed the following: the return-to-work timeline; the presence of any post-operative complaints, such as prolonged post-operative pain or wound discharge; functional limitations experienced by the patients; and potential recurrence, specifically focusing on the reappearance of symptoms or signs suggestive of PSD.

The primary outcome was the recurrence rate following the Bridge-and-Core procedure. Secondary outcomes included hospital stay duration, time to independent ambulation (without assistance), time to return to work, and incidence of post-operative complications.

Recurrence was defined as the reappearance of clinical signs or symptoms suggestive of PSD, including sinus formation, discharge, or abscess, at or near the original surgical site. Recurrence was confirmed through physical examination and, when necessary, imaging or surgical intervention.

Cases with incomplete or missing data (e.g., unrecorded symptom duration or unconfirmed return-to-work times) were documented as "not available" (N/A) and excluded from mean or percentage-based calculations.

All Bridge-and-Core procedures were performed by a single experienced surgeon who developed this technique. While a formal assessment of the learning curve was not conducted, all steps were standardized and consistently applied across patients. Intraoperative complications, including bleeding, injury to surrounding tissue, or anesthesia-related events, were monitored and recorded; none occurred in this series of cases.

### *Technique for single or two adjacent pits/sinus openings*

The procedure was performed with the patient in the prone position under general anesthesia, with the buttocks taped apart to expose the natal cleft. Following skin disinfection, methylene blue was injected via a plastic cannula into the sinus opening. An elliptical incision was made around the sinus opening, and the incision was deepened into

the subcutaneous tissue with diathermy while holding the sinus tract with Allis forceps. The sinus tract was carefully dissected circumferentially, avoiding unnecessary dissection of the normal subcutaneous tissue (Figure 1).

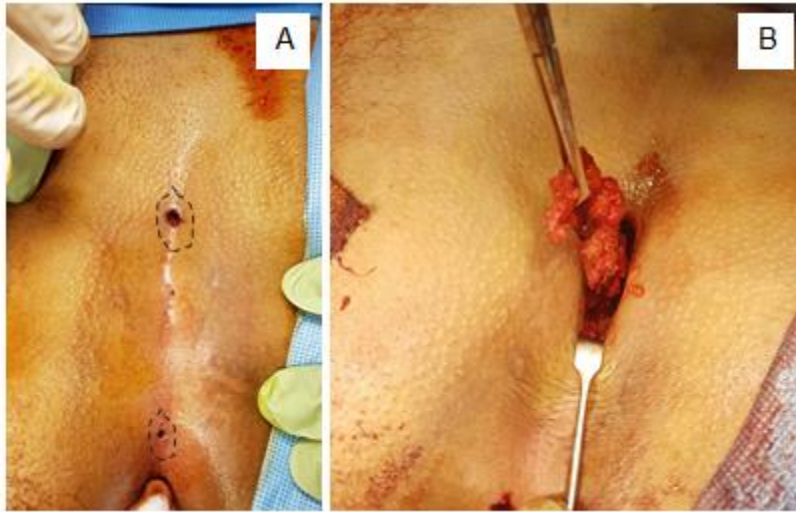


**Figure 1:** dissection of a single opening sinus tract.

Dissection continued through the subcutaneous tissue until the sacral fascia was reached. The pilonidal sinus tract was carefully excised from the sacral attachment to ensure complete removal. The technique preserves a bridge of healthy skin between pits and minimizes subcutaneous tissue dissection while ensuring complete removal of the sinus tract. Hemostasis was achieved to reduce post-operative bleeding. Following this, wound closure was performed by either primary closure or, as in all patients in this study, by secondary intention; the wound was thoroughly irrigated with sterile saline, packed with ribbon or plain gauze, and covered with a pressure dressing for 24 h.

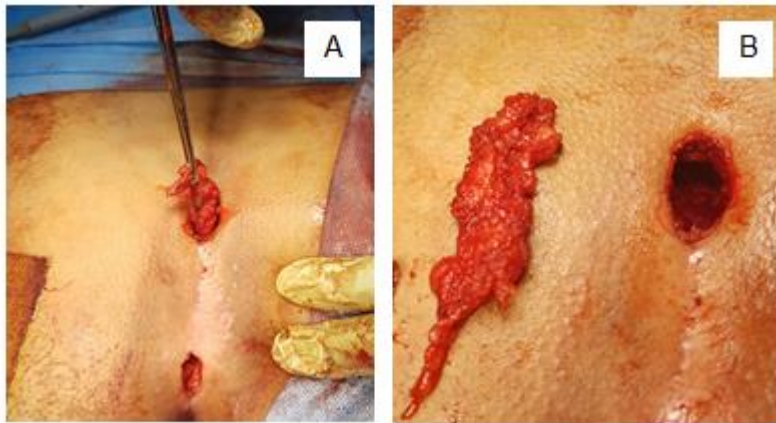
### ***Technique for multiple midline pits involving the whole natal cleft***

Methylene blue was injected to delineate the sinus tracts. Elliptical incisions were then made around the topmost and bottommost pits of the sinus, carefully preserving the bridge of healthy skin between the two. Using diathermy, the tract surrounding the topmost sinus was dissected while held with Allis forceps (Figure 2).



**Figure 2:** (A) after methylene blue is injected via a plastic cannula into the sinus opening. Then an elliptical incision is made around the topmost and lowest sinus openings. (B) The incision is deepened into the subcutaneous tissue with diathermy while holding the sinus tract with Allis forceps.

Dissection continues along the tract, minimizing the unnecessary removal of healthy tissue. To create a tunnel beneath the bridge flap and reduce the wound size, the tract was separated from the overlying skin by blunt and sharp dissection (Figure 3A). Then, the dissection around the bottommost sinus opening was carried out to complete the coring of the sinus tract. After which, the tract was dissected from its sacral attachment and removed through the lower wound created around the lowest pit (Figure 3B). Once the tract is fully removed, hemostasis is achieved. While the lower wound can be closed primarily, the upper wound is typically left open to allow drainage of any fluid and promote healing by secondary intention. For optimal outcomes, both wounds may be left open and packed with ribbons or plain gauze for 24 h, followed by daily wound dressing with close monitoring and patient education on proper wound care practices.

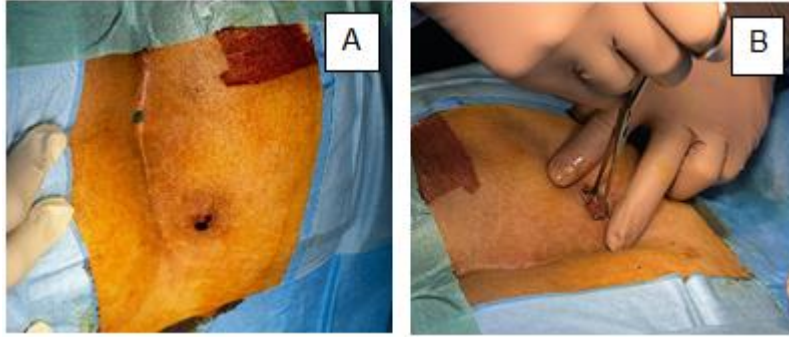


**Figure 3:**(A) dissection continues alongside the tract, while maintaining the skin bridge. (B) The tract is removed after detachment from the sacral fascia.

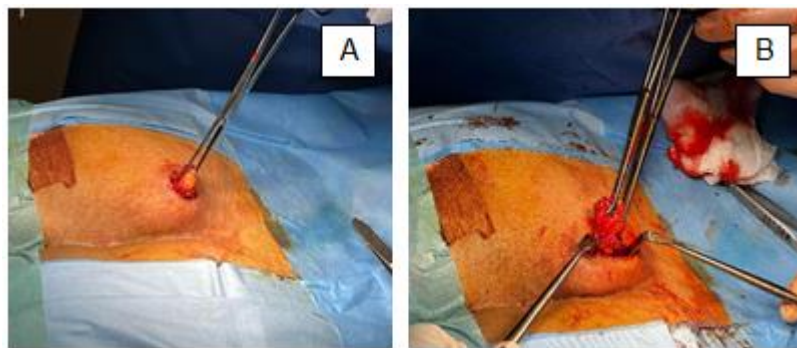
### ***Technique for two communicating sinus openings with a wide skin bridge***

For cases with two communicating sinus openings separated by a wide skin bridge, including instances in which one opening was lateral (not midline), the following technique was employed (Figures 4–7). An elliptical incision was first made around the upper sinus opening (Figure 4B), and the sinus tract was carefully held and stabilized with

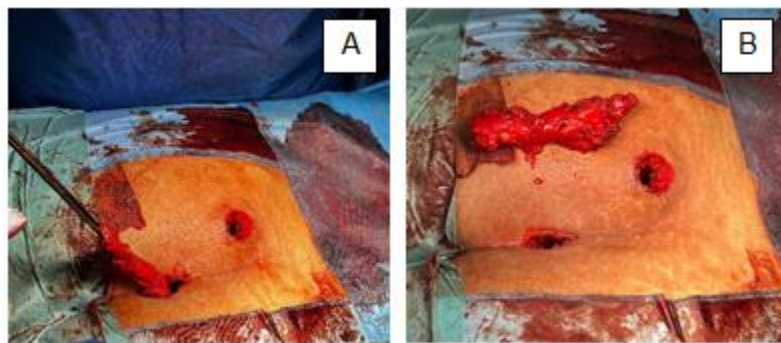
Allis forceps and dissected circumferentially using blunt, sharp, and diathermy techniques (Figure 5). A second elliptical incision was created around the lower sinus opening to complete the coring of the entire tract while minimizing dissection of surrounding normal subcutaneous tissue (Figure 6A). The entire sinus tract was then delivered through the lower incision, preserving the skin bridge between the two openings (Figure 6B). Finally, a suction drain was placed, and the wound cavity was closed using vertical mattress sutures (Figure 7).



**Figure 4:** (A) Pilonidal sinus with two communicating openings and a wide intervening skin bridge. (B) An elliptical incision was made around the upper lateral sinus.



**Figure 5:** (A) Sinus tract held with Allis forceps. (B) Tract dissected circumferentially using blunt, sharp, and diathermy techniques.



**Figure 6:** (A) Elliptical incision around the lower midline sinus to complete coring with minimal dissection of normal subcutaneous tissue. (B) Complete sinus tract delivered through the lower incision, preserving the skin bridge between the two sinus openings.





**Figure 7:** Suction drain placed and wound cavity closed with vertical mattress sutures.

### ***Post-operative care***

Post-operative management focused on wound healing and the prevention of complications. Patients were advised to minimize pressure on the wound while sitting, traveling, and sleeping, using specialized cushions or adopting positions that reduce stress on the healing area. Driving was discouraged until complete healing. Daily sitz baths are recommended, along with regular wound dressing changes, until the area is completely healed, while maintaining strict local hygiene. After the wound has healed, permanent hair removal from the affected area is recommended, such as laser hair removal, to reduce the chance of future pilonidal sinus recurrence. Finally, weight management may be advised, as maintaining a healthy weight can further reduce pressure on the surgical site and contribute to optimal healing.

### **Results**

The study population consisted of 14 patients, primarily young adults, with a mean age of 19.2 years (range 13-26 years) and a male predominance (10 males, 4 females). Pain and discharge were the most frequent presenting complaints, reported by nine patients. The average duration of symptoms prior to surgery was 131.6 days (range, 3 days -2 years). These findings are summarized in Table 1.

**Table 1:** case summary.

| Case | Age | Sex | Comorbidities  | Presenting symptoms | Symptom duration (days) | Surgery year | Hospital Stay (days) | Ambulating with no assistive device (Days) | Return to work/school/college (Days) | Post op complications | Recurrence (Yes/ No) | Last follow up (Months) |
|------|-----|-----|----------------|---------------------|-------------------------|--------------|----------------------|--------------------------------------------|--------------------------------------|-----------------------|----------------------|-------------------------|
| 1    | 20  | f   | nil            | Pain and discharge  | 14                      | 2022         | 2                    | 1                                          | 21                                   | nil                   | no                   | 18                      |
| 2    | 25  | m   | nil            | Pain and discharge  | 365                     | 2015         | 2                    | 1                                          | 30                                   | nil                   | no                   | 98                      |
| 3    | 22  | m   | nil            | Pain and discharge  | 14                      | 2017         | 1                    | 1                                          | 45                                   | recurrence            | yes                  | 77                      |
| 4    | 26  | m   | nil            | Pain and discharge  | 30                      | 2023         | 1                    | 1                                          | 36                                   | nil                   | no                   | 11                      |
| 5    | 19  | m   | nil            | Pain and discharge  | 90                      | 2016         | 1                    | 1                                          | 45                                   | wound infection       | no                   | 97                      |
| 6    | 21  | f   | nil            | Pain and swelling   | 120                     | 2016         | 1                    | 1                                          | 52                                   | nil                   | no                   | 91                      |
| 7    | 25  | m   | nil            | Pain and swelling   | 180                     | 2016         | 1                    | 1                                          | 30                                   | nil                   | no                   | 88                      |
| 8    | 13  | f   | nil            | Pain and swelling   | 150                     | 2018         | 1                    | 1                                          | N/A                                  | nil                   | no                   | 66                      |
| 9    | 22  | m   | nil            | Pain and swelling   | 5                       | 2018         | 1                    | 1                                          | 28                                   | nil                   | no                   | 63                      |
| 10   | 15  | f   | hypothyroidism | Pain and discharge  | 120                     | 2019         | 1                    | 1                                          | 14                                   | recurrence            | yes                  | 56                      |
| 11   | 16  | m   | hypertension   | Pain and discharge  | 730                     | 2019         | 1                    | 1                                          | 18                                   | nil                   | no                   | 54                      |
| 12   | 14  | m   | nil            | Pain and discharge  | N/A                     | 2019         | 1                    | 1                                          | 14                                   | nil                   | no                   | 1*                      |
| 13   | 14  | m   | nil            | Pain and swelling   | 3                       | 2023         | 1                    | 1                                          | 213                                  | wound infection, pain | no                   | 9                       |
| 14   | 17  | m   | G6PD           | Pain and discharge  | 21                      | 2023         | 1                    | 1                                          | 52                                   | nil                   | no                   | 5                       |

*\*latest physical followup was one month after surgery, patient was unreachable for telephone interview. N/A: data not available or not recalled by the patient at follow-up. Missing data were excluded from mean calculations.*

Furthermore, all patients achieved independent ambulation within the first post-operative day. The hospital stay was short, lasting 1 to 2 days. Follow-up was achieved for all patients, with a mean duration of 53 months (range, 1–98 months). The mean time to return to work was 46 days (approximately six weeks).

Post-operative complications were observed in a minority of patients. Two patients (14.3%) developed wound infections, and recurrence of pilonidal sinus disease was reported in 2 patients (14.3%) during the follow-up period.

## Discussion

This study explored the outcomes of Bridge-and-Core procedures, a novel surgical technique for pilonidal sinus disease (PSD). The optimal surgical approach for PSD remains undefined, with no single technique universally accepted as the "gold standard." This likely stems from variations in the surgeon's experience and the specific characteristics of each patient's condition.<sup>10</sup> However, several key principles guide the search for the ideal PSD treatment: a minimally invasive, low-morbidity technique that facilitates rapid recovery. Additionally, an ideal approach should minimize the risk of post-operative complications and achieve low recurrence rates to ensure long-term patient well-being.

The Bridge-and-Core procedure offers a distinct approach to PSD management by preserving a bridge of healthy skin between sinus openings, minimizing tissue excision while ensuring complete removal of the sinus tract. This contrasts with flap-based procedures such as the Bascom cleft lift and Karydakis flap, which involve dissection and excision of the wide part of normal skin and subcutaneous tissue, along with lateral tissue mobilization to close the surgical defect, resulting in a large-sized wound, and endoscopic methods (e.g., EPSiT), which involve cleaning, curettage, or obliteration of the sinus tract without removing it. Furthermore, EPSiT requires specialized training and equipment.<sup>11-13</sup>

We compared the Bridge-and-Core technique to other techniques used at our institute, such as wide excision and open secondary healing. The Bridge-and-Core procedure presents potential benefits, including limited dissection, preservation of healthy tissue, smaller wound size, and shorter healing time. These factors likely contributed to the mean return-to-work period of approximately 6 weeks, compared to the 8-10 weeks typically reported for conventional wide excision and open secondary healing techniques.<sup>14</sup> A shorter healing time correlates with lower direct and indirect costs associated with inpatient care, follow-up wound care, and days lost to work.<sup>14</sup>

Furthermore, all patients in our study achieved independent ambulation on the first postoperative day. This rapid return to mobility is crucial for post-operative recovery and for returning to daily activities, thereby reducing immobility-related post-operative complications.<sup>15</sup>

Similar findings have been reported by Mohamed et al., who compared wide excision with minimal excision and secondary healing.<sup>16</sup> Their Study demonstrated reduced blood loss, earlier discharge (day one post-operatively), less post-operative pain, and a low recurrence rate (less than 5%) with an average follow-up of 4.7 years. These results align with our findings, suggesting the potential advantages of minimally invasive approaches for PSD.

The Bridge-and-Core procedure shares several conceptual principles with contemporary minimally invasive techniques. While technically distinct —being an open, limited excision rather than an endoscopic or laser-based technique —it similarly emphasizes preservation of healthy tissue, limited dissection, and faster postoperative recovery. In our cohort, recurrence occurred in 14.3% of patients, higher than the 2–8% typically reported for endoscopic or laser-based approaches in primary disease.<sup>9,17-20</sup> However, the procedure demonstrated practical benefits, including small wound size, rapid return to ambulation, and minimal hospitalization. Notably, both patients with recurrence had comorbidities (atopic dermatitis and hypothyroidism), which may have adversely affected wound healing and predisposed them to recurrence. This suggests potential utility as a less invasive alternative to wide excision, especially for primary disease.



(21)Two of the 14 patients (14.3%) developed wound infections after surgery that resolved with conservative treatment.<sup>22</sup>This infection rate is within the variable ranges reported for pilonidal surgery; prior systematic reviews and merged-data analyses show that surgical-site infection rates differ by technique and follow-up duration and are reported across a broad range (1.8–22%).<sup>21,22</sup> Several studies have emphasized the importance of<sup>23,24</sup> meticulous postoperative hygiene, weight management, and smoking cessation for wound healing<sup>23,24</sup>

In summary, the Bridge-and-Core procedure represents a practical, low-cost, and easily reproducible alternative among minimally invasive PSD techniques. It offers promising outcomes in terms of reduced wound size and increased patient satisfaction. Future studies could directly compare the Bridge-and-Core technique with other approaches used at our center, such as wide excision and open secondary healing, to better evaluate relative efficacy, recovery time, and complication rates. Larger prospective studies with longer follow-up and comparative analyses are warranted to confirm long-term efficacy, identify predictors of recurrence, and refine patient selection criteria.

This study has several significant limitations. First, the sample size was small (n=14), limiting the statistical power and the generalizability of the findings, and definitive conclusions regarding long-term recurrence and complication rates cannot be made. Second, the study is a single-center, retrospective design, which introduces potential selection and information biases and limits external validity. Third, the follow-up period, although informative, was heterogeneous, ranging from 1 to 98 months, which may affect the assessment of recurrence and long-term outcomes. Fourth, there was no control group or direct comparison with established surgical techniques, preventing evaluation of superiority. Fifth, outcomes were primarily assessed through clinical evaluation and patient-reported measures, without standardized validated outcome tools (e.g., pain scores or quality-of-life indices). Sixth, all procedures were performed by a single surgeon, which may affect reproducibility and does not account for a learning curve in other practitioners. Finally, some variables were unavailable for a small subset of patients due to incomplete documentation or recall bias during follow-up. Although minimal, this limitation may have slightly influenced the precision of descriptive statistics. These factors prevent definitive conclusions regarding the efficacy and durability of the Bridge-and-Core procedure.

## Conclusion

The Bridge-and-Core procedure appears to be a safe and well-tolerated surgical option for pilonidal sinus disease, offering benefits such as a smaller wound size, a shorter hospital stay, and a rapid return to ambulation. While initial outcomes are promising, the small sample size, retrospective style, and lack of a control group limit the conclusions. Future prospective studies involving larger patient cohorts and surgeons trained in this technique are needed to validate its outcomes, refine technical aspects, and better define its role among current surgical options for pilonidal sinus disease.

## Disclosure

The authors have declared that no competing interests exist.

## References

1. Khanna A, Rombeau J. Pilonidal Disease. *Clin Colon Rectal Surg*. 2011 Mar 23;24(01):046–53.
2. Mutaf M, Temel M, Koç MN. A New Surgical Technique for Closure of Pilonidal Sinus Defects: Triangular Closure Technique. *Med Sci Monit* 2017 Feb;23:1033-1042.
3. Karydakos GE. EASY AND SUCCESSFUL TREATMENT OF PILONIDAL SINUS AFTER EXPLANATION OF ITS CAUSATIVE PROCESS. *Aust N Z J Surg* 1992 May;62(5):385-389.
4. Nixon AT, Garza RF. In: StatPearls [internet]. 2023 [cited 2024 Mar 24]. Pilonidal Cyst and Sinus. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK557770/>
5. Harlak A, Menten O, Kilic S, Coskun K, Duman K, Yilmaz F. Sacrococcygeal pilonidal disease: analysis of previously proposed risk factors. *Clinics (Sao Paulo)* 2010 Feb;65(2):125-131.

6. Mahmood F, Hussain A, Akingboye A. Pilonidal sinus disease: Review of current practice and prospects for endoscopic treatment. *Ann Med Surg (Lond)* 2020 Sep;57:212-217.
7. Foti N, Passannanti D, Libia A, Campanile FC. A minimally invasive approach to pilonidal disease with endoscopic pilonidal sinus treatment (EPSiT): a single-center case series with long-term results. *Tech Coloproctol* 2021 Sep;25(9):1045-1054.
8. AGNESI S, VIRGILIO F, CANDILORO FS, BIUNDO L, BALLA A. Endoscopic pilonidal sinus treatment versus excision with wound closure: a systematic review of the literature. *Minerva Surg* 2025 Jul;80(4).
9. Romic I, Augustin G, Bogdanic B, Bruketa T, Moric T. Laser treatment of pilonidal disease: a systematic review. *Lasers Med Sci* 2022 Mar;37(2):723-732.
10. Dandin O, Tihan D, Karakas DO, Hazer B, Balta AZ, Aydin OU. A new surgical approach for pilonidal sinus disease: "de-epithelialization technique". *Turk J Surg* 2018 May.
11. Parente G, Ruspi F, Thomas E, Di Mitri M, Cravano SM, D'Antonio S, et al. Endoscopic Pilonidal Sinus Treatment: Preliminary Results, Learning Curve and Comparison with Standard Open Approach. *Children (Basel)* 2023 Jun;10(6):1063.
12. Kumar NA, Sutradhar P. Karydak procedure for sacrococcygeal pilonidal sinus disease: Our experience. *Indian J Plast Surg* 2014 Sep;47(03):402-406.
13. Immerman SC. The Bascom Cleft Lift as a Solution for All Presentations of Pilonidal Disease. *Cureus* 2021 Feb.
14. Mahmood F, Hussain A, Akingboye A. Pilonidal sinus disease: Review of current practice and prospects for endoscopic treatment. *Ann Med Surg (Lond)* 2020 Sep;57:212-217.
15. Tazreean R, Nelson G, Twomey R. Early mobilization in enhanced recovery after surgery pathways: current evidence and recent advancements. *J Comp Eff Res* 2022 Feb;11(2):121-129.
16. Mohamed HA, Kadry I, Adly S. Comparison between three therapeutic modalities for non-complicated pilonidal sinus disease. *Surgeon* 2005 Apr;3(2):73-77.
17. Tien T, Athem R, Arulampalam T. Outcomes of endoscopic pilonidal sinus treatment (EPSiT): a systematic review. *Tech Coloproctol* 2018 May;22(5):325-331.
18. Karita K, Adalia L, Tuija P, Jukka H, Kethe H. Long-term follow-up of pilonidal sinus disease treated by radial laser surgery. *Langenbecks Arch Surg* 2024 Aug;409(1):260.
19. Xie C, Zeng R, Yu X. Efficacy of Laser Treatment in Pilonidal Disease: A Single-Arm Meta-Analysis. *Photobiomodul Photomed Laser Surg* 2024 May;42(5):375-382.
20. Chen S, Dai G, Liu P, Zhao X, Zhang J, Yang C, et al. Comparative analysis on the effect of the endoscopic versus conventional treatment for pilonidal sinus: A meta-analysis of controlled clinical trials. *Medicine (Baltimore)* 2022 Nov;101(45):e31767.
21. Stauffer VK, Luedi MM, Kauf P, Schmid M, Diekmann M, Wieferich K, et al. Common surgical procedures in pilonidal sinus disease: A meta-analysis, merged data analysis, and comprehensive study on recurrence. *Sci Rep* 2018 Feb;8(1):3058.
22. McCallum IJ, King PM, Bruce J. Healing by primary closure versus open healing after surgery for pilonidal sinus: systematic review and meta-analysis. *BMJ* 2008 Apr;336(7649):868-871.
23. Dupuis A, Christou N, Teterycz D, Balaphas A, Robert-Yap J, Zufferey G, et al. Sacro-coxxygial hygiene, a key factor in the outcome of pilonidal sinus surgical treatment? *BMC Surg* 2021 Dec;21(1):197.
24. Popeskou S, Christoforidis D, Ruffieux C, Demartines N. Wound Infection After Excision and Primary Midline Closure for Pilonidal Disease: Risk Factor Analysis to Improve Patient Selection. *World J Surg* 2011 Jan;35(1):206-211.