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Utilization of a Next Generation Decellularized Dermal Allograft to Provide Coverage and Promote Angiogenesis in a Traumatic, Full-Thickness Degloving of the Lower Extremity

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Surgical Summary

Clinical Presentation:

- 28-year-old healthy male sustained a traumatic injury to the left lower extremity, which consisted of a full-thickness, circumferential degloving (630 cm^2), with exposed extensor hallucis longus and Achilles tendons, bone, vasculature, and nerves. Additionally, he sustained a fracture to the left lateral malleolus and developed left leg compartment syndrome.
- Initial inpatient treatment managed by orthopedics consisted of stabilization, serial debridements, and V.A.C.® Therapy.
- At three weeks post-injury, plastic surgery was consulted to manage replacement of tissue/coverage needs.
  - Initial surgical management by plastics: Hemisoleus muscle flap to the left lower extremity and debridement
  - Subsequent surgical intervention three days later: Irrigation, debridement, and application of DermaPure®, a decellularized dermal allograft, for replacement of tissue, coverage of all exposed structures, and to promote angiogenesis

Intraoperative Findings: (Subsequent Surgical Intervention to Apply DermaPure®):

- Exposed extensor hallucis longus and Achilles tendon.
- Small gap (< 2mm) noted in the Achilles tendon.
- Well perfused hemisoleus muscle flap (Figure 1) and granulation tissue observed (Figure 2).

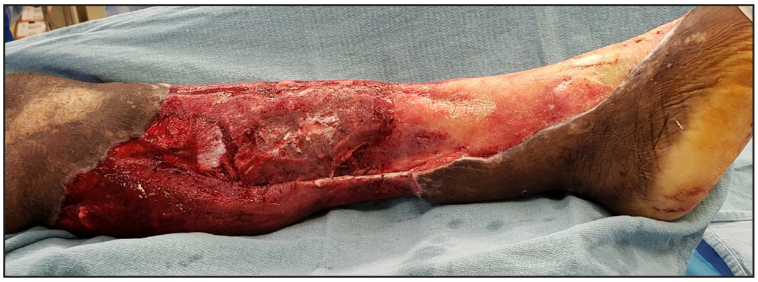

Figure 1.

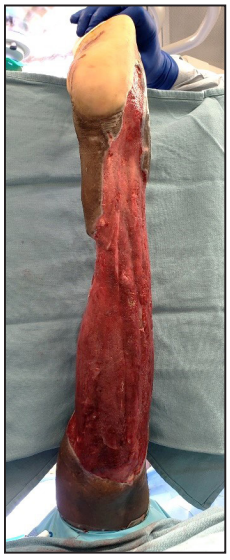

Figure 2.

Surgeon Perspective:

"With DermaPure®, depth fill was tremendous, also giving a very uniform appearance of angiogenesis throughout the wound."

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Surgical Procedure:

- The left lower extremity was draped/prepped in the usual sterile fashion. The tourniquet was elevated to 350 mmHg.
- The lower extremity was irrigated copiously with sterile normal saline followed by excisional preparation of the soft tissue defect edges with a #10 scalpel blade. Hemostasis was achieved with electrocautery.
- The entire area was irrigated again copiously with Clorpactin® Solution.
- Small gap in the Achilles tendon was closed with 3-0 Monocryl® suture in interrupted fashion.
- Seven DermaPure® decellularized dermal allografts (7 cm x 10 cm) meshed (3:1) were applied to the lower extremity. Meshing was done to expand the surface area coverage. One non-meshed 7 cm x 10 cm was placed over the exposed extensor hallucis longus tendon. All dermal allografts were secured with 4-0 chromic suture and regular staples.
- Promogran Prisma® was placed over the dermal allografts, followed by Xeroform. The entire area was bolstered with V.A.C.® Therapy at 125 mmHg with plan for the first dressing change seven days later.

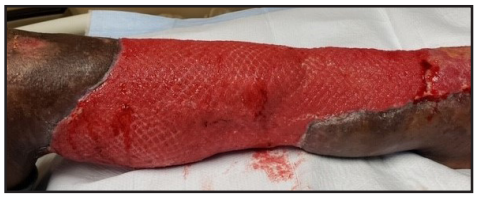

Figure 3. Three weeks post-application of DermaPure®.

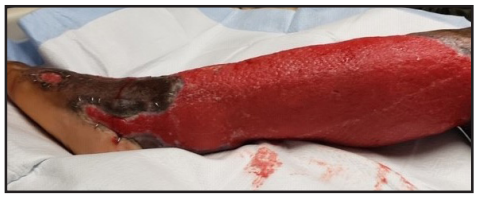

Figure 4. Three weeks post-application of DermaPure®.

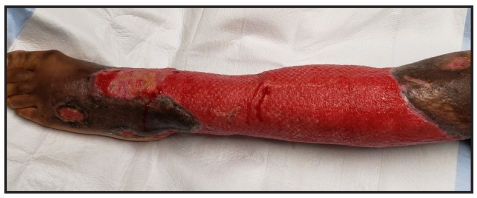

Figure 5. Three weeks post-application of DermaPure®.

DermaPure® Application
(7) 7 cm x 10 cm, Meshed 3:1
(1) 7 cm x 10 cm, Non-meshed
Basement Membrane Outer-Most

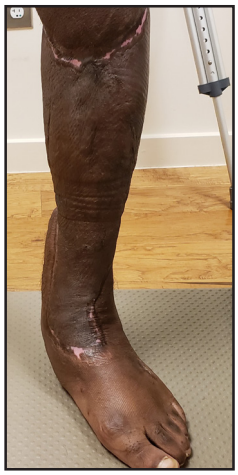

Figure 6.

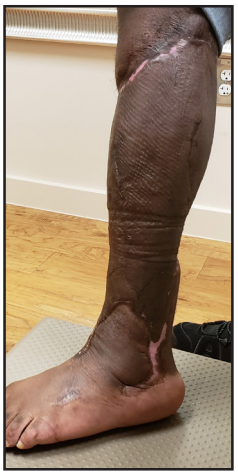

Figure 7.

Post-Operative Notes:

- Three weeks post-application of DermaPure®: Significant depth fill, angiogenesis and excellent coverage of structures (Figures 3, 4, and 5).
- Patient referred to burn center for definitive closure with STSG.
- Physical therapy completed with minimal foot drop.
- Nine month post-operative outcome: Functional mobility achieved with slight assistance of crutches (Figures 6 and 7).

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