

# The proximally based hemisoleus muscle flap for coverage of large soft tissue defect of the middle third of lower leg

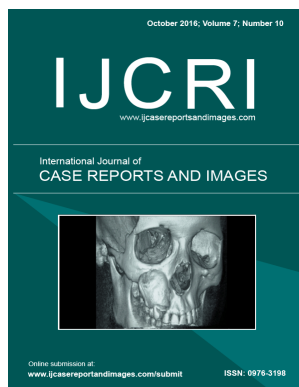
**Ingo Schmidt**

## **ABSTRACT**

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# The proximally based hemisoleus muscle flap for coverage of large soft tissue defect of the middle third of lower leg

Ingo Schmidt

## To the Editors,

Postoperative necrotizing soft tissue defect (NSTD) with exposure of relevant structures such as bone with or without osteosynthesis plates and tendon following highly comminuted fractures of the middle third of lower leg represents a challenging problem. A 49-year-old female presented with severe multiple closed fractures of the lower leg left that was treated initially with external fixation (Figure 1A). One week later, open reduction and internal fixation (ORIF) was performed. After that, the patient developed NSTD of the middle tibial third with large exposure of bone and hardware (Figure 1B). The defect was covered with the proximally based medial part of soleus muscle combined with split skin grafts (Figure 1C). In the further course, wound and fracture healing were uncomplicated (Figure 1D–E). Six months after injury, the function in ankle and knee joint was completely restored, and the patient could be mobilized with full weight-bearing on the affected leg (Figure 1F–G).

The use of local muscle flaps for coverage of large soft tissue defects of the lower leg is an option for treatment in patients who are not willing or healthy enough to undergo free microvascular tissue transplantation. Additionally, it does not require microsurgical expertise, and the complication rate is low. The soleus muscle is located in the posterior region of lower leg, inferior to the gastrocnemius muscle, and is classified as type II according to the classification of Mathes and Nahai [1].

Its major pedicle is the posterior tibial artery, and the perforating branches of this artery are the secondary pedicles [2]. The soleus muscle being the prime ankle plantar flexor and stabilizer of the ankle and cannot be sacrificed without significant morbidity. A consistently bipenniform neurovascular anatomy allows surgically splitting the muscle for transfer of one-half the muscle as a hemi-flap [3]. An advantage of using the hemisoleus flap rather than the entire muscle flap is the preservation of plantar flexion of the foot performed by the lateral portion of the muscle. Moreover, the medial muscle has a greater rotation angle than the entire muscle, and because of the constant arterial supply in its whole length by perforators of the posterior tibial artery the medial

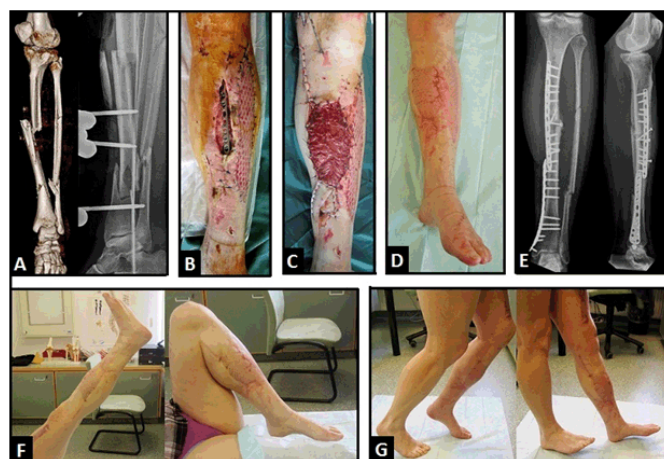


Figure 1: Figure 1: (A) Three-dimensional computed tomography scan and lateral radiograph demonstrating the injury followed by external fixation, (B) Clinical photograph showing large NSTD with exposure of bone and hardware, (C) Clinical photograph showing transfer of the medial hemisoleus muscle before skin grafting, (D) Clinical photograph showing complete healing of hemisoleus muscle flap with skin grafts, (E) Posteroanterior and lateral radiograph six months after injury demonstrating uncomplicated fracture healing, (F) Clinical photographs showing complete restoration of function in knee joint, and (G) Clinical photo showing mobilization of patient with full weight-bearing on the affected leg.

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Received: 30 June 2016

Accepted: 13 July 2016

Published: 01 October 2016

muscle is also viable as a distally based flap for coverage of the distal third of lower leg [4]. Recently, Ahmad et al. reported on complete flap loss in 2.5% and partial skin graft loss in 12.5% of a total of 40 patients [5].

**Keywords:** Middle third lower leg, Proximally based hemisoleus muscle flap, Soft tissue defect

#### How to cite this article

Schmidt I. The proximally based hemisoleus muscle flap for coverage of large soft tissue defect of the middle third of lower leg. Int J Case Rep Images 2016;7(10):683–684.

Article ID: Z01201610LE10022IS

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doi:10.5348/ijcri-201606-LE-10022

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#### Author Contributions

Ingo Schmidt – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

#### Guarantor

The corresponding author is the guarantor of submission.

#### Conflict of Interest

Authors declare no conflict of interest.

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