

Technical Strategies for Harvest of the Subtotal Pedicled Fillet of Thigh Flap for Reconstruction of External Hemipelvectomy and Hemicorporectomy Defects

Aaron M. Foglio, MD*
 Colin T. McNamara, MD*†
 Bennie G. Lindeque, MD‡
 Mark A. Greyson, MD*†

Summary: External hemipelvectomy and hemicorporectomy have been described in the literature for a variety of indications. A commonly used reconstructive technique is the pedicled anterior subtotal fillet of thigh flap. However, there are few descriptions regarding the technical pearls of harvest and inset of this flap. Here, we describe our step-by-step technique, as performed in three patients. The flap is pedicled on the common femoral artery and extends longitudinally to the knee to achieve the length required to extend past the midline and resurface sacral pressure ulcers, which are commonly found in patients who undergo this procedure for refractory pelvic osteomyelitis. Additionally, we describe a potential salvage option with late division of the popliteal artery to preserve the option for free tissue transfer of a subtotal fillet of lower leg flap. (*Plast Reconstr Surg Glob Open* 2023; 11:e4993; doi: [10.1097/GOX.0000000000004993](https://doi.org/10.1097/GOX.0000000000004993); Published online 30 June 2023.)

Hemipelvectomy and hemicorporectomy are morbid, uncommon procedures^{1,2} that result in dramatic physiological and soft tissue changes. As a result, we routinely quote patients a complication rate of 100%. This includes problems with wound healing as well as serious or life-threatening medical complications.³ Additionally, these patients remain at high risk for additional decubitus ulceration.^{4,5}

In this article, we present three cases with variable indications for amputation. Although descriptions for a pedicled fillet of thigh flap exist, there is no description of a flap that is simultaneously used to resurface the sacrum.^{6–9} We present our technical description of the subtotal thigh fillet flap to reconstruct hemipelvectomy defects in a manner that seeks to maximize the utility of the harvested flap and mitigate postoperative soft tissue complications.

From the *Department of Surgery, University of Colorado Anschutz Medical Center, Aurora, Colorado; †Division of Plastic and Reconstructive Surgery, University of Colorado Anschutz Medical Center, Aurora, Colorado; and ‡Department of Orthopedic Surgery, University of Colorado Anschutz Medical Center, Aurora, Colorado. Received for publication October 25, 2022; accepted March 23, 2023.

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TECHNICAL DESCRIPTION

The following description is for patients undergoing hemipelvectomy, specifically the description of case #3; however, the same principles described here also apply to patients undergoing hemicorporectomy or hip disarticulations. The patient is first placed in the lateral decubitus position. Preoperative markings are made by outlining a wide anterior-based flap, leaving pedicled skin between the anterior superior iliac spine and pubic symphysis (Fig. 1A). This is a critical maneuver to allow for venous egress via the subdermal plexus, as postoperatively, we have noted at least one instance of late occlusion of the femoral vein. Although this does not prevent femoral vein occlusion, it provides a secondary source of venous egress if the femoral vein kinks during flap inset. A posterior-lateral incision is made from the posterior superior iliac spine to the lateral superior border of the patella (Fig. 1B). The dissection is carried down in the interval between the vastus lateralis and long head of the biceps femoris. Once this incision is made and the flap partially defined, the orthopedic team performs their portion of the procedure through this lateral exposure. We remain for this dissection, both to begin our portion of the procedure and to ensure that the femoral vessels are identified and protected. The posterior-medial incision is made

Disclosure statements are at the end of this article, following the correspondence information.

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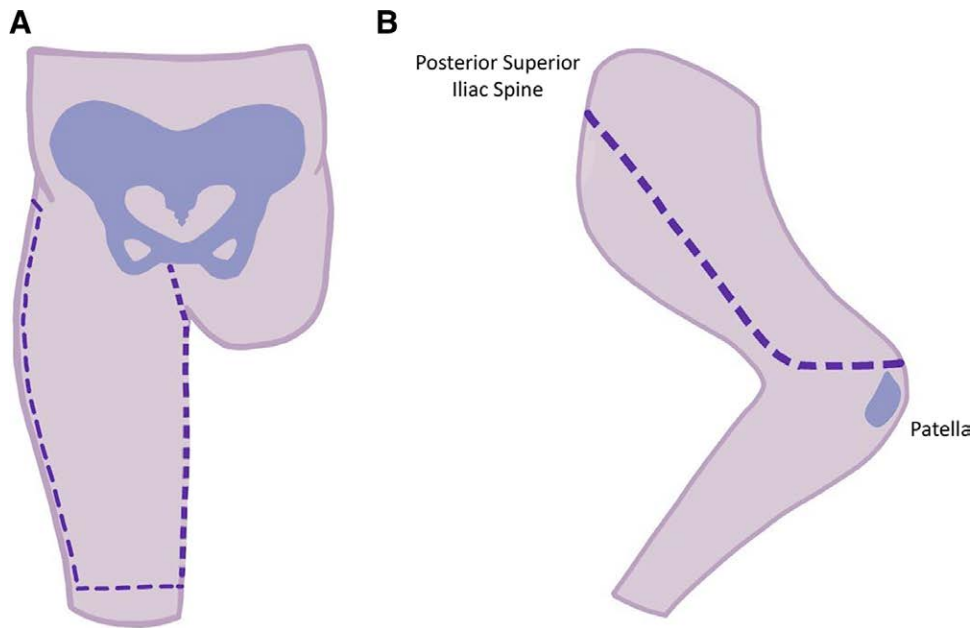


Fig. 1. Preoperative markings from case 3. Illustration of anterior, medial (A), and lateral preoperative markings (B).

extending from the pubis to the medial superior border of the patella. The plane of dissection is between the adductor magnus and the semimembranosus muscles. A distal transverse incision is made just proximal to the level of the patella. The knee may be disarticulated to allow for easier mobilization of the flap. If there is any concern for septic or neoplastic involvement of the femoral vessels proximally, we leave the lower leg disarticulated but pedicled to the popliteal artery and vein in order to preserve the option of a free fillet of leg flap as a surgical bailout (Fig. 2).¹⁰ If there is no concern, the popliteal vessels are ligated, and we proceed with the raising of the subtotal thigh flap off the femur. The femur serves as the plane of dissection for the majority of the flap, with the posterior compartment musculature and sciatic nerve left with the specimen (Fig. 3). We dissect proximally until the flap can easily rotate and cross past midline. If a sacral ulcer exists, it can be resurfaced; if there is not one present, we still utilize this technique and often resurface the sacrum, as it offers the single best opportunity to bring thick, vascularized muscle into an area that is highly likely to ulcerate in this population. In order to achieve the degree of rotation required, this may entail dissecting along the common femoral artery and ligating the internal iliac artery and vein. Once we have established the rotational arc, the flap is provisionally inset with staples. If the flap appears too large for the defect, the gracilis and sartorius muscles can be easily excised to reduce volume (Fig. 3). We also routinely use indocyanine green and SPY angiography (Stryker, Kalamazoo, Mich.) to assess flap perfusion and debride poorly vitalized areas. Often, the skin of the



Fig. 2. Intraoperative photograph of popliteal vessels with small surrounding band of tissue remaining connected after knee disarticulation as backup free flap.

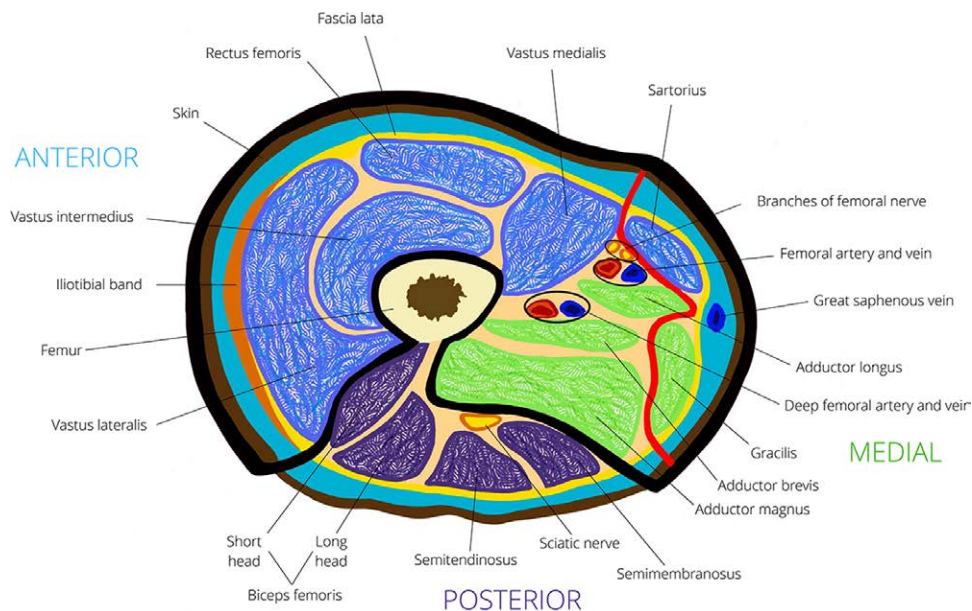


Fig. 3. Cross-section of the thigh. Area in black should be harvested. Sartorius and gracilis (in red) can be included with flap and then trimmed if bulk not needed.

ipsilateral buttocks is discarded or de-epithelialized to allow for rotation and inset of the flap. In the case of hemi-corporectomy, we secure the muscular fascia of the sub-total thigh flap to the fascia of the anterior rectus sheath and oblique musculature using interrupted, long-lasting, absorbable monofilament sutures as a buttress over the pelvic mesh. On the posterior side, we also perform a flap inset with the muscular fascia to what remains of the transected paraspinous muscles and gluteal muscles, also with long-lasting absorbable suture.

CASE PRESENTATIONS

Case 1

A 40-year-old man with hereditary multiple exostosis and recurrent pelvic chondrosarcoma underwent a right-sided hemipelvectomy. He developed recurrence in his left-side and underwent hemi-corporectomy and reconstruction utilizing a 35 x 20 cm fillet of thigh musculocutaneous flap based on the common femoral artery. His course was complicated by superficial wound dehiscence of his posterior incision on postoperative day 10, which was managed by secondary closure. At 3 months, his flap was well healed but had developed a 4-cm stage II pressure wound centrally within the flap. This was treated with wound care and has continued to heal.

Case 2

A 28-year-old man with T10 paraplegia and chronic right hip osteomyelitis ultimately required a right hemipelvectomy after multiple debridements failed. Reconstruction was performed with a 28x23 cm right pedicled anterior fillet of thigh musculocutaneous flap based on the common femoral artery. His course was complicated by left internal jugular vein catheter-associated

thrombus, left femur osteomyelitis, and multifocal cavity pneumonia with lung abscess. At the patient's 6-week follow-up, his flap had healed. He subsequently required a tensor fasciae latae rotational flap for coverage of a contralateral greater trochanteric ulcer.

Case 3

A 66-year-old man with T9 paraplegia developed chronic right-sided pelvic osteomyelitis refractory to multiple debridements and IV antibiotics (Fig. 4). He underwent a right hemipelvectomy with 40x20 cm pedicled anterior fillet of thigh musculocutaneous flap based on the superficial femoral artery. His course was complicated by fluid collections along the right hemipelvis and abdomen treated with multiple drains placed by interventional radiology, a left pleural effusion requiring chest tube placement, and a 2 cm posterior incisional dehiscence. On the day of discharge, 4 months postoperatively, his flap, including prior site of dehiscence, was healing

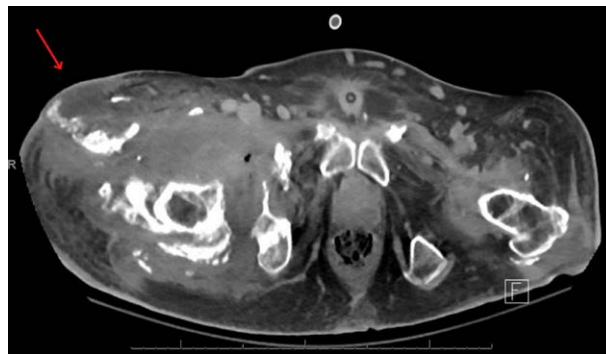


Fig. 4. Preoperative computed tomography scan demonstrating extensive right-sided osteomyelitis (red arrow).

well. (See figure, Supplemental Digital Content 1, which displays the lateral postoperative photograph taken at 4 months. <http://links.lww.com/PRSGO/C552>.) (See figure, Supplemental Digital Content 2, which displays the posterior postoperative photo taken at 4 months. <http://links.lww.com/PRSGO/C553>.)

CONCLUSIONS

The pedicled fillet of thigh flap can be used for the reconstruction of hemipelvectomy defects and should also be useful for hemicorporectomy defects as well as defects resulting from hip disarticulation performed for recalcitrant osteomyelitis with associated recurrent pressure ulceration. It is a well-vascularized, robust flap that provides adequate length to cross midline and may help mitigate the high risk of sacral pressure wounds in this population.

Mark Greyson, MD

University of Colorado Anschutz Medical Center
Division of Plastic and Reconstructive Surgery
12631 E. 17th Ave, C309 (Room 6414)
Aurora, CO 80045
E-mail: mark.greyson@cuanschutz.edu

DISCLOSURES

The authors have no financial interest to declare in relation to the content of this article. The views expressed in this article are those of the authors and do not reflect the official policy or position of the Department of the Navy, Department of Defense, or the U.S. Government.

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