

## Distally Based Sural artery Flap without Sural Nerve

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**Abstract-** The distal third of the tibia, ankle and heel area is difficult to reconstruct. For small to medium size defects, local flaps are often an easier alternative than free flap. In lower limb surgery, the sural flap is based on this principle and this flap is becoming increasingly popular. The distally based superficial sural artery flap, first described as a distally based neuro skin flap by masquelet *et al.*, is a skin island flap supplied by the vascular axis of the sural nerve. The main disadvantage of distally based sural artery flap is sacrifice of the sural nerve because it is described the concept of neurocutaneous island flap. We describe one case of reverse sural flap without sural nerve. The aim of this paper is to establish the reliability of this flap even without sural nerve.

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**Key words:** Sural nerve; gurgical flaps

### Introduction

Soft tissue loss in lower leg is a challenging problem, because of poor vascularity of lower leg, relatively tight skin (1). Various forms of coverage, including muscle flaps, fascial flaps, septocutaneous flaps, axial flaps were used that have their own specific indications and inherent disadvantages.

Heel is problematic site because of weight bearing properties; hence it needs a full thickness skin coverage (2). The distally based sural artery flap. First described as a distally based neuro cutaneous flap by masquelet *et al.* (3) is skin island flap supplied by the vascular axis of sural nerve. He reported, using colored latex injection studies in 1992 show that, the blood supply to the skin from the arteries accompanying the nerves and described the concept of neurocutaneous island flap (2). The flap is supplied by the superficial sural artery that accompanies the sural nerve (Figure 1) the artery gives off small branches to the skin in the lower two- thirds of the leg. In the lower part of the tibiofibular space, the superficial sural artery anastomoses with septocutaneous branches from the proneal artery. The flaps can be raised any where in the lower two thirds of the leg, provided the center of the flap is along the centerline of the posterior aspect of the leg. The main disadvantage of the distally based superficial sural artery flap is sacrifice of the sural nerve (3). Some authors recommend raising the flap without sural nerve (4, 5).

### Case Report

A 50- years old man was referred with a non healing ulcer on the right posterior aspect of the heel after motorcycle accident at 3 weeks before admission. He had a history of burn with flame at 35 years ago in right heel. he was smoker. He had not any history of diabetic mellitus, hypertension, ischemic heart disease or peripheral vascular disease.

Biopsy of ulcer was negative for malignancy. After debridement, we candidate him for the coverage of soft-tissue loss in right heel with distally based sural artery flap. The patient lied in prone position .the procedure carried out under pneumatic tourniquet. The flap size was 10 cm in length and 5 cm in width (Figure 1).

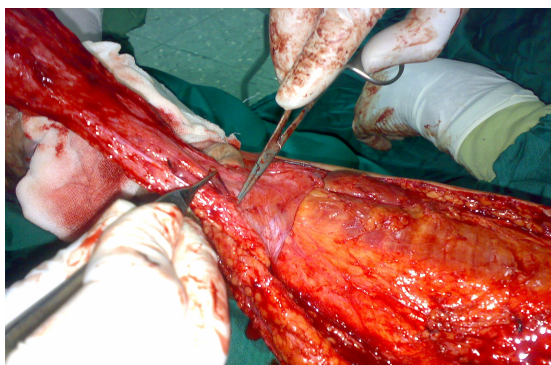


**Figure 1.** The flap is supplied by the superficial sural artery that accompanies the sural nerve

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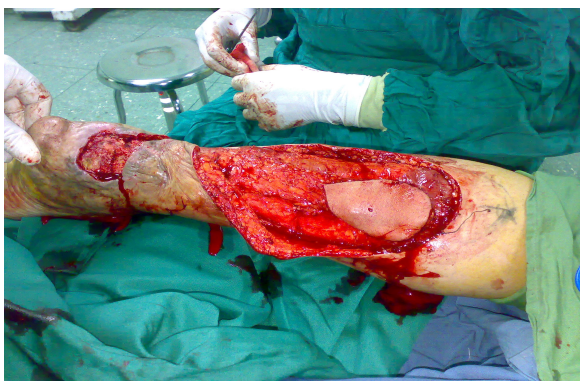
**Figure 2.** We missed sural nerve and only elevated short saphenous vein

The pivot point of the pedicle was 5 cm about the lateral malleolus to allow anastomosis with the peroneal artery. The flap was outlined at the posterior aspect of junction of upper and middle 1/3 leg. The dissection performed from proximal to distal, by elevating the skin paddle, the subcutaneous adipose tissue layer and the leg fascia up to opposite the posterolateral malleolar depression. The subdermal layer was dissected to expose the sural nerve accompanying superficial sural vessels, and short saphenous vein. We missed sural nerve and only elevated short saphenous vein (Figure 2).

The subcutaneous fascial pedicle was elevated with a width of 3 cm (Figure 3). The donor-site defect closed directly with pursestring suture of nylon. The flap sutured at the periphery of the soft-tissue loss.

The pedicle of flap was covered with split thickness skin graft after ten days. In postoperative, weight bearing on the flap avoided.

The patient lied in the dorsal or ventral decubitus position while a heel strap protected the flap. The flap did not show any venous congestion or edema or necrosis. Healing occurred three weeks, and he enabled weight bearing on the heel (Figure 4 and 5).



**Figure 3.** The subcutaneous fascial pedicle was elevated with a width of 3 cm



**Figure 4.** Flap after three weeks posterior view



**Figure 5.** Flap after three weeks lateral view

## Discussion

The distally based sural flap is a good option for coverage distal leg ankle and heel. Little attention had been paid to blood supply to the skin from the arteries accompanying the nerves until Masquelet et al. reported using colored latex (3).

However controversies exist in the papers should the flap include both sural nerve and lesser saphenous vein along with the accompanying vessels or it is unnecessary. Some authors recommend raising the flap without the sural nerve (4,5).

Nakajama et al (6) have shown that sural nerve and the lesser saphenous vein have their own independent accompanying arteries.

The application of this finding in clinical practice leads to creating flaps not including the sural nerve which they named lesser saphenous venodipofascial flap (7). Masquelet *et al.*, who first introduced the concept of neuroskin flap, suggest taking the nerve with the pedicle (7). Hasegawa *et al.* also support the nerve inclusion (8).

Sengjeng *et al.* (9) advise leaving the sural nerve behind and raising the lateral sural nerve with the flap.

Then, they performed neurotomy with the common sural nerve in order to provide sensation in the flaps.

However, the potential for injury to the common peroneal nerve does exist. More study included the sural nerve within the pedicle.

They preferred to secure the blood supply to the flap and accept the loss of sensation in the lateral part of the foot and fifth toe.

Accidentally, we missed sural nerve and raised fasciocutaneous flap only with lesser saphenous vein. We thought sural nerve is essential for living flap. But, we didn't have any necrosis or congestion in our flap.

In our opinion sural flap can rise without the sural nerve, as fascialpedicle flap.

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