



Case Report on Delayed Rotation of an Extended Reverse Peroneal Artery Perforator based Pedicled Flap: A Robust and Sustainable Option for Reconstruction in Ankle and Foot Defects

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ABSTRACT

The distal lower extremity and foot have long been acknowledged as challenging regions for reconstruction due to unreliable blood supply and the scarcity of local donor tissue, which often limits the use of local and regional flaps. Consequently, free tissue transfer has become the standard approach for treating traumatized lower limbs over the past few decades. The extended reverse sural artery pedicle flap (ERSAPF) is an effective solution for reconstructing complex defects of the ankle and foot. This case report explores the utilization of a delayed rotation technique to enhance the viability and sustainability of the flap in a challenging

reconstructive scenario. A 68-year-old female with a severe left heel defect due to trauma due to glass was treated using a 3- staged approach involving initial harvest and delayed rotation of the ERSAPF and then a Full thickness skin grafting. This technique allowed for increased vascularization before the flap's transfer to the defect site. Postoperative outcomes demonstrated successful integration and healing of the flap, with minimal complications and restored functional mobility. The delayed rotation technique of the ERSAPF presents a robust option for addressing extensive lower limb defects, promoting superior vascularization and sustainable reconstruction.

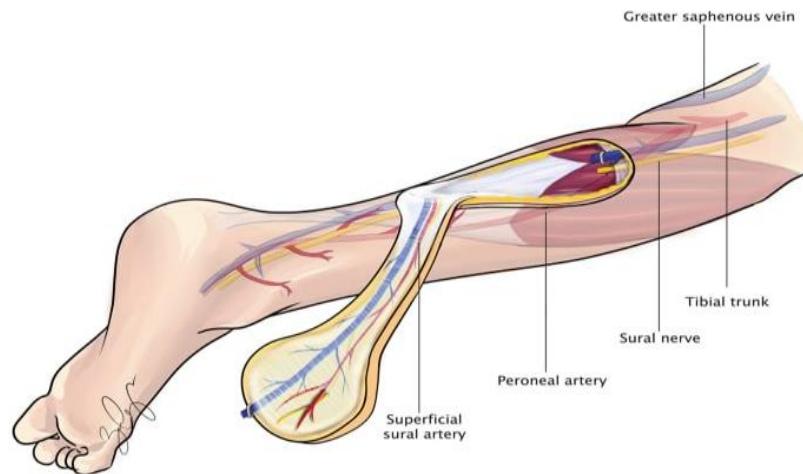
Keywords

Reconstruction, Free tissue transfer, Extended reverse, sural artery pedicle flap (ERSAPF) Vascularization, Delayed rotation technique.

Background

Reconstructive surgery for ankle and foot defects poses significant challenges due to the need for durable, well-vascularized tissue coverage. Thorough understanding of muscle flaps and their vascular anatomy stands as an essential base for understanding fasciocutaneous flaps. Over time, the evolution of perforator flaps from basic fascio-cutaneous flaps has decreased sacrifice of muscle. The ability to transfer substantial pieces of skin and subcutaneous tissue on

single submillimeter diameter vessels perforating into flap substances from underlying source vessels has allowed a nearly uncategorizable plethora of flaps to become useful and popular in modern reconstruction. Traditional methods often face limitations in flap viability, particularly in areas with compromised vascular supply. The extended reverse sural artery pedicle flap (ERSAPF) has emerged as a preferred option due to its reliable blood supply, flexibility, and ease of harvest. By implementing a delayed rotation technique, the vascularization and overall success of the ERSAPF can be further enhanced, particularly in complex and extensive defect scenarios.



Herein we present a case of a 68 -year-old female patient presented with a traumatic defect on the plantar aspect of left foot following an injury sustained. The defect measured cm by cm, exposing the foot muscles. An extended reverse sural artery pedicle flap was designed and marked on the posterior calf. The flap was carefully elevated with its vascular pedicle, but instead of immediate transfer, it was left in situ for two weeks to allow for improved

vascularization through the delay phenomenon (Procedure 1). Post 3 weeks of initial procedure we confirmed adequate vascular perfusion via needle pricking, then the flap was rotated and inserted into the defect area, ensuring meticulous alignment and tension-free suturing (Procedure 2). Postoperatively the flap demonstrated excellent viability with some signs of necrosis, infection, or dehiscence. Complete wound healing was observed within weeks, and the

patient regained functional mobility of the ankle with satisfactory aesthetic results. Follow-up at two months

showed stable coverage and no recurrence of the defect.



Figure 1: Original trauma wound of patient on left foot plantar aspect (pressure/weight) bearing area.



Figure 2: Pre-op marking for fasciocutaneous pedicled flap (left posterior aspect of Leg).



Figure 3: (Procedure 1) Post-op picture of lifted flap for delayed rotation (left posterior aspect of Leg).

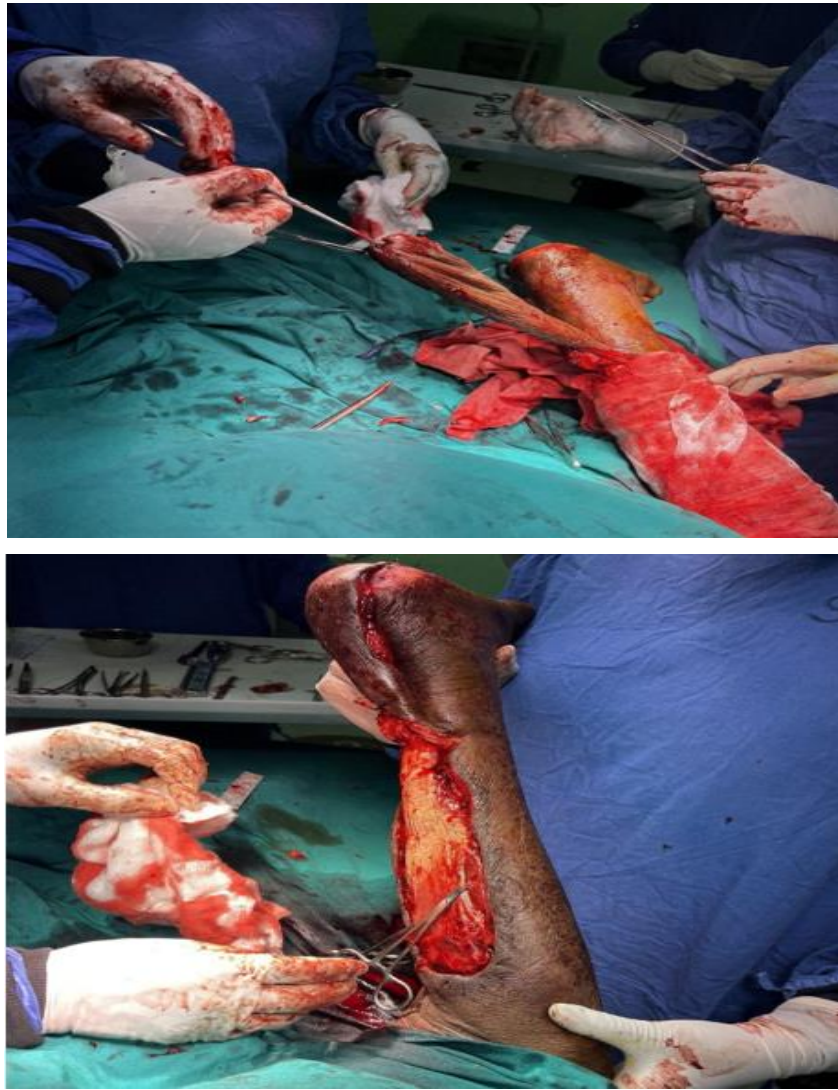


Figure 4: (Procedure 2) Intra op pictures of delayed rotation of fasciocutaneous flap



Figure 5: After 2 months when patient visited for a follow up.



Healed Ulcer

In conclusion the delayed rotation technique significantly improves flap viability by allowing pre-transfer vascular adaptation, reducing the risk of ischemic complications. This approach offers a sustainable and reliable solution for extensive and complex lower limb defects, particularly in patients with compromised local tissue conditions. The delayed rotation of the ERSAPF should be considered in cases where immediate flap transfer may jeopardize viability due to extensive tissue loss or poor vascularity. This technique ensures robust and sustainable reconstruction with favorable functional and aesthetic outcomes. Further studies and clinical trials could provide additional insights into optimizing this approach for broader applications in reconstructive surgery.

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