

# Ultrasonographic Evaluation of Flap Thickness In Patients with Pilonidal Sinus-Original Article

Pilonidal Sinüs Nedeni İle Opere Edilen Hastalarda Flep Kalınlığının Ultrasonografik Değerlendirmesi

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## Abstract

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| Aim        | Various risk factors have been defined for recurrence in pilonidal disease. This study was designed to investigate the local subcutaneous tissue thickness in patients who were operated on for sacrococcygeal pilonidal disease. ( <b>Sakarya Med J 2018, 8(3):505-510</b> )   |
| Methods    | Ninety-eight patients who had been operated in General Surgery Clinics of Sakarya University Research and Educational Hospital on with the diagnosis of pilonidal sinus were retrospectively evaluated between January 2008 and January 2014. In evaluation of the flap thickness, the nearest and farthest margins were measured by ultrasonography between the skin and sacrum. This is a cross-sectional and descriptive study and local ethics approval was obtained from Sakarya University Medical School |
| Results    | Resection and primary closure and Limberg flap transposition were performed in 46 (46.9%) and 52 (53.1%) patients, respectively. Mean flap thickness was found to be 17.2 mm (range: 3.9 - 36.4) and 20.5 mm (range: 4.0 - 42.3) in the primary repair group and the Limberg group, respectively. The recurrence rate was 10.8% in the primary repair group, 3.8% in the Limberg group at a mean of 27.1 months (range: 12-54 months) of follow-up.   |
| Conclusion | Subcutaneous tissue thickness in the place of surgery was greater in patients with the Limberg flap procedure compared to the patients with primary closure in pilonidal sinus disease. Flap thickness may be a parameter that can be used to predict the possibility of recurrence   |
| Keywords   | Pilonidal sinus; Surgery; Limberg   |

## Öz

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|-------------------|--|
| Amaç              | Pilonidal sinüs nedeni ile opere edilen hastalarda nüksün pek çok nedeni vardır. Bu çalışmanın amacı pilonidal sinüs nedeni ile limberg flep uygulanan hastalarda, flep kalınlığının hastalık tekrarına etkisini araştırmaktır ( <b>Sakarya Tıp Dergisi 2018, 8(3):505-510</b> ).  |
| Yöntem            | Ocak 2008 ve Ocak 2014 yılları arasında, Sakarya Üniversitesi Eğitim ve Araştırma Hastanesi Genel Cerrahi Kliniği'nde pilonidal sinüs nedeni ile opere edilen 98 hastanın verileri retrospektif olarak incelendi. Flep kalınlığı deri ile sakrum arasındaki en yakın ve en uzak mesafeler ultrasonografik olarak ölçülerek değerlendirildi. Bu araştırma kesitsel ve tanımlayıcı bir çalışmadır ve Sakarya Üniversitesi Tıp Fakültesi Etik Kurulu'ndan etik kurul onayı alınmıştır |
| Bulgular          | Limberg flep uygulanan 46 hasta (%46.9) ve rezeksiyon ve primer kapama uygulanan 52 hasta (%53.1) sonuçları geriye dönük değerlendirildi. Ortalama flep kalınlığı primer onanım grubu ve limberg flep grubunda sırası ile, 17.2 mm (3.9 - 36.4 mm) ve 20.5 mm (4 - 42.3 mm) olarak bulundu. Nüks oranı primer kapama grubunda %10.8 limberg flep grubunda % 3.8 olarak saptandı. Ölçümlerin ortalama takip süresi 27.1 ay (12-54 ay) olarak bulundu.                               |
| Sonuç             | Subkutan doku kalınlığı Limberg flep uygulanan hastalarda primer kapama grubuna göre belirgin olarak fazlaydı. Flep kalınlığı pilonidal sinüs nedeni ile opere edilen hastalarda nüksü azaltmada önemli bir parametre olarak kullanılabilir.   |
| Anahtar Kelimeler | Pilonidal sinüs; Cerrahi; Limberg  |

## Introduction

Pilonidal sinus (PS) is a chronic benign disorder, commonly localized to sacrococcygeal region. It is most frequently seen in young adults and in men. Although it is a benign disease, it might affect the entire society since it causes an important amount of loss of labor and interruption of the educational processes when the affected gender and age group are taken into account.

Numerous operative and non-operative treatment methods have been described for treatment of pilonidal sinus; however, recurrence is still a serious problem whose definitive solution is not yet known. More than 20 techniques have been described for the treatment of pilonidal disease (1), and significant recurrence rates have been reported with each one. This suggests that the factors effective on recurrence are still not entirely known.

In this study, subcutaneous tissue thickness, which was measured postoperatively in cases that underwent two different types of treatment for sacrococcygeal PS was evaluated to define whether it could be used as an effective parameter to determine the success of the surgery.

## Materials And Methods

Patients who were either operated on with the indication of recurrent or complicated PS, who had Diabetes Mellitus, who were using steroids on a regular basis for various reasons, with a body mass index of  $<18.5$  and  $>29.9$ , with age  $>65$  years or whose follow-up were not adequate were excluded from the study.

The records of 98 patients who were operated with the diagnosis of simple sacrococcygeal pilonidal sinus between January 2008 and January 2014 in General Surgery Clinics of Sakarya University Research and Educational Hospital, were evaluated in detail in terms of demographics, the technique of operation, recurrence and flap thickness.

The cyst was excised through an elliptical incision and the subcutaneous tissue was fixed to the presacral fascia using absorbable sutures in the primary repair technique (PR). In the other case, the cyst was excised through a rhomboid incision and the fasciocutaneous flap prepared from the right gluteus maximus muscle was fixed to the presacral fascia using absorbable sutures in the Limberg flap transposition technique (LF). The patients received a single dose of a prophylactic antibiotic (Cefazolin sodium, 1gr) and an aspirative drain was placed in the surgical field in both cases.

Follow-up of the patients were performed at the outpatient clinics. The diagnosis of recurrent disease was determined based on the physical examination findings (the presence of recurrent sinus openings at the localization of previous operation). Ultrasonographic measurements were applied between postoperative 3th and 7th days. The term "flap thickness" was used to define the thickness of the tissue between the skin and sacrum at the midline of the previous surgical field and was calculated as the mean of the shortest and the farthest of the ultrasonographic measurements (Aplio MX, Toshiba, Tokyo, Japan) (Figure 1). All the measurements were performed by the same radiologist.

Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) version 10.0 (SPSS, Inc., Chicago, IL, USA). The differences between the groups were analyzed

by the Mann-Whitney U-test and Fisher's exact test. A value of  $p < 0.05$  was considered to be statistically significant.

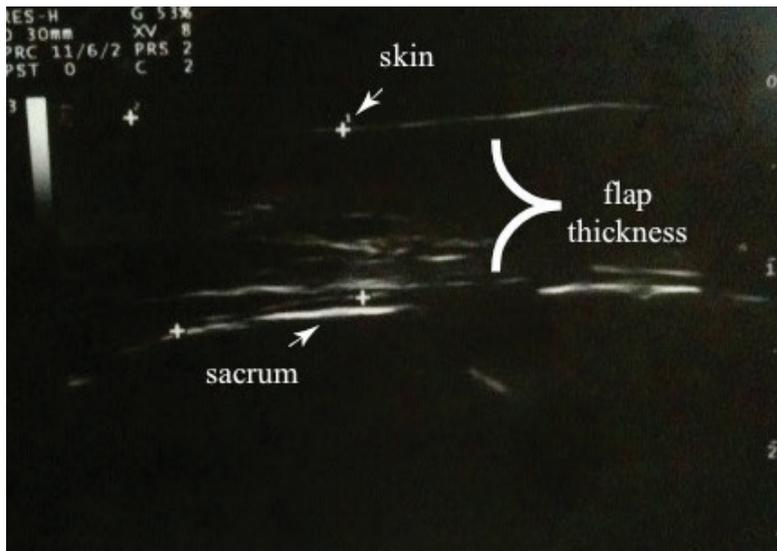


Figure 1. Ultrasonographic appearance of sacrococcygeal subcutaneous tissue in the postoperative period.

## Results

Thirteen of the patients were females (13.2%) while 85 were males (86.8%) with a mean age of 29.7 years (range:18-63). Patients were divided into two groups according to the procedure performed after the excision of the sinus. There were 46 patients in the primary repair group (46.9%) and 52 patients in the Limberg flap group (53.0%). The demographics of the patients, flap thicknesses, and the results of follow-up are shown in Table 1.

| Table 1: Demographic findings, type of surgery, flap thickness and follow-up results in all patients |                                 |                              |              |
|--|---------------------------------|------------------------------|--------------|
| Variables  | Primary closure<br>(n=46, %100) | Limberg flap<br>(n=52, %100) | p value      |
| Age (mean)   | 30.1 (18-55)                    | 29.1 (18-63)                 | 0.119        |
| Sex  |                                 |                              | 0.112        |
| Male   | 39, 84.8                        | 46, 88.5                     |              |
| Female   | 7, 15.2                         | 6, 11.5                      |              |
| BMI  |                                 |                              | 0.987        |
| Minimum  | 23.0                            | 20.0                         |              |
| Maximum  | 29.8                            | 29.6                         |              |
| Avarage  | 26.6                            | 25.1                         |              |
| Flap thickness (mm)  |                                 |                              | <b>0.004</b> |
| Minimum  | 3.9                             | 4.0                          |              |
| Maximum  | 36.4                            | 42.3                         |              |
| Avarage  | 17.2                            | 20.5                         |              |
| Recurrence   | 5, 10.8                         | 2, 3.8                       | 0.145        |
| Follow-up (months)   | 33.1 (12-54)                    | 21.1 (12-49)                 | 0.06         |
| Abbreviations: BMI; Body Mass Index, mm; milimeter   |                                 |                              |              |

The recurrence rate was 10.8% (n=5) in the primary repair group, 3.8% (n=2) in the Limberg group at a mean of 27.1 months (range: 12-54 months) of follow-up. None of these patients had any early postoperative complication (wound infection, hematoma etc.) in the course of ultrasonographic examination. Recurrence time were determined as postoperative 18th and 27th months in Limberg flap group; 9th, 14th, 17th, 19th and 34th months in primary repair group, respectively. No statistically significant differences in age ( $p=0.119$ ), gender ( $p=0.112$ ), and in the rate of recurrence ( $p=0.145$ ) between the two groups were determined. Mean flap thicknesses in all patients was greater in the LF group compared to the PC group ( $p=0.004$ ).

### Dicussion

Although it was thought to be mostly congenital when the pilonidal sinus disease was first defined, currently it is accepted to be mostly an acquired disease. After the understanding of its acquired etiology, some individual, local and mechanical risk factors facilitating the development of pilonidal sinus disease, such as poor personal hygiene, hairy body, stiffness of body hair, sweat, deep intergluteal groove, and the rolling movements of the buttock surface and prolonged sitting have been defined<sup>2,3</sup>. The most significant factors were suggested to be the presence of a deep natal cleft that collects hair that has fallen from other parts of the body<sup>4,5</sup>.

After better understanding of the risk factors, numerous types of treatment have been introduced with a baseline reference point to remove the sinus and/or facilitating factors. The ideal method of treatment for pilonidal sinus is one with minimal tissue loss, minimal postoperative morbidity, excellent cosmetic results, rapid resumption of daily activities, low cost, and a low recurrence rate<sup>6</sup>. Nevertheless, none of the present treatment options fulfill all these requirements.

Primary repair is the most frequently used surgical treatment in uncomplicated pilonidal sinus. Although the durations of wound healing, hospital stay and return to normal activity are shorter, the post-operative rate of complications and recurrences are high<sup>7-9</sup>. The reasons for failure have been suggested as the midline incision, tissue tension, and unflattening of the natal cleft. To overcome the negative results of primary closure, asymmetrical or oblique incision options have been developed<sup>10-14</sup>; however, currently, flap closure techniques have been selected predominantly<sup>15</sup>.

The most frequently used flap technique is the Limberg flap. Limberg flap has lower postoperative complication and recurrence rates, a shorter hospital stay, and better cosmetic results, when compared to primary repair<sup>7,8,16</sup>. These advantageous results are obtained by using the Limberg flap repair through the removal of the midline scar, providing a wound healing without tension, and by flattening and lateralizing the natal cleft<sup>17</sup>. In addition, Topgul et al.<sup>16</sup> recommended applying some technical points when preparing the flap, such as leaving the gluteal fascia under the flap and the suture fixation of the flap to the presacral fascia to decrease the rate of recurrence.

High body mass index was associated with the development of complications in pilonidal sinus and obesity was suggested as a risk factor for the development of recurrence<sup>16,18,19</sup>, Balik et al<sup>20</sup>, on the other hand, demonstrated a greater local subcutaneous fat tissue thickness in the sacrococcygeal region in patients with pilonidal sinus compared to controls, and reported that the thickness of the local subcutaneous fat tissue, rather than the whole body fat might be associated with the development of pilonidal sinus.

In this study, the subcutaneous fat tissue thickness was measured in the long term after surgery and this measurement was found to be greater in all patients who underwent Limberg flap application compared to patients with primary repair ( $p=0.004$ ). Although this result is one that would be expected after flap reconstruction, there is no data about postoperative local tissue thickness in patients with pilonidal sinus. The thicker postoperative local tissue after Limberg flap reconstruction might be one of the facts explaining the better postoperative results of Limberg flap technique compared to primary repair.

The limiting factors in this study were the small number of patients which prohibited us from analyzing the factors affecting the development of recurrence, and the presence of only two groups of PC and LF. To further evaluate the effects of flap thickness on the development of recurrent disease, large series including more numbers of recurrences and analyzing other techniques as well in the treatment of pilonidal sinus.

In conclusion, subcutaneous tissue thickness in the place of surgery was greater in patients with the Limberg flap procedure compared to the patients with primary closure in pilonidal sinus disease. Flap thickness may be a parameter that can be used to predict the possibility of recurrence.

**Conflict of interest:** The authors declare that they have no conflict of interest

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