

# Surgical Outcome of Limberg's Flap Reconstruction in the Treatment of Pilonidal Sinus Disease in a Community Hospital

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## ABSTRACT

### Background

Pilonidal sinus disease is an acquired condition that commonly arises in the hair follicles of the gluteal cleft with male predominance. Different treatment modalities have been described in the literature ranging from simple incision and drainage, wide local excision to complex plastic flaps.

### Objective

To evaluate the efficacy and outcome of Limberg's flap reconstruction in a community hospital.

### Method

This is a prospective study conducted over two-year duration in forty-two patients in the department of Surgery at Dhulikhel Hospital Kathmandu University Hospital from January 2017 till December 2018.

### Result

Total of 42 patients were operated ranging from 16-31 years with mean of 22.86 years, male to female ratio was 7.5:1, 52% were students and 19% were drivers. Mean operative duration was 61.86±25.3 minutes, length of hospital stay was 2.83±1.68 days, mean duration of drain in situ was 4±1.34 days, mean days for return to work was 14.5±5.7. We had a complication rate of 9.52% out of which 4.76% had seroma, 2.38% hematoma, 2.38% wound infection, and there was no flap necrosis or recurrence.

### Conclusion

It is a simple, easy to learn and safe procedure with good cosmetic results and low recurrence rate. It can be considered as an alternative to other flap and plasty procedures

## KEY WORDS

*Limberg's flap, Flap surgery, Pilonidal, Sinus*

## INTRODUCTION

Sinus is a blind ending tract connecting a cavity to the external surface lined by granulation tissue.<sup>1</sup> Pilonidal sinus is an acquired condition arising from the hair follicles of the gluteal cleft. The ingrowing hair becomes infected and forms into a "sinus" or tract.<sup>2</sup> The term pilonidal sinus, 'pilus' meaning hair and 'nidal' meaning nest, was first used by Hodges in 1880.<sup>3</sup> The mean age of presentation is 21 and 19 years in men and women respectively with estimated incidence of 26 per 100,000, with men to women ratio of 2.2.<sup>4-6</sup> However 82% occurs between 20-29 age group.<sup>1</sup>

Numerous procedures have been described in literature, ranging from simple incision and drainage to complex plastic flaps for cleft obliteration.<sup>7,8</sup> Options may include tract excision with marsupialisation, excision of the whole tract with primary closure or excision of all tracts and the defect closure by some other means like Z-plasty, V-Y plasty, Karydak's procedure, Bascom's and Limberg's flap reconstruction.<sup>1,9</sup> In 1948, the Russian maxillofacial surgeon Alexander A. Limberg described flap-plasty technique to cover rhombus-shaped defect using a paper model. Here, the opposite angles were 60 degree and 120 degrees, and the lengths of all sides were identical. This flap became internationally known and was subsequently referred to as the Limberg flap.<sup>10</sup> This technique combined both complete excision of the disease with rotational flap-based defect closure in single stage which meets the entire requirement for being the ideal procedure.<sup>11,12</sup>

The aim of the study was to report the outcome of Limberg's flap reconstruction in the management of pilonidal sinus with respect to duration of hospital stay, time to return to work, flap necrosis and recurrence. Our secondary objectives were to look for patient's cosmetic satisfaction, operative duration and wound infection.

## METHODS

This hospital based prospective study was conducted in Dhulikhel Hospital, Kathmandu University Hospital, Kavre, Nepal from January 2017 till December 2018. We included 42 patients who presented at Dhulikhel Hospital Surgical OPD, diagnosed to have pilonidal sinus and who underwent Limberg's flap closure. Approval from the IRC taken and informed written consent was taken. Data was collected from surgical registry and findings were recorded and maintained. We used descriptive statistics to summarize patient's characteristics, continuous variables are reported as mean and standard deviation. Categorical variables are summarized as frequencies (%). SPSS, version 20 (IBM Corp., Boston, MA), was used for data analysis.

### Inclusion Criteria

1. Adult patients above 16 years of age with pilonidal disease.

2. Recurrent presentation of pilonidal disease.

3. Patient treated for pilonidal abscess.

### Exclusion Criteria

1. Paediatric age group.
2. Pilonidal abscess.

### Procedure

Under spinal anesthesia, following procedure was conducted as shown in the figures below.



Figure 1. Marking of rhomboid incision with flap



Figure 2. Excision of sinus tract



Figure 3. Raising the flap



Figure 4. Flap rotated to cover the defect



Figure 5. Final closure of the defect with drain in situ

As prophylactic antibiotic single dose of Ampicillin-Cloxacillin was given just before the start of surgery, postoperatively these were continued for three more days. Postoperative analgesics and stool softener was given orally.

### Discharge and Follow-up

All the patients were discharged with drain and were followed up in SOPD on 7<sup>th</sup> postoperative day for wound inspection and on 14<sup>th</sup> day for suture removal. Drain was removed once the drainage was less than 10 ml. During these visits we assessed the wound for infection, flap necrosis, patient's cosmetic satisfaction and also advised to maintain hygiene and remove the hairs over the area by shaving, applying hair removal cream, waxing or laser therapy in order to avoid further recurrence. We also inquired about their time to return to routine daily activities and to work. On 3 months visit they were assessed for recurrence and at 6 months, telephone interview was done for the update and comments were recorded.

### RESULTS

Out of 42 patients, 37 were male and 5 were females. Age ranged from 16-31 years with the mean of 22.86 years as listed in table 1.

**Table 1. Patients' characteristics**

No. of patients	42
Age (mean±SD; range)	22.86 ± 4.58 years (16-31 years)
Sex,	n (%)
Males	37 (88)
Females	5 (12)

Regarding ethnicity 66.66% were Brahmins, 16.66% Chhetris, 12% Newars and 4% Tamangs. Similarly, occupation wise 52% were students, 19% drivers, 12% service holder, 7% shop keeper, 4% teacher and farmer.

**Table 2. Peri-operative parameters**

	Mean ± SD; range
Operative duration	61.86 ± 25.3; 40-160 minutes
Length of hospital stay	2.83 ± 1.68; 1-8 days
Duration of drain placement	4 ± 1.34; 3-7 days
Return to work	14.5 ± 5.7; 5-32 days

Mean operative duration was 61.86±25.3 mins (40-160 minutes) which also included two patients who underwent double Limberg's flap procedure for complex pilonidal sinus disease. Mean length of hospital stay was 2.83±1.68 days (1-8 days) as most of the patients were discharged with drain after proper counseling. Mean duration of drain in situ was 4±1.34 days and mean days for return to work was 14.5±5.7 days (5-32 days).

We had a total complication rate of 9.52% out of which two patients had seroma which was aspirated, one had hematoma for which evacuation was done and one had wound infection who underwent suture removal, antibiotic therapy according to the sensitivity and regular dressing followed by secondary suturing. However, no flap necrosis

**Table 3. Post-operative complications**

Issues	N (%)
Seroma	2 (4.76)
Hematoma	1 (2.38)
Wound infection	1 (2.38)
Flap necrosis	-
Recurrence	-
Total	4 (9.52)

was seen in early post operative period nor any recurrence was recorded during the 6 months follow up period. Patients were satisfied with the final cosmesis.

### DISCUSSION

Pilonidal sinus disease is an acquired condition commonly seen in young adults. Its etiology is still under debate but relates to penetration of free hair deeper into the natal cleft. Various other associated factors include sweating with sitting and buttock friction, poor personal hygiene, obesity, local trauma and narrow natal cleft.<sup>13,14</sup> There are different surgical procedures described in the literature for the treatment of pilonidal sinus disease ranging from simple incision and drainage, wide local excision to complex plastic flaps with lack of an ideal procedure.<sup>15</sup> However, the surgical management should focus on excision of the entire sinus tract and its associated factors.<sup>16</sup>

Cochrane review on healing by primary versus secondary intention after surgical treatment for pilonidal sinus showed no obvious benefit for open wound healing over surgical closure however it concluded that when surgical closure is opted, off midline closure should be the standard management.<sup>17</sup>

Besides, a systematic review done by Mohamed Boshnaq et al. including 68 studies with average follow up of 18 months showed that Limberg's flap or its modification is superior to primary closure with results comparable to Karydakias flap and post-operative complication rate of 11.5% (two partial wound dehiscence, one wound infection).<sup>18</sup>

Furthermore, another updated systematic review and meta-analysis of randomized controlled trials by Gabriela et al. comparing classical Limberg to classical Karydakias flaps for pilonidal disease over 727 patients showed lower rate of seroma formation in Limberg's group with no significant differences in recurrence, wound dehiscence, wound infection or hematoma formation.<sup>19</sup>

Similarly, a study conducted by Jethwani et al. over 67 patients with limberg's flap procedure had operation time ranging from 60-100 mins with hospital stay of 48-72 hrs, suture removed at 12-14 days followed by time off work 12-22 days and overall complication rate of 11.94% out of which 4.47% had seroma and 2.98% developed wound infection, whereas in our study operative duration ranged

**Table 4.** comparison of published studies with our study with respect to operative duration and complications

Studies (Ref.)	Year	No. of cases	Operative duration (mins)	Infection (%)	Seroma/ wound gaping (%)	Flap necrosis	Hematoma	Recurrence (%)	Return to work (days)
Jethwani et al. <sup>20</sup>	2013	67	60-100	2.98	4.47	NA	NA	0	12-22
Thapa et al. <sup>22</sup>	2017	32	NA	3.1	6.2%	3.1	NA	0	NA
Singh et al. <sup>21</sup>	2017	50	32±4.4	2	6	0	0	0	18-24
Srihari et al. <sup>23</sup>	2016	46	40-75	6.5	NA	2.1	NA	2.1	12-22
Our Study	2017-2018	42	61±25	2.38	4.76	0	2.38	0	5-32

from 40-160 mins which is slightly higher as we also included 2 cases of excision with double limberg's flap for complex pilonidal sinus disease.<sup>20</sup> The hospital stay in our cases ranged from 1-8 days as 1 patient developed wound infection and stayed back till secondary closure was done besides suture removal was done in 14-18 days which is quite similar and time to return to work was 5-32 days in our study which might be due to avoidance of prolonged sitting posture. We had a complication rate of 9.52% out of which 4.76% developed seroma and 2.38% had wound infection and hematoma with no recurrence which is comparable to the above studies. Similar study also done by Singh et al. over 32 patients had seroma in 6.2% and wound infection and flap necrosis in 3.1% each with no recurrence which is similar to ours however, no flap necrosis is observed in our cases so far.<sup>21</sup> Another study by Thapa PB et al over 50 patients also showed comparable results with no flap necrosis or recurrence.<sup>22</sup>

For further prevention of recurrence, patients were counselled regarding maintenance of good hygiene and hair removal.

Our patient has been followed up for minimum of 6 months period only so long term follow up is required to see the further recurrence, besides Limberg flap has been shown to be effective procedure in recurrent cases however all our cases were primary disease.

## CONCLUSION

It is a simple, easy to learn and safe procedure with good cosmetic results and low recurrence rate and hence can be considered as an alternative to other flap and plasty procedures.

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