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Case Report

Innovative Use of Dermal Substitute for Salvage of Exposed Lower Leg Implant

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Abstract: Management of exposed orthopedic implants in patients with diabetes and peripheral atherosclerotic disease is particularly challenging due to compromised vascularity, increased risk of infection, and limited reconstructive options. Flap coverage is considered the gold standard for such defects; however, in certain high-risk patients, flap reconstruction may not be feasible. Dermal substitutes have emerged as a promising alternative in selected cases, offering a less invasive option for achieving soft tissue coverage and limb salvage. Here is a case of old age female patient with exposed implant in lower leg covered with dermal substitute.

Keywords: Lower leg exposed implant, Dermal Substitute, Flap coverage not possible, Advanced plastic surgery, Diabetes mellitus plus atherosclerotic limb, Negative pressure wound therapy (NPWT).

Introduction

Management of exposed orthopedic implants in patients with diabetes and peripheral atherosclerotic disease is particularly challenging due to compromised vascularity, increased risk of infection, and limited reconstructive options. Flap coverage is considered the gold standard for such defects; however, in certain high-risk patients, flap reconstruction may not be feasible. Dermal substitutes have emerged as a promising alternative in selected cases, offering a less invasive option for achieving soft tissue coverage and limb salvage.

Case Presentation

A 60-year-old female with poorly controlled diabetes mellitus and known atherosclerotic lower limb disease presented with an exposed implant at the site of a right lower limb fibula fracture. The surrounding soft tissue was severely compromised with signs of infection and poor healing capacity. There was pouring pus from the wound. Vascular assessment suggested suboptimal perfusion, limiting reconstructive options.

Given the patient's comorbidities and local tissue condition, both local and free flap options were deemed unsuitable. The limb was considered at high risk for amputation.

Management

A staged limb salvage approach was undertaken:

- **Debridement:** Thorough and repeated surgical debridement was performed to remove necrotic tissue and reduce bacterial load.
- **Infection Control:** Empirical broad-spectrum antibiotics were initiated and later tailored based on culture sensitivity.
- **Implant Assessment:** The implant was retained as it was stable and not grossly infected. And also Implant was exposed to atmosphere for a very short period of time intraoperatively

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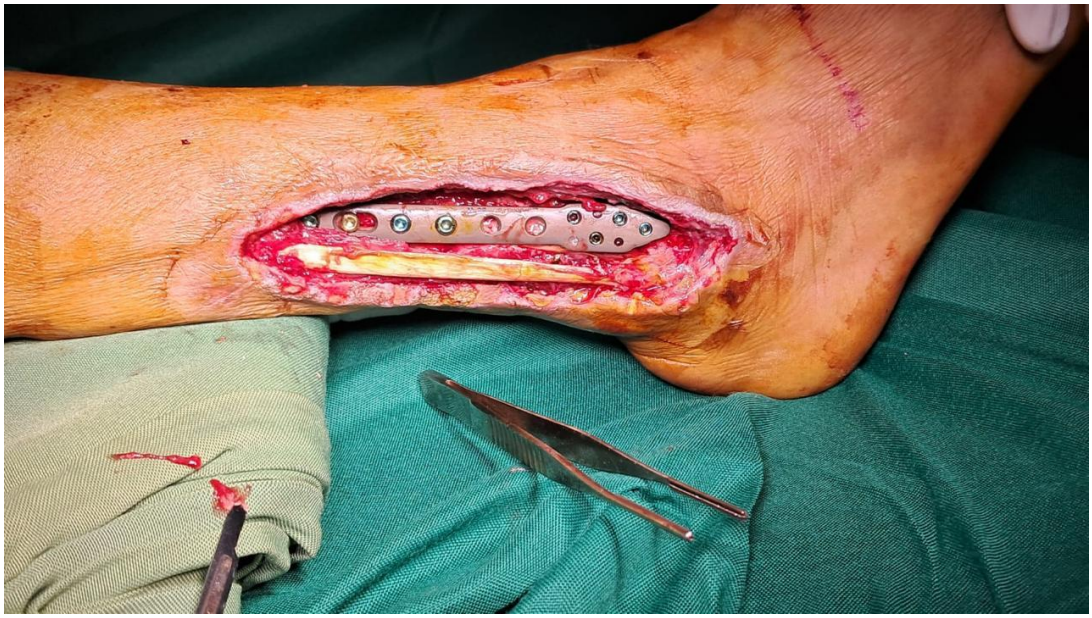

Fig. 1 Exposed implant with fracture site and tendon with pouring pus

- **Wound Bed Preparation:** Advanced wound care techniques, including negative pressure wound therapy (NPWT), were used to optimize the wound bed.
- **Dermal Substitute Application:** In view of the absence of flap options, a dermal substitute was applied over the exposed implant to facilitate neodermis formation and coverage. Dermal substitute Myriad Matrix™ is an advanced dermal substitute developed by Aroa Biosurgery, designed for soft tissue reconstruction and complex wound healing. It is made from ovine (sheep) forestomach extracellular matrix (ECM), offering rapid cell infiltration, angiogenesis support, and proven clinical efficacy.

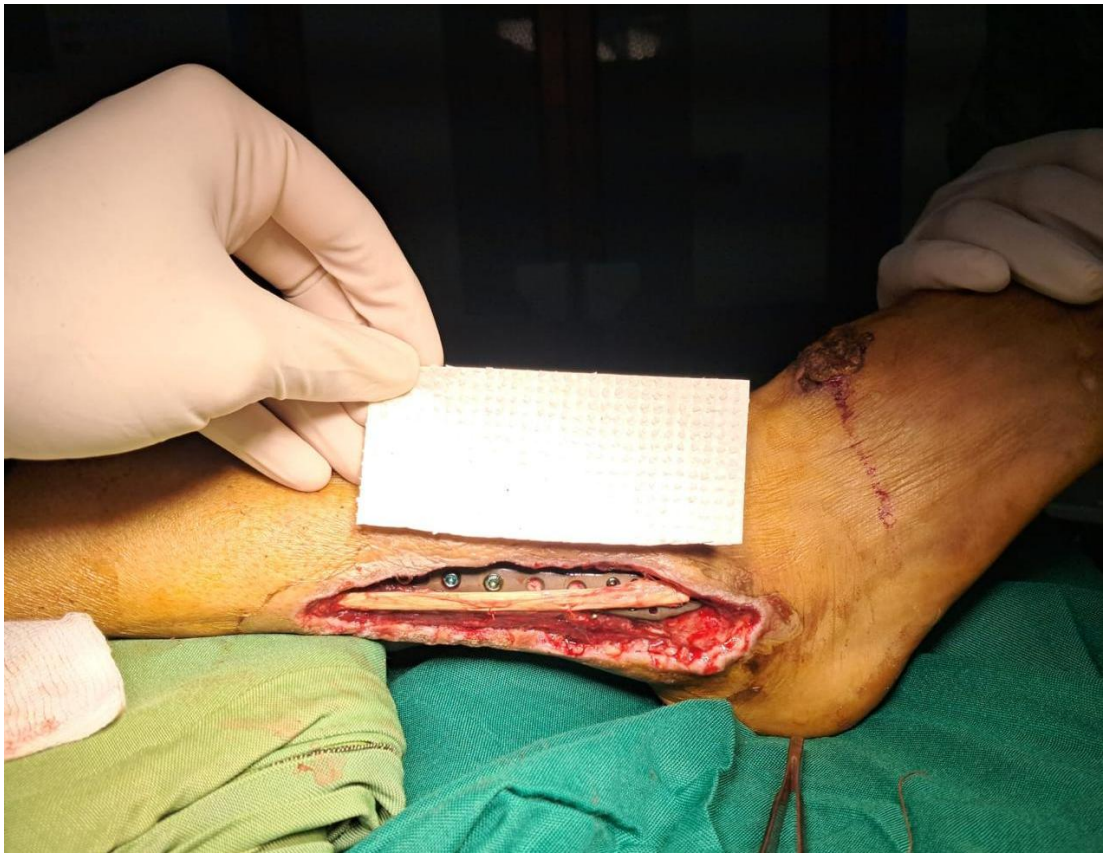

Fig. 2 Exposed Implant covered with dermal substitute and part of peroneus tendon

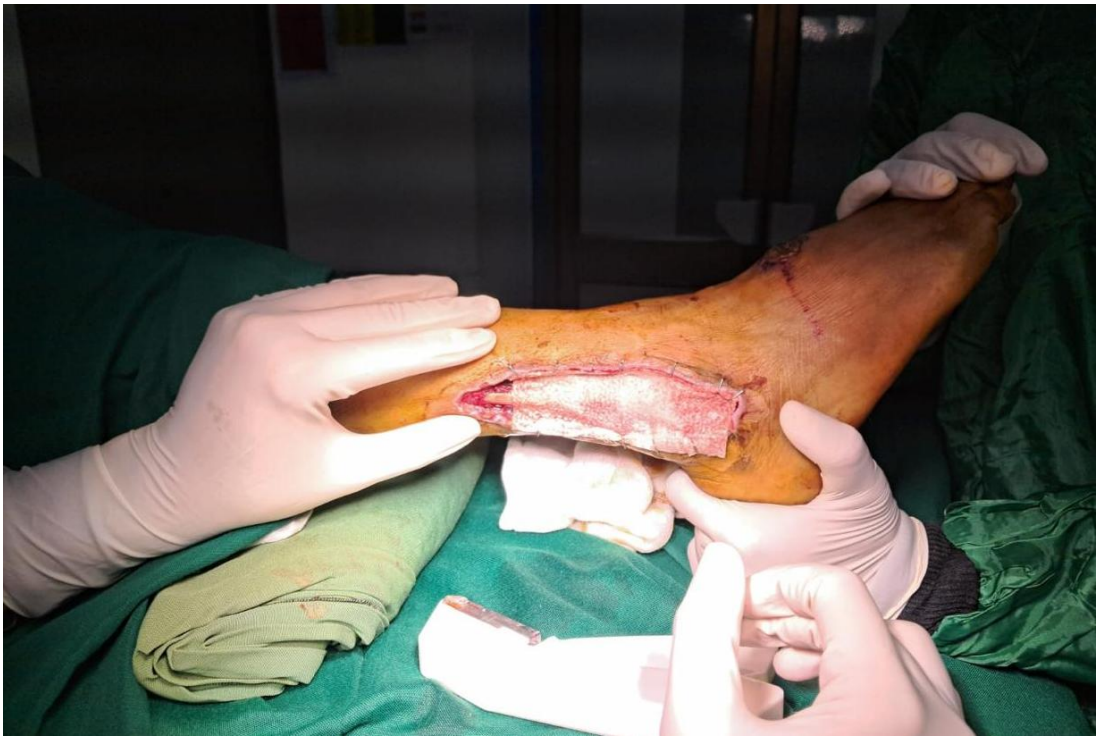

Fig 3. Dermal substitute edges fixed with skin stapler and wound covered

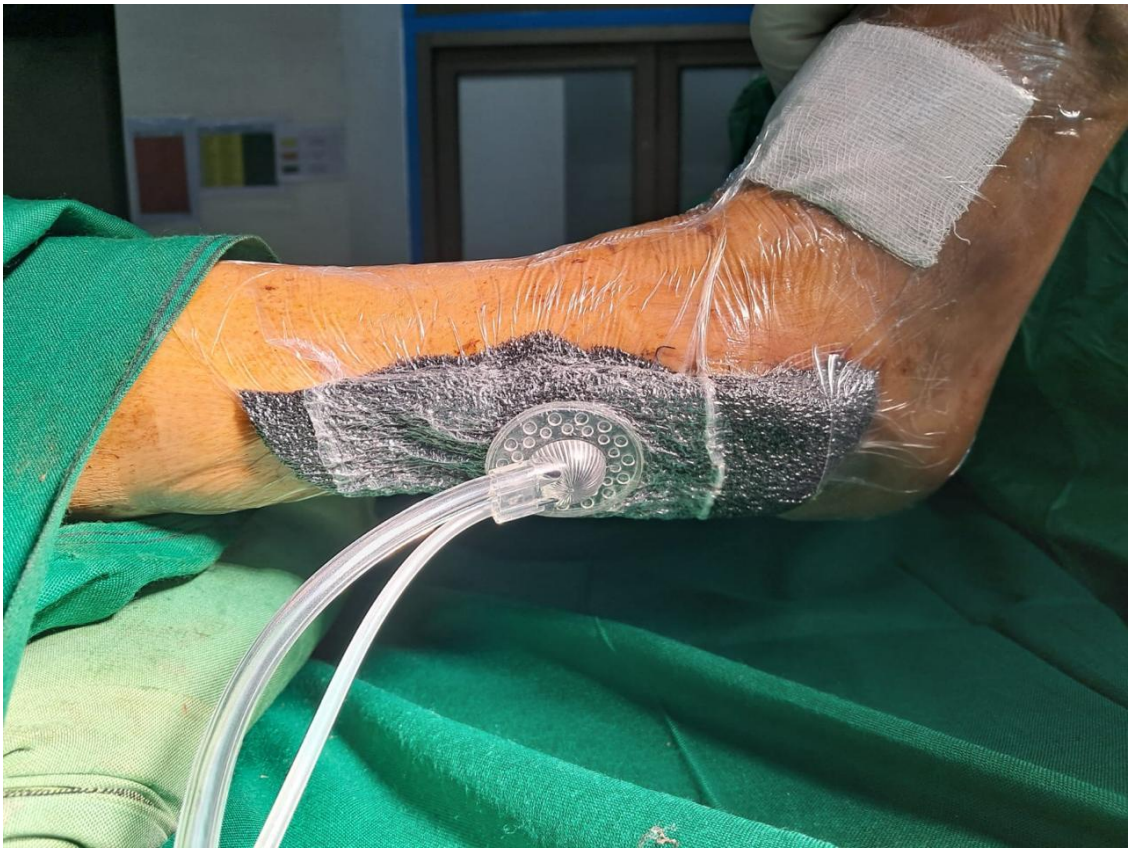

Fig. 4 Negative pressure wound therapy started over dermal substitute

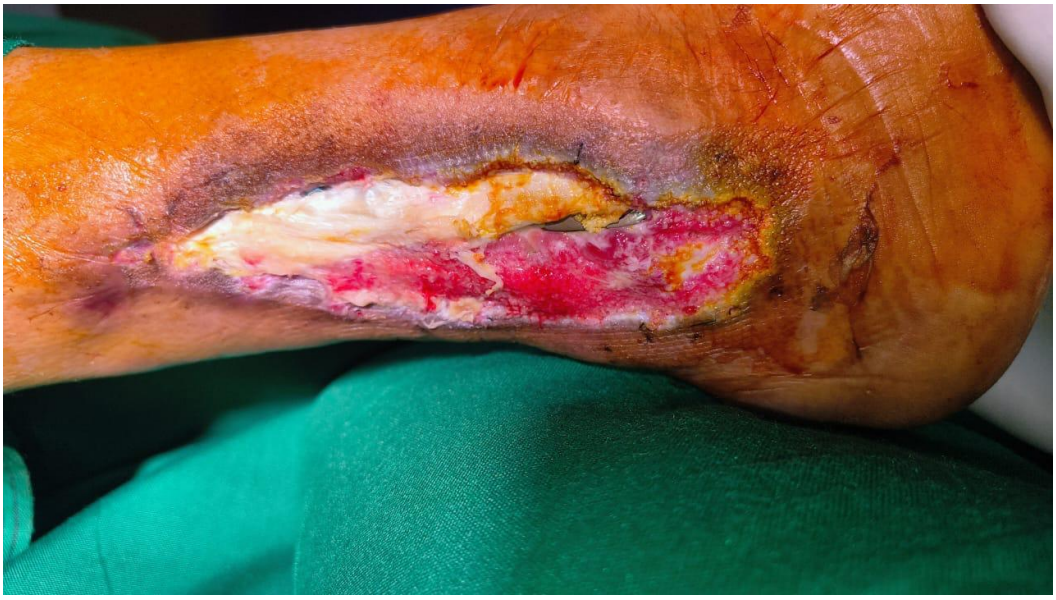

Fig. 5 Remaining Raw area covered with dermal substitute

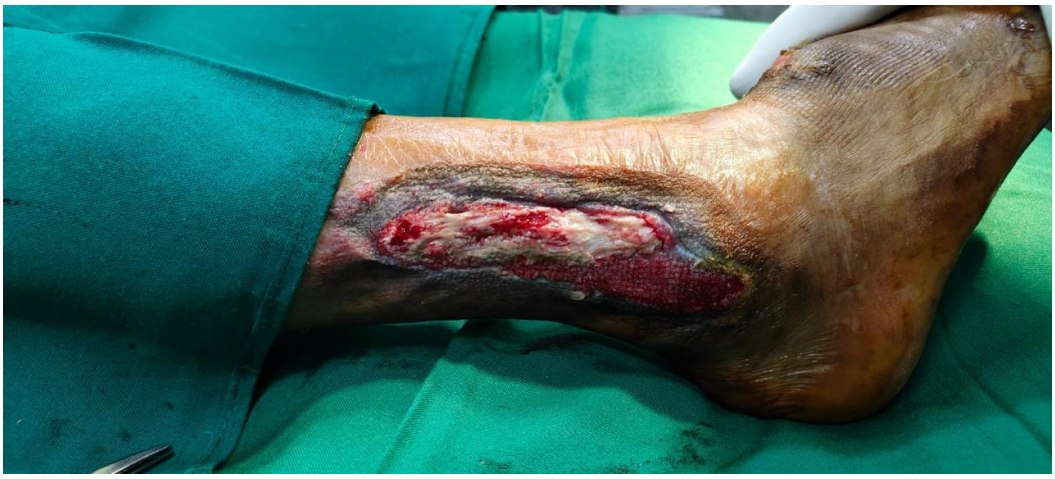

Fig 6 Implant coverage complete with dermal substitute

- **Definitive Closure:** Following successful integration of the dermal substitute, secondary skin grafting/epithelialization was achieved.

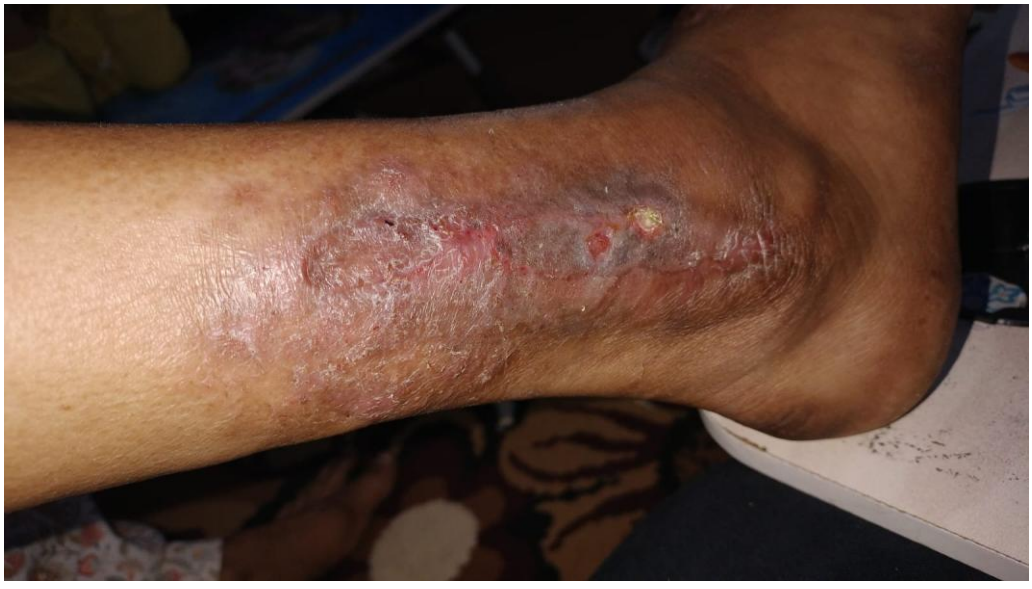

Fig 7 Progressive coverage of implant with small skin graft

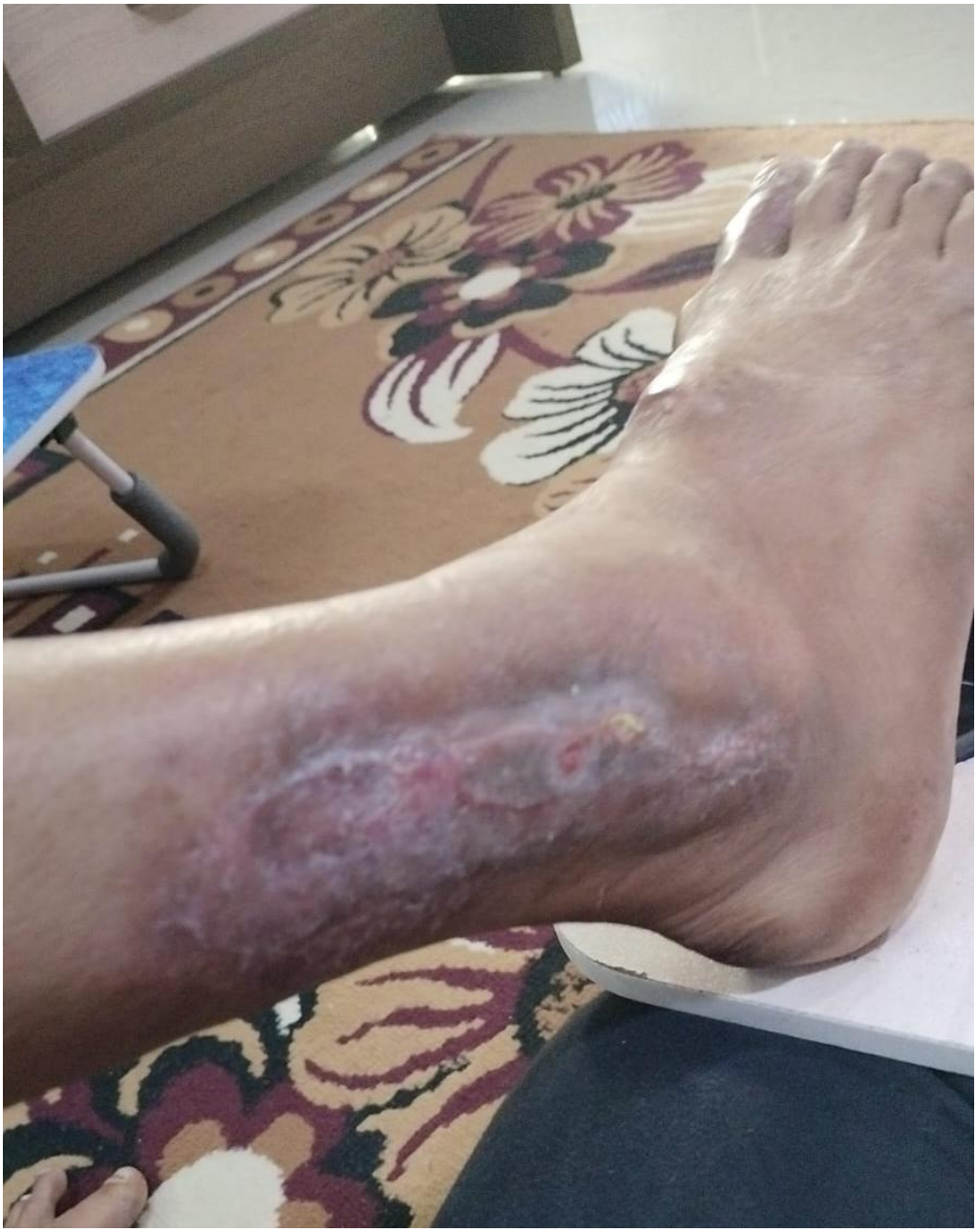

Fig 8 Late follow up show stable skin cover

Outcome

The dermal substitute demonstrated successful take, with progressive granulation and coverage of the previously exposed implant. Over a period of approximately six weeks, stable soft tissue coverage was achieved. The limb was salvaged without the need for amputation, and no recurrent infection or implant failure was observed during follow-up.