

POSTERIOR AND ANTERIOR TIBIALIS TURN-OVER MUSCLE FLAPS WITH PRIMATRIX FOR SALVAGE OF LOWER EXTREMITY AFTER FREE-FLAP FAILURE

Dear Editor

Large pretibial defects associated with exposed bone or an open fracture following high energy degloving injuries require reconstruction with microvascular-free tissue transfer. This is often the only option for limb salvage. Despite appropriate vessel selection and adherence to meticulous technique, flap failure rates continue to be much higher in lower extremity trauma than in other anatomical sites, reaching up to 10%, with more than 20% of amputations following a failed-free flap.^{1,2} Increased rates of lower-extremity free-flap failures have been associated with high-energy trauma, thrombocytosis, and intimal damage, particularly for reconstructions performed between 3 days and 6 weeks after injury.³ Execution of a second-free flap to salvage the extremity following initial free-flap failure is beset by a particularly high-failure rate, reported as high as 42–50%.⁴ Under these circumstances, a viable alternative to salvage a lower extremity would be extremely useful.

In 1993, Lo et al.⁵ described the split anterior tibialis muscle flap for coverage of avulsion lower leg injuries with minor bony exposure. Since this first description, the anterior tibialis muscle flap has been reported to be a reliable reconstructive option for soft-tissue defects with exposed mid-shaft of tibia. However, to the best of our knowledge, there have been no reports on a combination of posterior and anterior tibialis muscle turn-over flaps.



Figure 1. (a) Extensive degloving injury with the entire anterior tibia exposed following high-energy road traffic accident. (b) Posterior (black arrow) and anterior (white arrow) tibialis muscle turn-over flaps used to cover the defect following debridement of the failed primary-free flap. (c) Primatrix dermal scaffold integrated over viable muscle flaps. (d) Follow-up at 4 months postoperatively showing a stable and esthetically pleasing reconstruction achieved with no functional impairment. [Color figure can be viewed in the online issue, which is available at wileyonlinelibrary.com.]

These flaps are based on both posterior and anterior tibial artery perforators for coverage of extensive soft tissue defects resulting in the full length and width of tibia exposed, to salvage a lower limb after primary free-flap failure.

We describe the case of a 42-year-old male with extensive degloving injury to his right-lower leg associated with a Gustillo IIIB undisplaced open ankle fracture and exposure of the entire length and width of the right tibia (Fig. 1a). This injury was sustained from a high-energy road traffic accident. The patient was transferred 6 days postinjury from another institution, and free-flap

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reconstruction using the *latissimus* dorsi muscle was performed 2 days later to provide coverage of his right-lower leg extensive defects. On the fourth postoperative day, venous thrombosis of the anastomosis occurred necessitating exploration in the operating theater. However, the flap was not salvageable and was completely debrided. Longitudinal split posterior tibialis and anterior tibialis muscle turn-over flaps were dissected in full length from the knee to the ankle joint, preserving all the perforators arising from the posterior and anterior tibial arteries. Both muscles were turned-over and sutured to each other over entire length and width of exposed tibia (Fig. 1b). The turn-over tibialis muscle flaps were covered with Primatrix™ Dermal Repair Scaffold (TEI Biosciences, Boston, MA) and a topical negative pressure dressing was applied for a week. Successful integration of the dermal scaffold into completely viable muscles was noted after a week (Fig. 1c) and split thickness skin grafting was performed. Healing was uneventful and the grafts were fully taken 5 days postoperatively. At the 4 month follow-up, the patient had stable and esthetically pleasing results with no functional impairment (Fig. 1d).

Posterior and anterior tibialis longitudinal split flaps can provide successful reconstruction of difficult large soft-tissue defects and should be considered as a valuable

alternative for salvage of lower extremity after a free-flap failure.

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