

# The SIEA SHRIMP Flap: An Ultrathin Axial Pattern Free Flap Useable in Obese Patients

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**Summary:** The reconstruction of distal extremity wounds poses a unique surgical challenge. In free tissue transfer, a thin, pliable skin flap is the ideal. Obese patients have a paucity of thin skin donor sites. Herein we report the discovery of a free SHRIMP flap (Superthin Harvest of a Reliable Islanded Medial Pannus flap) based on the SIEA vessels, harvested from a thick abdominal pannus at the time of cosmetic abdominoplasty. A 61-year-old woman with a chronic wound of the right Achilles tendon was evaluated for reconstruction after failing conservative measures. At the time of consultation, the patient expressed interest in abdominoplasty. Therefore, a skin flap from the abdomen or rectus abdominis muscle flap in the context of an abdominoplasty was offered. Despite obesity affecting the pannus, the superficial inferior epigastric vessels were found to course superficially beneath the dermis at time of abdominoplasty. This allowed straightforward harvest of a superthin flap of skin and minimal subcutaneous fat, which contoured to the ankle with an aesthetically pleasing outcome. The patient was satisfied with the results of her abdominoplasty and coverage of her chronic wound. The SHRIMP flap provides a straightforward, axial pattern, superthin free skin flap based on the superficial inferior epigastric vessels, and represents a useful option in obese patients. The flap can be combined with abdominoplasty for an aesthetic donor site. (*Plast Reconstr Surg Glob Open* 2022;10:e4274; doi: [10.1097/GOX.0000000000004274](https://doi.org/10.1097/GOX.0000000000004274); Published online 22 April 2022.)

Muscle flaps have traditionally been used for distal extremity coverage, capitalizing on the atrophy caused by denervation to achieve a thin contour. However, the ideal coverage would be a thin skin flap: “replacing like with like.” Muscle flaps have been shown to have a higher rate of secondary skin grafting and revision procedures than fasciocutaneous flaps used for lower extremity coverage.<sup>1</sup>

Obese body habitus is a common factor affecting flap selection in Western populations. Few skin flaps are both reliably thin in obese patients and have an aesthetically acceptable donor site. The radial forearm and distal lateral arm flaps both have aesthetically significant donor site morbidity. Flaps such as the anterolateral thigh and the

superficial circumflex iliac artery perforator flap raised at the suprafascial or even suprascarpal level are generally very thin, and provide acceptable donor site morbidity.<sup>2,3</sup> However, in obese patients, even suprascarpal harvest of the anterolateral thigh flap may not provide a thin enough flap to be suitable for distal extremity defects. The superficial circumflex iliac artery perforator flap is a thin flap; however, in the obese, the flap should be harvested from beneath an overhanging pannus, which puts the incision at risk for wound healing complications.

Therefore, in the case of obese patients, rather than looking for a thin area of the body from which to harvest a skin flap, one may be forced to consider how to make a thick donor site into a thin flap. Herein we introduce a very thin axial pattern skin flap suitable for distal extremity reconstruction. The flap is termed the SHRIMP flap (Superthin Harvest of a Reliable Islanded Medial Pannus flap) to emphasize that it is appropriate for use even in obese patients. This case report describes the flap’s utility and its serendipitous discovery during cosmetic abdominoplasty.

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## MATERIALS AND METHODS

A 61-year-old woman with BMI of 33.7 presented with a chronic postoperative wound overlying the right Achilles tendon that had been present for 18 months and failed multiple prior surgical interventions (Fig. 1). (See Video [online], which displays details of SHRIMP flap harvest along with summary and discussion of case report.)

Dorsalis pedis artery and posterior tibial artery pulses were palpable. A recommendation of excision and free flap reconstruction with thinned gracilis muscle flap and split-thickness skin graft was made.

The patient returned to the clinic to inquire about cosmetic abdominoplasty and the possibility of combining the two operations. Physical examination revealed a moderate but thick infraumbilical pannus, and moderate supraumbilical laxity (Fig. 2). Given the patient's interest in an abdominoplasty, we discussed the use of a skin flap or rectus muscle flap from the abdomen.

On the operative day, the chronic wound and scar tissue were excised. The resultant defect measured 7×4 cm. Next, the caudal incision of the abdominoplasty was made and minor branches of the SIEA/V vessels were identified within the superficial subcutaneous fat. The vessels coursed superficially; so an axial pattern skin flap from the lower abdomen was elevated based on the superficial inferior epigastric



**Fig. 1.** Preoperative view of chronic Achilles wound.



**Fig. 2.** Preoperative view of thick abdominal pannus.

artery and vein. Flap elevation was performed in the subcutaneous plane, by excluding all tissue deep to the SIEV, even further superficial than the Scarpa's plane. Thus, the flap was quite thin (0.8 cm) despite the thickness of the pannus (10–12 cm, with suprascarpal layer being 5–6 cm). Pedicle length was initially 8 cm, but was trimmed to 4 cm for appropriate inset. (See Video [online].)

End-to-side anastomosis was performed between the SIEA and the posterior tibial artery. The SIEV and SIEA comitantes were anastomosed end-to-end to the posterior tibial venae comitantes.

The abdominoplasty continued in the standard fashion and was paid for by the patient. Rectus abdominis plication was not performed to mitigate the risk of deep vein thrombosis and pulmonary embolus, given the patient's expected postoperative immobility.

## RESULTS

The postoperative course was unremarkable, with complete flap survival, excellent contour, and an improved abdominal contour (Figs. 3, 4).

## DISCUSSION

To our knowledge, we report the first use of a super-thin SIEA flap for reconstruction of an Achilles wound harvested from an obese pannus during cosmetic abdominoplasty.





**Fig. 3.** Postoperative appearance of abdominal donor site status post abdominoplasty.

Suprafascial and suprascarpal perforator-based flaps have been described for resurfacing shallow defects, but even flaps such as the superficial circumflex iliac artery perforator flaps can be thicker than desired in the obese population.<sup>4,5</sup> Less is known about flaps that are thinned significantly beyond the suprascarpal level when the suprascarpal fat is thick. Although these techniques have been described in the literature,<sup>5,6</sup> they add an element of unpredictability and risk to flap perfusion.

The superficial nature and predictable course of the SIEA and SIEV allow for an axial pattern flap with



**Fig. 4.** Postoperative appearance of SHRIMP flap harvested from thick abdominal pannus and inset to Achilles wound, demonstrating good contour.

a simple dissection. Within 2–3 cm of crossing the inguinal ligament, the SIEA pierces Scarpa's fascia to become superficial and run in the subcutaneous tissue.<sup>7</sup> Perforating branches are given off until the level of the umbilicus, providing a robust skin paddle particularly in obese patients.<sup>7</sup> However, to our knowledge, reports on the use of the SIEA flap for extremity defects in the literature all seemingly describe full-thickness harvest, from the abdominal wall to the skin, in thinner patients.<sup>8,9</sup> In these cases, primary thinning was not performed, at times requiring significant debulking liposuction months later.<sup>8</sup>

Although thin skin flaps based on the SIEA have been reported, none seem to have been harvested from a thick pannus, and thinned to the level of our reported case.<sup>10</sup> Our patient provided an opportunity to utilize her unwanted tissue as a creative solution to her chronic wound. Normally we select a thin area of the body, or purposefully seek out thick areas to reconstruct defects that require a voluminous flap. However, this case highlights the ability to convert thick to thin in a novel way. The SHRIMP flap is also an enjoyable example of the “art” of plastic surgery, as this novel approach solved a functional problem using excess tissue from a desired cosmetic procedure.

## CONCLUSIONS

In patients who desire concomitant panniculectomy or abdominoplasty in the setting of a distal extremity defect, the SHRIMP flap based on the superficial inferior epigastric vessels is a possible option if anatomy permits. An axial pattern, thin flap can be raised despite a thick pannus. Combining these two procedures minimizes donor site morbidity and provides an aesthetically favorable reconstruction.

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