

Successful Coverage and Closure of a Complex Left Lower Extremity Wound with a Next Generation Decellularized Dermal Allograft

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Surgical Summary

Clinical Presentation:

- A 37-year-old male presented to the emergency department (ED) following a fall from height with a left open tibial fracture. Initial management included serial debridement's in preparation for tibial fixation. After 10 days, definitive fixation of the tibial fracture was performed, followed by immediate soft tissue reconstruction using a free latissimus muscle flap. Three days later, staged skin grafting was attempted.
- Despite early intervention, the patient developed moderate drainage with concern for infection.
- Surgical debridement and placement of DermaPure®, a next generation decellularized dermal allograft, was recommended to optimize coverage and closure.

Intraoperative Findings:

At the time of surgery, the proximal latissimus muscle and skin flap demonstrated good perfusion, however posteriorly the flap showed necrosis with exposure of the Achilles tendon, fascia, underlying muscle, and subcutaneous tissue (Figure 1).



Surgeon Perspective:

"DermaPure® provided a stable and easy to use dermal substitute which encouraged granulation tissue formation over a complex wound with exposed tendon eventually enabling successful wound closure with skin grafting."

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Surgical Procedure:

- Under general anesthesia, the patient was positioned prone. Upon evaluation the proximal latissimus muscle and skin flap demonstrated good perfusion, however posteriorly the flap showed necrosis with exposure of the Achilles tendon, fascia, underlying muscle, and subcutaneous tissue (Figure 1).
- Sharp excisional debridement of necrotic skin, soft tissue, fascia, muscle, and tendon was performed over a 12 cm x 8 cm area, extending down to healthy, bleeding tissue. The wound was thoroughly irrigated with sterile saline, and hemostasis was achieved.
- A 7 cm x 10 cm DermaPure® Meshed decellularized dermal allograft was applied to the wound bed and secured with chromic sutures (Figure 2). The site was dressed with Adaptic® and V.A.C.® Therapy.
- Surgical plan for coverage with a split-thickness skin graft once sufficient granulation has developed.



Figure 5. Week three post-op: Progressive integration of DermaPure® observed.



Figure 6. Week five post-op: DermaPure® fully integrated; split-thickness skin graft applied in the OR.



Figure 7. Week seven post-op: Complete take of split-thickness skin graft observed.



Figure 8. Week 11 post-op: STSG fully integrated, no signs of breakdown or infection. Wound bed fully epithelialized.



Figure 9. Week 11 post-op: STSG fully integrated, no signs of breakdown or infection. Wound bed fully epithelialized.

Post-Operative Notes:

- Week one post-op: DermaPure® demonstrated good take with no evidence of compromise. Surrounding tissue appeared viable with minimal edema and no signs of infection (Figure 3). V.A.C.® Therapy continued.
- Week two post-op: DermaPure® showed partial integration. Depth fill was progressing appropriately. No signs of infection or compromise noted (Figure 4). V.A.C.® Therapy continued.
- Week three post-op: DermaPure® showed progressive integration with increasing depth fill. Granulation tissue evident at wound base, no evidence of necrosis or infection (Figure 5). V.A.C.® Therapy continued.
- Week five post-op: Complete integration of DermaPure® with sufficient granulation tissue noted (Figure 6). Proceeded to the OR for split-thickness skin graft coverage.
- Week seven post-op: Complete take of split-thickness skin graft (STSG) observed (Figure 7).
- Week 11 post-op: STSG fully integrated, no signs of breakdown or infection. Wound bed fully epithelialized (Figures 8 and 9).