Soft Tissue Reconstruction with Acellular Dermal Matrix and Negative Pressure Wound Therapy: A Less Invasive Solution for Open Fractures

Christopher Didzbalis MD, Varoon Phondge BA, Anish Raman BA, Joseph Weisberger MD, Edward S. Lee MS, MD

Rutgers University - New Jersey Medical School

RUTGERS

BACKGROUND

Open fractures of the extremities are challenging for the reconstructive surgeon. More severe injuries and other chronic wounds may result in significant soft tissue loss, periosteal stripping and often require some form of flap reconstruction. Unfortunately, many patients may be poor candidates for these procedures. Aseptically processed meshed human reticular acellular dermal matrix (HR-ADM) provides an open structure that can support host tissue ingrowth and revascularization to help rebuild extensive soft tissue loss. The goal of this study was to determine if meshed HR-ADM application with negative pressure wound therapy (NPWT) would provide adequate coverage over lost soft tissue. This institutional case series presents the outcomes of patients with extremity wounds with periosteal stripping treated with meshed HR-ADM.

METHODS

A retrospective chart review was conducted in patients by a single surgeon between 2022 and 2025. Demographic information, wound size and location, and mechanism of injury were collected. The key endpoints were the presence of granulation tissue after meshed HR-ADM application, the receipt of skin grafting, and wound closure. Patients were excluded if they were lost to follow up.

RESULTS

- **N=7 patients analyzed**
- **Demographics:**
  - Mean age: 57 years
  - Gender: 57% male
- **Wound characteristics:**
  - Location: 86% Lower Extremity
  - Wound Surface Area: range 6 cm^2-700 cm^2 with a median of 48 cm^2
- **Etiology:**
  - 86% traumatic wounds
  - 71% presented with infection
- **Management & Outcomes**
  - Skin grafting performed in 4 patients (57%)
  - Wound closure achieved in 6 patients (86%)
    - 2 of the 6 patients (33%) healed without skin grafting
  - 1 patient currently undergoing dermal matrix treatment with developing granulation tissue observed

CASE 1

Chronic Lower Extremity Wound

Debridement

HR-ADM Placement

1 Year Post-Op

CASE 2

Lower Extremity Non-Healing Wound After Open Tibia Fracture

Free Flap

Flap Failed to Close the Wound

Meshed HR-ADM placement

3 Months Post-Op

Granulation Tissue Visible (Zoomed-in)

DISCUSSION

Extremity wounds with exposed bone may be reconstructed in numerous ways. The results demonstrate adequate coverage was achieved with meshed HR-ADM allograft and NPWT in patients in a staged-reconstructive fashion. Future research with larger sample size, greater longitudinal follow-up and less attrition may be beneficial in further elucidating the effectiveness of this reconstructive approach.