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IDEAS AND INNOVATIONS

Reconstructive

Chimeric Superficial Circumflex Iliac Perforator Flap Including External Oblique Fascia: A Refinement of Conventional Harvesting

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Summary: The superficial circumflex iliac perforator (SCIP) flap is one of the most suitable flaps to cover distal extremity defects due to its lack of bulkiness and donor site concealment. However, it is less popular than other perforator flaps due to its anatomical variations, short pedicle length, and small caliber vessels. We describe a novel design for the SCIP flap, consisting of a chimeric flap with a piece of the external oblique muscle fascia. The purpose of this design is to cover and protect the vascular anastomosis in distal lower limb defects where recipient vessels are superficial and skin coverage is poor. In addition, lengthening the pedicle with this design makes the flap more versatile. The addition of a cuff of fascia in harvesting of the SCIP flap lengthens the pedicle, allowing easier insetting of the skin paddle and providing complete protection and coverage of the vessels. This procedure allows greater versatility in inset of the skin paddle and is particularly suitable in cases where recipient vessels are superficial or when skin coverage is poor. *(Plast Reconstr Surg Glob Open 2016;4:e766; doi: 10.1097/GOX.0000000000000757; Published online 28 June 2016.)*

Traditional groin flaps were first described by McGregor and Jackson[1] in 1972 and Daniel and Taylor[2] in 1973.[3–6] In 2004, Koshima et al[7] presented the superficial circumflex iliac perforator (SCIP) flap, consisting of the dissection of a large groin flap based on a single perforator rising from the superficial circumflex iliac artery (SCIA). The SCIP flap is one of the most useful flaps to cover distal extremity defects as it provides a large amount of skin and soft tissue in sites where bulkiness must be avoided. It also allows direct closure and concealment of the donor site. However, it is seldom used due to its drawbacks such as anatomical variations, short pedicle length, and small caliber vessels that frequently require a hardener and make vascular dissection difficult.

Several anatomical variations of the SCIP technique have been proposed to meet clinical needs. These include the super-thin SCIP flap, sensate SCIP flap using intercostal nerves, supercharged SCIP flap using intercostal artery perforator flaps, use of vascularized iliac bone combined with the SCIP flap, vascularized groin lymph nodes combined with the SCIP flap, and SCIP–deep inferior epigastric perforator combination.[7–9] Each of these modifications improves results of SCIP in specific conditions.

We describe a novel variation of the SCIP flap, consisting of a chimeric flap with a portion of external oblique muscle fascia based on a small branch arising from the main pedicle of the flap.

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PATIENT AND METHODS

Surgical Technique

The procedure follows previous descriptions of raising this flap.[7,10,11] Briefly, a line is drawn between the anterior superior iliac spine and the pubis. With the angio–computed tomographic scan and/or hand-held Doppler ultrasound, cutaneous branches of the SCIA are located in the skin paddle. First, a skin incision is made over the site where the main pedicle (superficial branch of SCIA) lies in the medial and lower part of the skin paddle. The dissection then proceeds from distal to proximal and lateral to medial, allowing incorporation of sizeable perforators in the flap. The dissection should be located in the suprafascial plane. Once the fascia of the oblique muscle is reached, care must be taken to preserve the branches running in this direction. A cuff of fascia of 4 cm × 2 cm centered on one of the sizeable branches is then taken as the pedicle is raised (Fig. 1). Once the main pedicle and a branch running toward the external oblique fascia are located and isolated with the flap, the lower incision is performed. Under direct vision, the pedicle is dissected to its origin in the femoral vessels. Figure 2 shows a schematic drawing of the location of the branches and their relationship with the main pedicle. The pedicle averages 3 mm in diameter and has 1 artery and 2 veins (the artery is about 2 mm in diameter). The whole flap is elevated and transferred to the defect. After completing the anastomosis, the cuff of fascia is placed directly on the vessels to protect the anastomosis and the pedicle. If primary closure is not possible without tension, a split skin graft can be placed over the fascia flap for coverage. The donor site can be closed directly (Figs. 1 and 2).

We present the case of a 52-year-old woman who underwent a chimeric SCIP flap with external oblique fascia following a full-thickness defect on the left dorsal foot with exposure of the tendons. Because the peritenon was gone, a free flap or pedicle flap was necessary to provide adequate coverage. We designed an SCIP chimeric flap that includes a cuff of external oblique fascia, and this piece of vascularized fascia was used to properly cover the anastomosis and vessels (Fig. 3). The vascular anastomosis was performed to the dorsalis pedis vessels in an end-to-end fashion. The piece of fascia was placer over the anastomosis to protect it. The final aspect of the flap five months after surgery is shown in Figure 4. The patient could walk normally with a complete recovery of the foot movement.

DISCUSSION

The SCIP flap has undergone many variations in its design since it was first described in 2004 by Daniel and Taylor.[2] These authors included both the superficial and deep branches of SCIA, which was the first free groin flap for reconstruction of the lower limb.[2] More recently, with the introduction of perforator flaps, many authors have demonstrated the viability of raising large groin flaps based on a single perforator. Sinna et al[12] considered the perforator should preferably arise from the deep branch of the SCIA, although other authors recommended that the inclusion of 1 dominant perforator, whether it arises from the superficial branch or the deep branch, is sufficient to nourish the flap.[7,13] Further refinements of this flap have been reported, such as the super-thin flap that was raised above the Scarpa fascia so as to preserve not only the deep fat tissue but also the lymphatics, lymph nodes, and cutaneous nerves.[14] Koshima et al[7] described several variations of the SCIP flap, such as a supercharged SCIP flap that has an intercostal artery perforator flap, combined

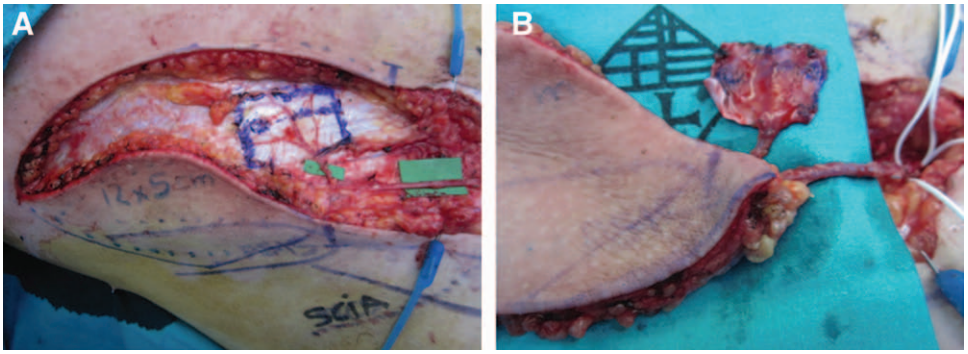

Fig. 1. A, During dissection, after performing the upper incision, a branch toward the external oblique muscle fascia is isolated and a cuff of the fascia is drawn with a marking pen. The green underground is placed below the superficial branch of the SCIA. B, The whole flap is raised and the pedicle is dissected until reaching the femoral vessels. The piece of the fascia showing the corresponding branch arising from the main pedicle.

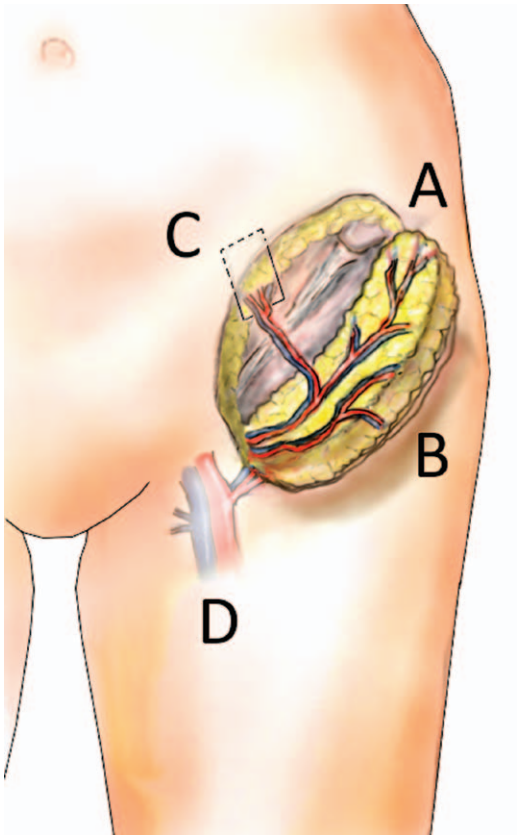

Fig. 2. Drawing of the branches arising from the femoral vessels. A, Perforators of the SCIP flap arise from the superficial branch. B, Deep branch of the superficial circumflex iliac flap is spared. C, Branches toward the external oblique muscle fascia should be spared during harvesting of the flap. D, Femoral vessels.

Fig. 3. After a degloving injury of the foot, it was covered using a chimeric SCIP flap. A piece of fascia lying above the vessels can be seen to protect them.

with the vascularized iliac bone and the addition of groin lymph nodes or conjoined with the deep inferior epigastric perforator flap.[8,9,15,16]

In this report, the chimeric SCIP flap ensures coverage of the pedicle in the recipient site by including a cuff of fascia based on a branch toward the external oblique muscle. This addition allows more versatility in skin paddle placement and lengthens the pedicle. This variation of the SCIP flap may be particularly valuable in traumatic cases where suitable recipient vessels are located far from the wound. Moreover, in areas where the recipient vessels are superficially located and skin coverage is poor, such as the lower leg and foot, this flap may provide optimal coverage of the anastomosis.

Fig. 4. Postoperative picture of the left foot 5 months after surgery. The piece of split skin graft placed over the fascia, in the area of the anastomosis, of 1 × 2 cm (in the ankle, the most proximal scar) was hypertrophied.

CONCLUSIONS

We described a chimeric flap that includes a cuff of external oblique fascia in harvesting of the SCIP flap. This procedure allows more versatility in insetting of the skin paddle and is particularly suitable in cases where the recipient vessels are superficial or when skin coverage is poor.

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