

**ORIGINAL ARTICLE****COMPARATIVE STUDY OF LIMBERG FLAP/ Z PLASTY VS OPEN METHOD IN SURGICAL MANAGEMENT OF PILONIDAL SINUS**Nitin Nagpal<sup>1</sup>, Vikas Goyal<sup>2</sup>, HPS Sandhu<sup>3</sup>, Ajay Singh<sup>4</sup>, Bharat Bhushan<sup>5</sup><sup>1</sup>Associate Professor, <sup>2</sup>Assistant Professor, <sup>3</sup>Professor, <sup>4</sup>Junior resident, <sup>5</sup>Junior resident, Department of Surgery, GGS Medical College, Faridkot, Punjab, India**ABSTRACT:**

**Background:** Pilonidal sinus is a commonly encountered surgical problem, but none of the surgical procedure seem to be representative of ideal for treatment. The present study was done to compare two techniques which are commonly practised and associated with low recurrence rates. We have compared the outcome after surgical management of pilonidal sinus by Limberg's flap/ Z plasty or by open method. **Material and Methods:** Patient who underwent surgical management for pilonidal sinus, between January 2014 to December 2015, were studied retrospectively. Out of a total of 31 patients, 14 patients who underwent Limberg's flap/ Z plasty were included in group A, 17 patients underwent open method included in group B. Details were then recorded. **Results:** Most patients belonged to 3rd decade of life (51.6 %) and mean age was  $29.96 \pm 6.49$  years. Male preponderance (90.3%) was found and M:F ratio was 9.3:1. Both group A and B were demographically comparable and also length hospital stay. Group A took significantly lesser time for complete healing as compared to group B and also reported to have lesser incidence of wound infection and recurrence. **Discussion:** Limberg's flap/ Z plasty are superior to open method after excision of pilonidal sinus for its of its low complication rate, short time to return to normal activity, low recurrence rate, patient comfort and good long-term results.

**Keywords:** Pilonidal sinus, Limberg's flap, Z plasty

Corresponding author: Dr. Nitin Nagpal, 79, Medical Campus, Sadiq Road, Faridkot, Email: drnitinnagpal@gmail.com

This article may be cited as: Nagpal N, Goyal V, Sandhu HPS, Singh A, Bhushan B. Comparative study of Limberg flap/ Z Plasty vs open method in surgical management of pilonidal sinus. J Adv Med Dent Scie Res 2016;4(3):75-78.

**INTRODUCTION**

Pilonidal sinus disease is an acquired condition, usually seen in young adults. Most common site of occurrence is in the Sacro coccygeal region.

Although very rarely it can be seen in axilla, umbilicus, pubis, inter-mammary region, scalp, ear, genital tracts of both men and women, inter-digital webs of hairdressers, and hands of farmers who shear sheep.<sup>1</sup> The etiology of pilonidal disease has been an area of dispute. Previously it was postulated to be of congenital origin, but this theory has been given up. Aetiology of this disease relates to the implantation of loose hair in to the depth of the natal cleft. The increased occurrence in jeep drivers during World War II earned it the name "Jeep bottom".<sup>2</sup> Karydakos suggests three main factors interacting to produce the disease, namely hair, force and vulnerability.<sup>3</sup> The most important predisposing factors for the development of pilonidal sinus are the existence of a deep natal cleft and the presence of hair within the cleft. Obese individuals having deeper natal cleft and excessive hair are found to be more commonly affected. The vacuum effects created between heavy

buttocks also play a role in pilonidal disease development, as it sucks the anaerobic bacteria, hair, and debris into the subcutaneous fat tissue. Thus deep natal cleft is a favourable environment for sweating, maceration, bacterial contamination, and penetration of hairs.<sup>4</sup>

Patients commonly present with recurrent episodes of pain, swelling and discharge when these sinuses become infected. Diagnosis is established locating a characteristic sinus tract in the natal cleft containing hair, a short distance behind the anal verge. Several treatment procedures have been described in the literature. They vary from simple incision and drainage to the use of complex plastic flaps for cleft obliteration. Despite these advances in surgical therapy management of pilonidal sinus remains a grey zone. Ideal goals of treatment of pilonidal sinus are to achieve reliable wound healing with a low risk of recurrence, associated with minimal pain, a short hospital stay, early return to work and less morbidity with few wound-management problems.<sup>4</sup> Medical treatment methods include alcohol, phenol and silver

nitrate injection into the cavity. Surgical treatment is often preferred. Surgical therapeutic options include curettage after Sinotomy, leaving an open or marsupialized wound after cystectomy, Bascom surgery, primary excision and closure, the Karydakias flap procedure, or sinus excision and skin graft and flap methods, such as Limberg's flap rotation.<sup>3-5</sup> Primary closure of the defect in the midline is known to be associated with high incidence of recurrence. But methods like Limberg's flap or Z plasty which offer an off midline suture line are known to be associated with minimum recurrence. The present study was conducted to compare the outcome of Limberg's flap closure/ Zplasty with that of excision and open method for the treatment of Pilonidal sinus in Sacrococcygeal region.

**MATERIALS AND METHODS**

The present study was conducted in Department of Surgery at Guru Gobind Singh Medical College, Faridkot. In this retrospective analysis patients, who had undergone surgical treatment for pilonidal sinus in the sacrococcygeal region, between January 2014 to December 2015 were included. Patients with recurrent disease, diabetes mellitus, immunocompromised conditions were excluded from the study. Data was then collected in Performa, from hospital records of patients in medical records department to obtain details of demographic data, duration of disease, clinical presentation and laboratory data, type of surgical procedure done, length of hospital stay, time to complete wound healing and recovery, postoperative complications like wound infection, wound dehiscence, partial flap necrosis and recurrence. Based on type of surgical management received patients were divided into 2 groups as shown in table 1.

**Table 1:** Group based on surgical treatment received

Group name	Type of surgical treatment
Group A	Excision of sinus and primary closure by Limbergs Flap or Z-plasty
Group B	Excision of sinus and healing by secondary intention( Open method)

**SURGICAL TECHNIQUE:** After adequate preoperative preparation all cases were operated under spinal anaesthesia. In prone position the natal cleft was exposed using adhesive tapes by strapping buttocks apart. After cleaning and draping operative area, Methylene blue dye was injected using blunt tipped needle into the sinus opening. This helps in mapping the lateral and deep ramifications of the sinus and thus completely delineates the track.

Vertical elliptical incision was made to include the diseased skin. Incision was then deepened up to the fascia and sinus tract is excised en-block, ensuring the lateral branches of sinus tract were included(which can be adequately identified by the methylene blue staining of sinus tract). The specimen was examined for adequacy of the excision. Based on type of surgical management received patients were divided into 2 groups as shown in table 1. In patients included in group A depending on the plan of surgery either Limberg flap or Z plasty incision is marked. Incision was marked. Flap was then raised to include skin and adipose tissue and was then transposed to the defect and suturing was then done in two layers to cover the defect (Image no. 1 illustrates a completed Limberg flap repair) after placing a vacuum suction drain. Postoperatively dressing changed after 48 hours. Drain was removed once the output became less than 10ml/day. Sutures were usually removed on day 10. In patients included in group B, wound cavity was given a thorough lavage and the wound was packed with povidone-iodine soaked gauze. Postoperatively the wound was dressed following standard techniques until wound healed completely.

Using IBM SPSS 20 software descriptive statistics were reported as frequencies and percentage, or as mean and standard deviation. Pearson correlation and linear regression model was used to examine the correlation between two groups.



**Figure 1:** Limberg flap operative image

**RESULTS**

31 patients with Pilonidal sinus were studied in a retrospective manner to obtain following observations. Based on type of surgery done 14 patients were included in group A, while 17 patients were included in group B. In the present study, maximum number of patient were in age group between 20-30 (51.6 %). Mean age was 29.96 ± 6.49 years with a range of minimum being 18 years and maximum 40 years. Mean age in group A was 27.92 ± 6.78 years and group B was 31.64 ± 5.91years and both were comparable. The present study had a male

preponderance with 28 patients being male and only 3 females, with 1 in group A and 2 in group B, thus making gender distribution comparable in both groups. Usual presentation of patient was with pain or discomfort in natal cleft region and mean duration of symptoms at the time of presentation was  $7.83 \pm 2.72$  months, and was comparable along both groups.

In the present study, mean postoperative hospital stay in group A  $7.85 \pm 1.16$  days and in group B it was  $4.70 \pm 0.84$  days. Patient who underwent open method of treatment were discharged from the hospital early and this can be attributable to drainage tube removal as patients in our setup prefer discharge after drain removal. Mean time to complete recovery in group A was  $52.35 \pm 3.83$  days while in group B was  $26.14 \pm 3.69$  days. This suggest that patients who underwent primary closure with Limberg's flap/ Z plasty had achieved complete healing in a significantly lesser time as compared to those in whom the wound was left open. Rate of wound infection was higher in group B(29.41%) as compared to group A(21.4%). In group A 1(7.14%) patient had wound dehiscence and 2(14.28%) patients experienced partial flap necrosis. Both of these complications are unlikely to happen in group B and suggest advantages of open method of treatment. However a high incidence of recurrence of disease was observed in 2(11.7%) patient in group B, whereas only 1(7.1%) patient had experienced recurrence in group A.

**Table 2:** Comparison between both groups

S No	Parameter	Group A	Group B
1	Hospital stay in days (mean±SD)	$7.85 \pm 1.16$	$4.70 \pm 0.84$
2	Time to healing in days (mean±SD)	$26.14 \pm 3.69$	$52.35 \pm 3.83$
3	Wound Infection n(%)	(21.4%)	(29.41%)
4	Wound Dehiscence n(%)	1(7.14%)	0
5	Flap Necrosis n(%)	2(14.28%)	0
6	Recurrence n(%)	1(7.1%)	2(11.7%)

**DISCUSSION**

Herbert Mayo in 1833 was the first person to describe a cyst that contained hair just below the coccyx in the available literature.<sup>2</sup> However it was Hodge in 1880 who coined the term ‘Pilonidal Sinus’ to describe a chronic infection that contained hair and was usually found between buttocks. The term ‘Pilonidal’ comes from Pilus (hair) and Nidus (nest) literally meaning “nest of hair”.<sup>2,6,7</sup> Extensive disease with numerous pilonidal openings, branching tracts is usually managed by wide excision. Even though complete excision of the sinus is widely practiced, but controversy remains about what to do with the wound

after excision.<sup>8</sup> The ultimate aim of treatment in pilonidal sinus disease is to render cure of the disease, minimize chances of recurrence and early return to work.<sup>9</sup>

The onset of pilonidal sinus is rare before puberty and after the age of 45 years. Males are affected more frequently than females probably due to their more hirsute nature. The present study found 51.6 % of the patients in their 3<sup>rd</sup> decade of life with Mean age being  $29.96 \pm 6.49$  years and 90.3% of patients were male (M:F=9.3:1). So demographic distribution of the disease was consistent with the available literature.<sup>1,2,6</sup>

The pathogenesis of Pilonidal sinus is thought to be related to the accumulation of weak and lifeless hair in the natal cleft. Then because of shearing action of buttocks which is increased by sitting on a hard seat and especially vibration of the vehicle, loose hair travel down the furrow and penetrate the skin and result in formation of pilonidal sinus. Obesity, hirsute habitat, trauma and local irritation are known to be the risk factors.<sup>10</sup> Common presenting complaints include pain, swelling, discharge or may present as a mere discomfort in the natal cleft region. Malignant change is a relatively rare complication of pilonidal disease. The most common scenario is of squamous cell carcinoma arising after decades of pre-existing pilonidal disease.<sup>11</sup>

Several treatment procedures have been described but till date no ideal technique has been defined for the treatment. Wide excision of the sinus completely clears the disease but leaves behind a large defect in an area which is already prone to infection. Primary closure is one the option which can help in quicker healing and early recovery, but has its own inherent problems. Scar tissue in midline will be exposed to similar environment as natal cleft preoperatively thus making it more prone for infection, skin maceration and ultimately recurrence. Also patients report of feeling discomfort and restriction of activity due to tissue tension in midline scar.<sup>4</sup> The available literature reports a very high recurrence rates (7-42%) associated with primary closure.<sup>9,10,12</sup> So primary midline closure is not very widely practised around the world. Another method of treatment is to leave the defect open and let it heal by secondary intention. This method gives excellent results as per authors experience and also available literature.<sup>2,6,13</sup> But such wounds are often painful and usually demand regular dressing for a long period and can delay ones return to activity. Karydakos et al suggested the principal of off midline closure that is a technique of asymmetrical wound closure.<sup>3</sup> It achieves closure of the pilonidal wounds by avoiding placement of the wound in the midline at the depth of the natal cleft and also flattens the cleft, thereby reducing hair accumulation and

mechanical irritation and decreasing recurrence.<sup>3,5</sup> Similar principals are used by Limberg's flap and Z plasty. They considerably decrease time to healing as compared to open method. In the present study mean time to recovery in days was considerably less( $26.14 \pm 3.69$ ) as compared to open method( $52.35 \pm 3.83$ ), even though length of stay in hospital was higher for flap group. Wound infection, fluid collection, edema, hematoma and wound dehiscence are the usual complications associated. Use of drains after surgery can prevent fluid accumulation, edema and hematoma formation.<sup>14</sup> Also open method was reported to be associated with higher incidence of wound infection(29%vs 21%) and recurrence(11%vs 7%). Mentès et al.<sup>15</sup>, Ersoy et al.<sup>16</sup>, and Campbell et al.<sup>17</sup> reported that modified Limberg flaps presented lower recurrence and complication rates than Karydakís flap in their respective series. The reported recurrence rate for Limberg flap varied from 0.8 to 2.7%.

## CONCLUSION

Surgical management of pilonidal sinus is controversial. We conclude that Limberg flap/Z plasty procedure are a safe choice for the surgical treatment of pilonidal sinus disease due to its low complication rate, moderate length of hospital stay and shorter complete healing duration. This can lead to tremendous patient satisfaction and early return work. Thus the authors recommend routine use of Limberg flap/Z plasty for surgical management of pilonidal sinus in sacrococcygeal region.

## REFERENCES:

1. Chaudhary ZA, Akhter MJ, Rafi Y, Syed AS, Chaudhary AM. Primary closure after pilonidal sinus excision. *Ann King Edward Med Uni* 1997; 2: 9-10.
2. Z Matar. Pilonidal Sinus Disease: A 5-year Study. *The Internet Journal of Surgery*. 2006 Volume 13 Number 2.
3. Karydakís G.E. Easy and Successful Treatment of Pilonidal Sinus after Explanation of its Causative Process. *The Australian and New Zealand Journal of Surgery*, May 1992.
4. T. Mahdy. Surgical Treatment of the Pilonidal Disease: Primary Closure or Flap Reconstruction after Excision. *The Ascrs volume* 1816 51: 1816–1822 (2008).
5. Bascom J. Surgical treatment of pilonidal disease. *BMJ*. 2008;336(7649):842-3
6. Tariq Wahab Khanzada, Abdul Samad. Recurrence after excision and primary closure of Pilonidal sinus. *Pak J Med Sci* May - June 2007 Vol. 23 No. 3 375-379.
7. Williams NS. The anus and anal canal. In Bailey & Love's short Practice of Surgery (24th edn), Russell RCG, Williams NS, Bulstrode CJK (eds.), Arnold Publishers: London, 2004;1242-71.
8. Corman ML. Colon and rectal surgery. 2nd ed. Philadelphia: Lippincott, 1989:297–304.
9. Akca T, Colak T, Ustunsoy B, Kanik A, Aydin S. Randomized clinical trial comparing primary closure with the Limberg flap in the treatment of primary sacrococcygeal pilonidal disease. *Br J Surg* 2005;92:1081-4.
10. Sondena K, Andersen E, Nesvik I, Søreide JA. Patient characteristics and symptoms in chronic pilonidal sinus disease. *Int J Colorectal Dis*. 1995;10(1):39-42
11. Abboud B, Ingea H. Recurrent Squamous cell carcinoma arising in sacrococcygeal pilonidal sinus tract. Report of a case and review of the literature. *Dis Colon Rectum* 1999;42:525-8.
12. Urhan MK, Kucukel F, Topgul K, Ozer I, Sari S. Rhomboid excision and Limberg flap for managing pilonidal sinus: results of 102 cases. *Dis Colon Rectum* 2002; 45: 656-9.
13. Ihan Bali, Mehmet Aziret, Selim Sozen, Seyfi Emir, et al. Effectiveness of Limberg and Karydakís flap in recurrent pilonidal sinus disease. *CLINICS* 2015;70(5):350-355
14. Faisal Shabbir, Mahmood Ayyaz, Muhammad Waris Farooka, Asad Ali Toor. Modified Limberg's flap versus primary closure for treatment of pilonidal sinus disease: A comparative study, *JPMA* 64: 1270; 2014
15. Mentès BB, Leventoglu S, Cihan A, Tatlicioglu E, Akin M, Oguz M. Modified Limberg transposition flap for sacrococcygeal pilonidal sinus. *Surg Today*. 2004;34(5):419-23,
16. Ersoy E, Devay AO, Aktimur R, Doganay B, Ozdoğan M, Gündođdu RH. Comparison of the short-term results after Limberg and Karydakís procedures for pilonidal disease: randomized prospective analysis of 100 patients. *Colorectal Dis*. 2009;11(7):705-10,
17. Can MF, Sevinc MM, Hancerliogullari O, Yilmaz M, Yagci G. Multicenter prospective randomized trial comparing modified Limberg flap transposition and Karydakís flap reconstruction in patients with sacrococcygeal pilonidal disease. *Am J Surg*. 2010;200(3):318-27.

**Source of support:** Nil

**Conflict of interest:** None declared

This work is licensed under CC BY: **Creative Commons Attribution 3.0 License**.