

# Multidimensional Use of Pedicled Gluteal Artery Perforator Flaps in Perianal and Gluteal Regions

## *Perianal ve Gluteal Bölge Defektlerinin Onarımında Pediküllü Gluteal Arter Perforatör Flebinin Çok Yönlü Kullanımı*

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### ABSTRACT

**Objective:** Before the concept of the perforator flap, methods such as secondary intention, skin grafting, primary closure, random pattern transposition, and rotation flaps had been used to treat wounds such as pilonidal sinus, hidradenitis suppurativa and pressure sores. In this study the advantages of gluteal artery perforator flaps for the reconstruction of perineal and gluteal region are discussed.

**Materials and Methods:** Between dates August 2011 and August 2014, seventeen patients with perianal and gluteal region defects were operated using gluteal artery perforator flaps. Twenty-five flaps were used, eight of the patients necessitated two flaps. Fifteen of the 25 flaps were SGAP, while nine were IGAP. One patient with trochanteric and ischial pressure sores was reconstructed with m. biceps femoris flap for his trochanteric sore.

**Results:** Among these 17 patients with gluteal and perineal wounds, eleven had pressure sores, two had hidradenitis suppurativa, two had pilonidal sinus, one had post-burn contracture in the gluteal sulcus and the last one had nevus sebaceous. All flaps survived. The mean follow up period was 11,7 months (range 9-20 months). No early or late complications were evident.

**Conclusions:** It is our conclusion that the SGAP and IGAP flaps are useful tools for the soft tissue reconstruction of perineal and gluteal region.

**Key Words:** Gluteal artery, gluteal region defects, perforator flaps, post-burn contracture, perianal region defects, pressure sore

### ÖZET

**Amaç:** Perforator flap konseptinden önce gluteal bölgede pilonidal sinüs, hidradenitis suppurativa ve bası yarası rezeksiyonundan sonra oluşan yumuşak doku eksikliklerinin onarımında; sekonder iyileşme, deri greftlemesi, primer onarım, random pattern flepler ve transpozisyon flepleri kullanılmaktaydı. Çalışmamızda gluteal arter perforator fleplerinin perineal ve gluteal defektlerin onarımında avantajlarını sunmayı amaçladık.

**Gereç ve Yöntem:** Ağustos 2011-2014 tarihleri arasında on yedi hasta gluteal arter perforator flebi kullanılarak perineal ve gluteal bölge defektlerinin onarımı için opere edildi. Toplamda 25 flep kullanıldı ve 8 hastaya çift flep ile onarım yapıldı. 15 adet flep SGAP, 9 tanesi IGAP ve bir hastaya da trochanteric bası yarası için m.biceps femoris flebi kullanıldı.

**Bulgular:** Gluteal ve perineal yumuşak doku defekti olan 17 hastadan 11 tanesi bası ülseri, 2 tanesi hidradenitis suppurativa, 2 adedi pilonidal sinus diğer ikisi de intergluteal sulkusta yanık sonrası kontraktür ve sebace nevüs olarak rapor edildi. Tüm flepler başarılı bir şekilde uygulandı, ortalama takip süresi 11,7 ay olarak rapor edildi. Herhangi bir erken veya geç komplikasyonla karşılaşmadık.

**Sonuç:** SGAP ve IGAP flepleri özellikle gluteal ve perineal bölge yumuşak doku onarımlarında başarıyla kullanılabilir.

**Anahtar Kelimeler:** Bası ülseri, Gluteal arter, gluteal bölge defektleri, perforator flep, perianal bölge defektleri, yanık kontraktürü

### Introduction

Open and infected wounds of various sizes, such as pilonidal sinus and hidradenitis suppurativa,

may occur in the gluteal region. Pressure sore, pilonidal sinus and rarely resection of extensive soft tissue masses result in perianal and gluteal soft tissue defects. Before the concept of the

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**Table 1.** Patients repaired with 'gluteal artery' perforator flaps

Patient	Age/sex	Diagnosis	Location of morbidity	pattern pedicle/ flap	of	Follow-up period
1. Fig.1a-b	53/f	Post-burn contracture	Sulcus interglutealis	SGAP		19 months
2.Fig.2a-b	60/m	Pressure sore	Sacral Ischial	SGAP IGAP		10 months
3. Fig.3a-b	20/m	Pressure sore	Sacral	IGAP		10 months
4. Fig.4a-b	21/m	Nevus sebaceous	Perianal	SGAP		14 months
5. Fig.5a-b	21/m	Pilonidal sinus	Sacral	SGAP		16 months
6. Fig.6a-b-c-d	52 /m	Pressure sore	Trochanteric Ischial	m. biceps femoris IGAP		19 months
7. Fig.7a-b-c	23/m	Hidradenitis suppurativa	Gluteal region (Grade-3)	SGAP		8 months
8.	75/m	Pressure sore	Sacral	SGAP		10 months
9.	18/m	Pressure sore	Sacral	SGAP (bilateral)		10 Months
10.	22/m	Pilonidal sinus	Sacral	SGAP (bilateral)		9 months
11.	62/m	Pressure sore	Trochanteric Ischial	IGAP IGAP		11 months
12.	65/m	Pressure sore	Sacral	SGAP (bilateral)		8 months
13.	22/m	Pressure sore	Ischial	IGAP		10 months
14.	24/m	Pressure sore	Trochanteric	IGAP		7 months
15.	67/m	Pressure sore	Sacral	SGAP (bilateral)		10 months
16.	65/m	Pressure sore	Trochanteric	IGAP		8 months
17.	21/m	Hidradenitis suppurativa	Gluteal region (Grade-3)	SGAP		20 Months

perforator flap, methods such as secondary intention, skin grafting, primary closure, random pattern transposition, and rotation flaps had been used to treat these wounds (1,2). Each of these methods has its particular limitations (3).

Long pedicles of superior and inferior gluteal artery perforator flaps facilitate mobilization of neighbouring healthy tissue into the defect area (4). Another advantage is the abundant amount of sizable perforators belonging to the superior and inferior gluteal arteries. This condition makes possible the planning of various sizes and shapes of flaps around the defect area.

We aim to present our clinical experiences in using superior and inferior gluteal artery perforator flaps in gluteal region defects for various reasons.

## Materials and Methods

Patients treated in our clinic with soft tissue defects in the gluteal regions due to pilonidal

sinus, pressure sore and hidradenitis between dates August 2011 and August 2014, were included in the study. One patient was operated for neurofibroma. Before the operation, perforators were determined by using the manual 8 MHz hand held Doppler. Enema was administered prior to surgery. The procedure was performed under spinal anesthesia in all patients. With the flap planned to be approximately the size of the area of the defect in the region where perforators were marked, local anesthesia was inducted at incision borders. The wound area was excised radically until healthy subcutaneous tissue was reached. An SGAP or IGAP flap containing perforators was planned adjacent to the defect area. Incision was started at the near border of the wound area. The flap was elevated in the subfascial plane while preserving the perforators previously marked by the manual Doppler. The subfascial plane was a safe level for identifying the perforators, and to dissect them precisely. Localization of the perforators during dissection was made easier by translumination at set intervals

while coursing parallel to muscle fibers. During the postoperative period, clear diet and oral diphenoxylate and atropine were administered for 3 days in order to prevent fecal contamination. Patients received first generation cephalosporins intraoperatively and postoperatively, and the drug was stopped on the fifth postoperative day. When the outflow was below 30 ml/day, the drainage was removed. Consultations to recommend general surgery were conducted with two patients with perianal region excision. All patients were operated by the same surgeons. Eleven patients had pressure sores, two had hidradenitis suppurativa, two had pilonidal sinus, one had post-burn contracture in the gluteal sulcus and the last one had nevus sebaceous (Table 1).

## Results

A total of 17 patients were operated because of wounds in the perianal and gluteal regions. All patients were male except one. The age of the patients ranged between 20 and 75 years (mean of 40,7 years). After the excision, lesion dimensions were between 5x6 cm and 18x27 cm (mean of

12x17 cm). A total of 25 flaps were performed on 17 patients; nine of these were IGAP, fifteen were SGAP and one was a biceps femoris muscle transposition flap. Eight patients were treated by double flaps. The mean duration of the procedure was 1.5 hours, and mean duration of follow up was 11.7 (8-20) months.

**Case 1:** A 50-year-old ambulatory female patient presented with a 35-year history of intergluteal post-burn contracture following a flame induced thermal injury. A SGAP flap was used to cover the intergluteal defect caused by contracture release. The donor site was closed primarily. The flap healed uneventfully. The follow-up period was 19 months. No contracture recurrence was observed (Figure 1).

**Case 2:** A 60-year-old male patient had a Grade 3 sacral and ischial pressure sores for 10 months. The sacral defect was 8x8 cm<sup>2</sup> and the ischial was 10x10 cm<sup>2</sup> after debriding the necrotic tissue. SGAP and IGAP were raised to cover the defects. At his latest follow-up 10 months later, flap recovery was successful and no recurrence was noted (Figure 2).



**Figure 1a).** Preoperative view of the patient, **b).** 19. month post-operative view of the patient.



**Figure 2a).** Preoperative view of the patient. **b).** 10. Month post-operative view.



**Figure 3a).** Preoperative view of the patient. **b).** 10th month post-operative view of the patient.



**Figure 4a).** Preoperative view of the nevus sebaceous on the right gluteal region. **b).** Postoperative view of the patient.



**Figure 5a).** Preoperative view of the patient. **b).** Early post-operative view of the patient.

**Case 3:** A 20-year-old ambulatory male patient was referred with grade 3 pressure sore on his sacral region. Under spinal anesthesia the lesion was totally excised and the soft tissue defect was closed with IGAP flap. The donor site was closed primarily. The follow-up period was 10 months and flap recovery was unproblematic (Figure 3).

## Discussion

Pedicled SGAP and IGAP flaps are quite useful in the repair of gluteal region defects. Previously, some problems have been encountered in defects closed by secondary intention, grafting, or random pattern local flaps. Scarred appearance and sensitivity caused by friction from underwear are

long-term morbidities. Healing may take a long time in large defects, and it can be also psychologically exhausting. Grafting is also an option for wound closure. However, this is difficult in a region where humidity is high due to lymphatic drainage or perspiration. To overcome this problem, performing the holes on the graft increases the success rate of the grafting, but it will cause a cosmetically unpleasant appearance. After the graft take a distinct shape, cosmetic deformities such as the depression of the grafted area in the gluteal region, color difference, and patchy appearance are commonly encountered. Local flaps such as rotation or transposition flaps are commonly employed options for wound closures in this region. These flaps, which are





**Figure 6a).** Preoperative view of the patient. **b).** Intraoperative view of the patient. **c).** 10th day post-operative view of the patient. **d).** 19th month post-operative view of the patient.



**Figure 7a).** Preoperative view of the patient. **b).** Early view after excision of the lesion. **c).** 8th month post-operative view of the patient.

elevated in random patterns, can be planned as large as the width-length ratio enables. Therefore, their usage in large defects is limited, or usually more than one flap is required. On the other hand, after they are placed on the defect, tension pockets may be formed, and they may cause borderline deformities. Partial necrosis and dehiscence are commonly encountered

complications in these flaps. The gluteus maximus myocutaneous flap has also been widely used for reconstructing sacral and gluteal pressure sores (5,6). However disadvantages such as limited flap rotation and sacrificing the muscle may limit the application. After the perforator concept, we think that the SGAP and IGAP flap methods we have used are very useful and practical in repairs of gluteal region defects (7).

In all cases, SGAP and IGAP were skeletalized to the segmentary artery. This skeletalization greatly increased flap mobilization. However, small diameter venous insufficiency may be encountered in addition to risk of pedicle damage in this condition. Perforator flaps offer a new approach in microsurgical soft tissue repair. A perforator vessel is an arterial branch that has its origin in one of the axial arteries together with its venous component and passes through the deep fascia and forms the subcutaneous vascular plexus. These flaps are able to move in almost all directions so that they can be designed in large dimensions (8). Major advantages of perforator flap over the myocutaneous flap include reduced bleeding, preserving the underlying muscle and increased arc of rotation of the flap. Bilateral weakness of the M. Gluteus maximus muscle may cause loss of walking activity and necessitates the aid of crutches. However, disadvantage of perforator and propeller perforator flaps is mostly the insensate nature of the flaps. Most insensate

local flaps may develop a slight sensory recover via peripheral innervations. In addition to this condition a myocutaneous flap is still a better choice for filling an extensive cavity when more bulk tissue is indicated (9,10). The SGAP and IGAP flaps provide large bulky and save skin-subcutaneous flap to manage perineal and gluteal soft tissue defects. (10,11). There were no recurrences in the patient cases during the follow-up period.

Pedicled gluteal artery perforator flaps are quite useful in the repair of wounds in the gluteal region caused by any reason such as a pressure ulcer, pilonidal sinus or hidradenitis. In particular, adequately large excision of pilonidal sinuses without any concern about the closure will reduce the recurrence risk to a great extent.

The gluteal artery perforator flaps provide safe skin-subcutaneous flaps to cover perineal defects with no muscle function loss. Usage of this flap provides tension-free skin closure, and also reduces the risk of local recurrence. They can be considered as a first-line option. This contributes to the preservation of muscle flaps for later procedures to treat commonly encountered wounds in this region, such as pressure ulcers.

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