

Fasciocutaneous Free Tissue Transfer in Limb Salvage: Prior Flap as a Split-thickness Skin Graft Donor Site

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Summary: Free flap surgery for limb salvage has become the surgical standard for reconstruction of bone and soft tissue with success rates and flap survivals of 94%–95%. The soft tissue defect dictates the technique of coverage. In many cases, multiple techniques of soft tissue coverage are necessary, ranging from myocutaneous and fasciocutaneous free flaps to split-thickness skin grafts (STSGs). It has been shown that fasciocutaneous free flaps are not inferior to muscle flaps in treatment of lower leg limb salvage. Although a complete flap loss is rare, it is not uncommon to have partial flap necrosis, wound dehiscence, or secondary soft tissue defects, necessitating further minor reconstruction, which we call “touch up” skin grafts. In many of these secondary procedures, split thickness skin grafts are sufficient. We have been using the skin portion of the fasciocutaneous free flap as a donor site for harvesting STSGs for quite some time without disadvantages. We believe that minimizing additional donor site morbidity is of great importance. The free tissue transfer is insensate and readily available at the site of injury, making prepping and draping simple as well as cosmetically acceptable, as the transferred free tissue, unfortunately, is rarely a perfect fit. The associated pain, discomfort, and scar of an additional donor site can be avoided. In our case series, we did not experience any flap loss, infections, or complications. Thus, harvesting an STSG from a fasciocutaneous free flap seems to be a feasible option to be considered in limb salvage. (*Plast Reconstr Surg Glob Open* 2023; 11:e5212; doi: [10.1097/GOX.0000000000005212](https://doi.org/10.1097/GOX.0000000000005212); Published online 16 August 2023.)

TECHNIQUE

This retrospective review includes six patients who required additional skin grafting after successful free flap reconstruction. Approval for this study was obtained from the University of Pennsylvania institutional review board. Four patients were men and two were women, with a mean age of 57 years. Reasons for skin grafting included wound dehiscence, partial loss of the flap, and additional/remaining defects not directly covered by the free tissue transfer. All six patients received a split-thickness skin

graft (STSG) (12/1000-in) taken from the skin overlying the free flap that had been used for initial coverage of the soft tissue defect. All the grafts were harvested with a pneumatic dermatome under general anesthesia, meshed 1:1.5, and grafted onto the necessary defect. The donor site was covered with a sterile petrolatum gauze dressing. Demographics as well as free flap type, reason for skin grafting, flap size, size of harvested skin graft, interval between free flap and skin graft, postoperative complications, and follow-up are summarized in [Table 1](#). No complications related to the STSG harvesting were noted. No free tissue transfer was lost after a minimal follow-up of 6 months [mean: 19 months (range: 6–38)].

DISCUSSION

STSG is one of the most frequently used procedures in reconstructive plastic surgery. An STSG includes the epidermis and part of the dermis and can be taken from almost anywhere on the body. The donor site heals by reepithelization in approximately 3 weeks. However, donor site morbidity is inevitable and largely

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Table 1. Patient Demographics and Overview

#	Age (y)	Gender	Indication for Free Flap	Flap Type	Reason for Skin Grafting	Flap Size (cm × cm)	Skin Graft Size (cm × cm)	Time between Index Surgery and Skin Graft (wk)	Postoperative Complications	Follow-up (mo)	Flap Survival
1	70	M	Insufficient soft tissue envelope for ankle fusion	Fasciocutaneous lateral arm flap	Partial necrosis after re-raising	12×12	5×5	24	None	35	Yes
2	67	M	Chronic wound over Achilles tendon	Fasciocutaneous anteromedial thigh flap	Wound dehiscence	15×15	4×6	16	Multiple minor touch ups without further STSG	38	Yes
3	61	F	Traumatic defect medial malleolus/tibia	Fasciocutaneous anterolateral thigh flap	Wound dehiscence	21×14	10×10	5	None	17	Yes
4	63	F	Septicemia necrosis	Fasciocutaneous groin flap	Wound dehiscence	5×5	4×4	4	None	14	Yes
5	14	M	Soft tissue defect for correction of club foot deformity	Fasciocutaneous bi-lobe parascapular and scapular flap	Remaining defect	20×15	6×6	3	Wound dehiscence without additional STSG	6	Yes
6	65	M	Septic bilateral forefoot infarction	Left split fasciocutaneous ALT for both feet	Remaining defect	15×12	8×4	11 d	None	6	Yes

M, Masculine; F, Feminine.

Takeaways

Question: How can we minimize donor site morbidity in patients requiring complex free tissue transfers?

Findings: In this retrospective study, we demonstrate that a split-thickness skin graft can be taken as early as 11 days after a fasciocutaneous free tissue transfer without compromising the free flap.

Meaning: Consider the fasciocutaneous free flap as a donor site for a split-thickness skin graft to minimize donor site morbidity.

underestimated.¹⁻⁴ Donor site morbidity includes pain, discomfort, infections, pruritus, wound exudation, and aesthetic dissatisfaction.⁵

Harvesting an STSG from the free tissue transfer offers multiple advantages. The free tissue transfer is insensate for at least 3 months after transfer, making harvesting of the graft and the subsequent dressing changes less discomforting to the patient.^{5,6} Additional advantages include its vicinity to the defect that needs additional coverage as well as the lesser cosmetic disturbance when harvesting the STSG from the already cosmetically noticeable free tissue transfer, compared with harvesting the graft from a distant site.

In our series, we harvested the STSGs from a multitude of fasciocutaneous flaps, including anterolateral and anteromedial thigh flap, lateral arm flap, groin flap, and parascapular flap, demonstrating that this is a feasible option in these fasciocutaneous flaps and can be safely performed early after the index surgery to cover remaining defects that cannot and do not need to be covered by the free flap. We have proceeded on harvesting the STSG as early as 11 days after free tissue transfers without issues and, thus, markedly earlier than Kim et al⁷ (Fig. 1). We did not experience any complications. The STSG taken only 11 days after index surgery showed a 100% take on the recipient site and a readily healing donor site. We do not believe there is a minimum time to be waited for until an STSG can safely be harvested from a fasciocutaneous free flap. Neovascularization, which may start as early as 5–10 days after inset, is not a prerequisite for harvesting an STSG from a free tissue transfer.^{8,9}

The donor site on the free tissue transfer healed without complications in all cases, in a similar manner compared with traditional donor sites, and were mostly performed in an out-patient setting (Fig. 1). General anesthesia was performed in all patients. The outcomes of the STSG were inconspicuous and comparable to other skin grafting procedures.

Disadvantages of this technique mainly include the size limitation for these “touch up” skin graft procedures, as this is limited to the size of the transferred free tissue. However, in our experience, large STSGs are rarely necessary, as the greater part of the soft tissue defect is covered by the free tissue transfer.

In conclusion, harvesting an STSG from a fasciocutaneous free flap is an elegant and safe option, possibly even earlier than 11 days after the index surgery, to obtain an

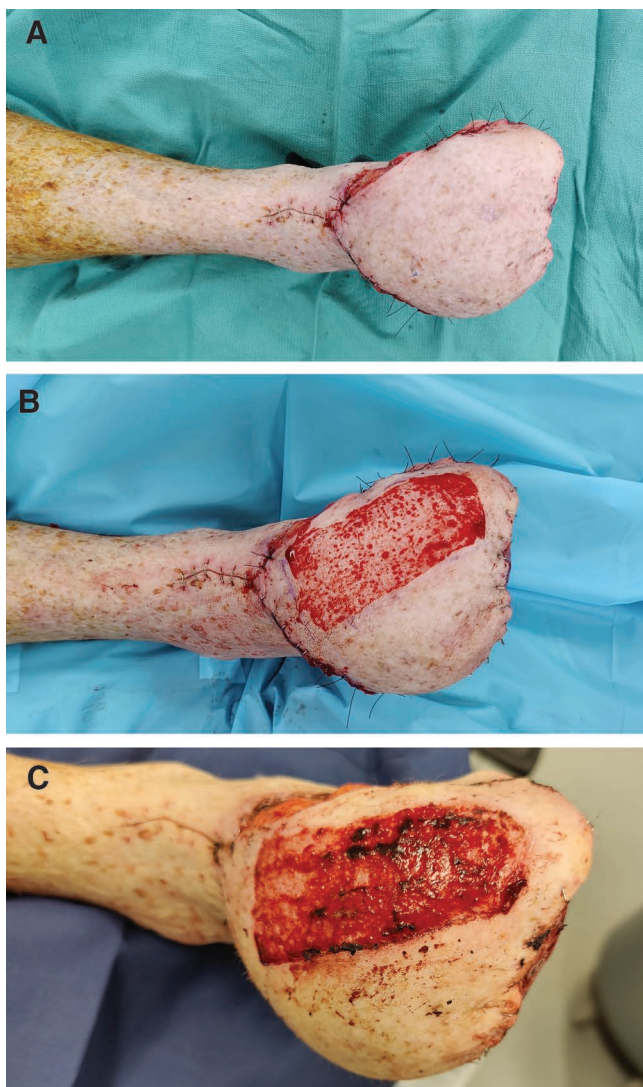


Fig. 1. Picture series depicting the right forefoot of a 65-year-old patient who experienced a bilateral septic forefoot infarction. After surgical debridement and partial forefoot amputation, the soft tissue defect was covered by a split fasciocutaneous ALT flap (A). A superficial soft tissue defect remained, which was subsequently covered 11 days after the index surgery by obtaining a split-thickness skin graft from the fasciocutaneous free tissue transfer (B). An additional 10 days later, the STSG donor site showed inconspicuous healing (C), and the STSG showed a 100% take.

STSG without the need for an additional donor site, and should be readily considered on an individual basis.

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DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

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