

A Comparative Study of Limberg Flap and Karydakias Flap in the Management of Chronic Sacrococcygeal Pilonidal Sinus Disease

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Abstract

Background: Sacrococcygeal pilonidal sinus disease (SPSD) is a common condition among young adults, often causing pain, discharge, and recurrent infections. Limberg flap technique (LFT) and Karydakias flap technique (KFT) are widely used, but comparative outcomes remain variable. The aim is to compare the efficacy and outcomes of KFT and LFT in the surgical management of chronic sacrococcygeal pilonidal sinus disease. **Material and Methods:** This prospective observational study included 50 patients with clinically diagnosed SPSP, divided equally into KFT (Group A, n=25) and LFT (Group B, n=25). Operative time, intraoperative blood loss, drain requirement, postoperative pain (VAS on postoperative days 1, 3 and 5), hospital stay, first mobilization, painless toilet seating, wound healing, complications and patient satisfaction were assessed. **Results:** KFT had significantly shorter operative time (42.08 ± 5.36 vs. 48.60 ± 4.97 min; $p < 0.0001$) and lower intraoperative blood loss (32.16 ± 8.40 vs. 41.40 ± 7.90 mL; $p < 0.0001$). Drain requirement was lower with KFT (26.1% vs. 73.9%; $p = 0.002$). VAS pain scores were lower with KFT on postoperative days 1, 3 and 5 ($p \leq 0.002$). KFT was associated with earlier mobilization (13.28 ± 2.70 vs. 16.68 ± 5.34 h; $p = 0.007$), shorter hospital stay (3.92 ± 0.76 vs. 4.72 ± 1.02 days; $p = 0.003$), faster wound healing (15.56 ± 3.86 vs. 19.96 ± 2.67 days; $p < 0.0001$), and higher patient satisfaction (8.10 ± 0.70 vs. 7.50 ± 0.80 ; $p = 0.006$). Postoperative complication rates were not significantly different ($p = 0.564$). **Conclusion:** Both techniques were effective. KFT demonstrated advantages in operative efficiency, blood loss, postoperative pain, mobilization, hospital stay, wound healing and patient satisfaction, and may be preferred in selected patients.

Keywords: Pilonidal sinus; Limberg flap; Karydakias flap; postoperative outcome; recurrence; wound healing; flap surgery.

Received: 22 July 2026

Revised: 05 August 2026

Accepted: 20 August 2026

Published: 11 September 2026

INTRODUCTION

Sacroccoccygeal pilonidal sinus disease (SPSD) is a prevalent and complex ailment primarily impacting young individuals. It can cause chronic pain, recurrent infection, offensive discharge and abscess formation, with a substantial impact on quality of life and daily activities.^[1,2]

The condition is now generally regarded as an acquired disease related to hair penetration, friction and inflammation within the natal cleft. Risk factors described in the study literature include male sex, overweight, family history, prolonged sitting, excessive body hair and a deep natal cleft. For chronic or recurrent disease, flap-based procedures aim to remove diseased tissue, flatten the natal cleft and move the suture line away from the midline. Karydakias and Limberg flaps are established off-midline techniques. The Karydakias procedure uses an asymmetric excision and lateral advancement of tissue, whereas the Limberg flap uses a rhomboid excision and transposition flap.^[3-6]

Previous comparative studies and meta-analyses have reported broadly similar recurrence rates but variable results for operative time, wound complications, healing and patient-reported outcomes. Stauffer et al. reported recurrence rates of 1.5% for Karydakias and 1.8% for Limberg flaps, while Sahebally et al. found no major overall difference in

complications.^[7-12]

The present study was undertaken to compare KFT and LFT with respect to operative parameters, postoperative pain, recovery, wound healing, complications and patient satisfaction.^[13]

Aim

To analyse the Karydakias flap technique (KFT) in relation to the Limberg flap method (LFT) utilised in the surgical intervention for sacrococcygeal pilonidal sinus illness.

MATERIALS AND METHODS

Study design: The present study was a prospective observational study.

Study setting: Sacrococcygeal pilonidal sinus cases attending the General Surgery outpatient department and ward, Department

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DOI:
10.21276/amit.2026.v13.i3.1024

How to cite this article: Kirubakaran R, Jeeva N, Ayyappan P, Karthikeyan N, Ramkumar B. A Comparative Study of Limberg Flap and Karydakias Flap in the Management of Chronic Sacrococcygeal Pilonidal Sinus Disease. Acta Med Int. 2026;13(3):84-87.

of General Surgery, Govt Mohan Kumaramangalam Medical College and Hospital, Salem.

Study duration: July 2022 to June 2024.

Sample size: 50 patients with clinical diagnosis of sacrococcygeal pilonidal sinus; 25 underwent KFT (Group A) and 25 underwent LFT (Group B).

Inclusion criteria: Patients aged over 18 years, with no additional diseases, and BMI 18–30 kg/m².

Exclusion criteria: Recurrent cases, active infectious cases, and patients who could not be followed up after the operation.

Data collection: A pre-designed, pre-tested questionnaire was used. Demographic data, BMI, history, duration of symptoms, examination findings and basic investigations were recorded. Patients were followed until discharge and at periodic intervals. Postoperative pain on days 1, 3 and 5, painless toilet seating, first mobilization, complete wound healing, complications, recurrence and patient satisfaction were assessed.

Ethical considerations: Approval from the institutional

Ethics Committee was secured. Prior to the study, informed consent was secured, confidentiality was upheld, and participation was elective.

Statistical analysis: The analysis of data was conducted utilising IBM SPSS version 21. Continuous variables were represented as mean and standard deviation, whereas categorical variables were denoted as frequency and percentage. The chi-square test was employed for categorical relationships, while the independent t-test was utilised for continuous variables. A P-value of less than 0.05 was deemed statistically significant.

RESULTS

Fifty patients were included, with 25 patients in each group. The mean age of the study population was 41.46 ± 13.12 years; 54% were male and 46% female. Mean BMI was 23.83 ± 3.32 kg/m². The cohorts shown similarity in initial demographic and clinical attributes, encompassing age, gender, BMI, smoking habits, symptom duration, and manifestation.

Table 1: Baseline characteristics of the study groups

Parameter	KFT (n=25)	LFT (n=25)	p-value
Age, mean ± SD (years)	38.32 ± 11.62	44.60 ± 13.98	0.091
BMI, mean ± SD (kg/m ²)	23.92 ± 3.43	23.75 ± 3.27	0.857
Female, n	11	12	0.777
Male, n	14	13	
Smoking, n (%)	5 (20.0)	6 (24.0)	0.733
Duration of symptoms, mean ± SD (months)	2.20 ± 0.76	1.92 ± 0.76	0.200

The KFT cohort saw a markedly reduced surgical duration and less intraoperative haemorrhage compared to the LFT cohort. The KFT group had a markedly reduced drain need.

Table 2: Comparison of operative and postoperative outcomes

Outcome	KFT (n=25)	LFT (n=25)	p-value
Operative time, min	42.08 ± 5.36	48.60 ± 4.97	<0.0001
Blood loss, mL	32.16 ± 8.40	41.40 ± 7.90	<0.0001
Drain required, n (%)	6 (26.1)	17 (73.9)	0.002
First mobilization, h	13.28 ± 2.70	16.68 ± 5.34	0.007
Painless toilet seating, days	6.92 ± 1.15	7.48 ± 1.48	0.141
Hospital stay, days	3.92 ± 0.76	4.72 ± 1.02	0.003
Wound healing, days	15.56 ± 3.86	19.96 ± 2.67	<0.0001
Patient satisfaction (1–10)	8.10 ± 0.70	7.50 ± 0.80	0.006

Table 3: Postoperative pain scores

VAS pain score	KFT (n=25)	LFT (n=25)	p-value
Postoperative day 1	4.56 ± 0.92	5.40 ± 0.87	0.002
Postoperative day 3	3.48 ± 0.96	4.64 ± 0.90	<0.0001
Postoperative day 5	1.96 ± 0.84	2.88 ± 0.73	<0.0001

Table 4: Postoperative complications

Postoperative complication	KFT (n=25)	LFT (n=25)
None	21	17
Secondary infection	1	1
Seroma	2	5
Wound dehiscence	1	2
Overall comparison	p=0.564	

Intraoperative complications were uncommon and did not differ significantly between groups (p=0.836). Postoperative complications were more frequent in the Limberg group, particularly seroma and wound dehiscence, but the overall

difference was not statistically significant (p=0.564).

DISCUSSION

This prospective observational study compared KFT and LFT in

50 patients with chronic sacrococcygeal pilonidal sinus disease. The principal finding was that KFT was associated with better short-term operative and recovery outcomes across several measured parameters, while both techniques remained clinically effective.^[14,15]

The two groups were comparable with respect to baseline characteristics. The mean age was 41.46 years, with most participants in the 26–50-year age group, and the cohort showed a slight male predominance. Mean BMI and symptom duration were also similar between groups, supporting comparison of postoperative outcomes.^[16–18]

KFT required significantly less operative time and was associated with lower intraoperative blood loss. These findings are consistent with the simpler asymmetric excision and flap advancement used in KFT. Previous comparative literature cited in the thesis similarly reports shorter operative duration with KFT.^[19]

Postoperative pain was significantly lower with KFT on days 1, 3 and 5. KFT was also associated with earlier mobilization and shorter hospital stay. Time to painless toilet seating was slightly shorter with KFT but did not reach statistical significance.

Wound healing occurred significantly earlier following KFT. Patient satisfaction was also significantly higher in the KFT group. These findings support the potential benefit of an off-midline closure that is technically straightforward and may facilitate earlier recovery. Nevertheless, previous studies have reported mixed results, emphasizing that outcomes can vary according to patient characteristics, surgical modification and postoperative care.^[20]

Drain requirement was significantly higher in the LFT group. Although seroma and wound dehiscence were more frequent after LFT in the present study, the overall postoperative complication difference was not statistically significant. The available literature likewise suggests that both procedures have acceptable complication profiles, with no consistent overall superiority for recurrence or complications.

Overall, the present findings suggest that KFT may provide advantages in operative efficiency, postoperative pain, mobilization, hospital stay, wound healing and patient satisfaction, while LFT remains an effective off-midline flap procedure.

CONCLUSION

Both Karydakias and Limberg flap techniques were effective for the surgical management of chronic sacrococcygeal pilonidal sinus disease. In this study, KFT demonstrated significantly shorter operative duration, lower blood loss, lower postoperative pain, lower drain requirement, earlier mobilization, shorter hospital stay, faster wound healing and higher patient satisfaction. Postoperative complication rates were comparable. KFT may therefore be preferred in selected patients, particularly when early recovery and patient comfort are priorities.

Limitations: The study was prospective and included a relatively small sample of 50 patients from a single institution. The thesis document does not provide sufficient detail in the manuscript section to quantify recurrence events

by group; therefore, no numerical recurrence comparison is presented here. Larger multicentre studies with longer follow-up would strengthen comparison of recurrence and long-term patient-reported outcomes.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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