

The Pedicled Anterolateral Thigh Flap for Donor Site Closure after a Large Superficial Circumflex Iliac Artery Perforator Flap Harvest

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Summary: The superficial circumflex iliac artery perforator (SCIP) flap is useful for covering defects in the extremities because its pedicle size can match many recipient options. However, when harvesting a large flap, skin grafting of the donor site is not highly recommended because of the mobility of the hip joint and occasional lymphorrhea. Here, we present a case of a successful reconstruction of a defect in the lower leg after sarcoma resection, using a large SCIP flap. A 58-year-old man underwent resection of a large soft tissue tumor in the lower leg, resulting in a 16×14 cm defect. A 25×14 cm SCIP flap was harvested from the groin, and the superficial circumflex iliac artery and the superficial circumflex iliac vein were anastomosed to the saphenous artery and the great saphenous vein, respectively, in an end-to-end fashion. For coverage of the groin donor site, a 25×8 cm pedicled anterolateral thigh (ALT) flap was harvested from the ipsilateral lateral thigh and was pulled through a subcutaneous tunnel to the groin. The additional operative time for pedicled ALT flap elevation and transfer was approximately 15 minutes. With this pedicled ALT flap, the donor site of the SCIP flap could be closed directly over a drain. The follow-up at 3 months showed complete survival of both flaps, and the patient was able to walk with a cane. The pedicled ALT flap allows for direct closure of the donor site after a large SCIP flap harvest. (*Plast Reconstr Surg Glob Open* 2023; 11:e5115; doi: 10.1097/GOX.00000000000005115; Published online 12 July 2023.)

Coverage of large defects in the lower leg after soft tissue tumor resection can be challenging due to the paucity of the recipient arteries. The superficial circumflex iliac artery perforator (SCIP) flap is one of the optimal flaps for this purpose, because the small diameter of the superficial circumflex iliac artery (SCIA) can match relatively small recipient arteries in this region, such as the descending genicular artery or its distal branch, the saphenous artery.¹ Pliable skin of the donor site allows for direct closure up to 12 cm in flap width.¹ Skin grafting of the donor site becomes necessary when flap dimension exceeds this width, but this is known to result in a relatively low take rate, often due to abundant lymphatic exudate from the region.² Locoregional flaps could be the next option to cover the defect after SCIP flap harvest. A

pedicled anterolateral thigh (ALT) flap, with reliable and consistent vascular anatomy and a relatively long pedicle, has served as a valuable option for reconstruction of lower abdominal, groin, and perineal regions.^{3,4} Herein, we report a case where a large defect in the lower leg after sarcoma resection was reconstructed using a large SCIP flap, and the donor site was closed using a pedicled ALT flap.

CASE REPORT

A 58-year-old man with a body mass index of 28.7 presented with a mass that was increasing in volume in his right medial lower leg, which was diagnosed as spindle cell sarcoma. The patient had a 15-year history of diabetes mellitus, which was treated with insulin therapy at the time of presentation. The patient had been a smoker from the age of 18–49 years. Wide resection of the tumor, partial resection of tibia, and immediate reconstruction using a large SCIP flap were planned. Tumor extirpation resulted in a 16×14 cm defect (Fig. 1). A 25×14 cm SCIP flap was harvested from the right groin, in which the superficial branch of the SCIA and the superficial circumflex iliac vein, both of which were identified with preoperative ultrasonography, were dissected out in the beginning.⁵ The vessels were placed in the middle of the skin paddle

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Fig. 1. A 58-year-old man presented with a mass that was increasing in volume in his right medial lower leg. Tumor extirpation resulted in a 16×14 cm defect.



Fig. 2. The defect was covered with a large SCIP flap (25×14 cm).

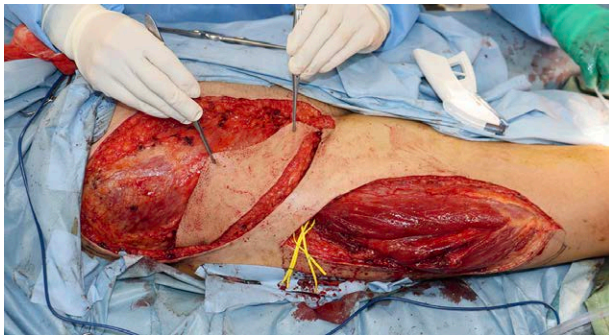


Fig. 3. For coverage of the groin donor site, a 25×8 cm pedicled ALT flap was harvested from the right lateral thigh and was pulled through a subcutaneous tunnel to the right groin.

to maximize its perfusion. The SCIA and the superficial circumflex iliac vein were anastomosed to the saphenous artery and the great saphenous vein, respectively, in an end-to-end fashion. The defect after tumor resection was completely covered with the SCIP flap (Fig. 2). For coverage of the groin donor site, a 25×8 cm pedicled ALT flap was harvested from the right lateral thigh and was pulled through a subcutaneous tunnel to the right groin (Fig. 3). With this pedicled ALT flap, the donor site of the SCIP



Fig. 4. Postoperative view at 3 months. Both the SCIP flap and the ALT flap survived completely with satisfactory contour.

flap could be closed directly over a drain. The ALT donor site was also closed directly over a drain. The additional operative time for pedicled ALT elevation and transfer was approximately 15 minutes. Both flaps survived completely, and ambulation with a cane was resumed 1 week after the operation (Fig. 4). There were no postoperative complications in the donor site. The patient began ambulation without any assistance 4 weeks after the operation. After a 3-month follow-up period, the knee flexion range of motion was 132 degrees, while the knee extension range of motion was 0.5 degrees. The hip flexion range of motion was 126 degrees, and the hip extension range of motion was 13 degrees.

DISCUSSION

The SCIP flap has been widely used in reconstruction for defects of soft tissue in the extremities, especially when the procedure is performed in the supine or lateral position.^{1,5,6} The diameter of the SCIA is usually around 1.2 mm; so almost any small perforator and its venae comitantes, if found, can be used. If no small recipient vessels can be found, an end-to-side anastomosis can be performed to larger source vessels.¹ The SCIP flap is also useful for covering large defects, because the width of the donor site that can be directly closed is larger than that of other perforator flaps such as the ALT flap, the thoracodorsal artery perforator flap, the profunda femoris artery flap, and the medial sural artery perforator flap.¹ However, the greater the width, the greater the probability of wound dehiscence complications. Skin grafting of the groin donor site is less likely to be successful, partly due to abundant lymphatic vessels and lymph nodes in the region; lymphorrhea significantly decreases the take rate.²

An alternative choice for addressing the defect was to use a musculocutaneous flap, although this would have resulted in a notably bulky flap, which is not desirable for the front portion of the lower leg. Other options involving fasciocutaneous flaps such as a large ALT flap would have necessitated skin grafting at the donor site, which could have prolonged the healing process and delayed

postoperative treatments of sarcoma; healing time of a skin graft is reported to be generally longer than that of the pedicled flap, especially in a patient with a history of smoking as in the presented case.⁷

Combining the SCIP flap with the superficial inferior epigastric artery flap or the deep inferior epigastric artery flap has been proposed for coverage of large defects, allowing for direct closure of the donor site.⁸ However, the method may necessitate multiple arterial anastomoses at times, which can be a burden for surgeons with less experience.

Use of pedicled flaps for direct closure of the donor site after a SCIP flap elevation has been reported.⁹ However, because the SCIP flap was larger than the ones reported, it would have been extremely difficult to achieve direct closure of the donor site with pedicled flaps elevated in the proximity of the donor site.

The pedicled ALT flap is widely used as a dependable workhorse for reconstruction of complex abdominal and pelvic reconstructions.¹⁰ To the best of our knowledge, this is the first report of using a pedicled ALT flap for the coverage of a large SCIP flap donor site.

The greatest disadvantage of this method is additional operative time. However, because the ALT flap is a well-described and widely used flap, its elevation should not take much time. Postoperatively, the patient's hip flexion must be limited for several days to kink the pedicle of the ALT flap. This method adds one more flap that has to be monitored, which may increase the burden of the medical staff. However, once the flap is stabilized, it will be easier to manage.

Herein, we report a successful transfer of a pedicled ALT flap to close the donor site of a SCIP flap. In cases when a large SCIP flap must be used, this method may be a good option for coverage of the donor site, allowing harvest of a very large SCIP flap.

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DISCLOSURES

Yuma Fuse, Tomoyuki Yano, and Hidehiko Yoshimatsu are editorial board members of *Microsurgery* and also co-authors of this article. To minimize bias, they were excluded from all editorial decision-making related to the acceptance of this article for publication. Ryo Karakawa has no financial interest to declare in relation to the content of this article.

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