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Definitive Coverage and Closure of a Complicated Dorsal Finger Skin Defect to the Right Hand with a Next Generation Decellularized Dermal Allograft

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Surgical Summary

Clinical Presentation:

- A 33-year-old male with a mutilating right-hand injury secondary to a circular saw. (Figure 1)
- Preoperative diagnoses of:
  - Complex open wounds involving the right hand
  - Right hand open fracture to the proximal phalanx of the middle finger
  - Open fracture to the middle phalanx of the right small finger
  - Extensor tendon laceration to the right hand, middle, ring and small finger
  - Traumatic arthrotomy of the right small finger distal interphalangeal joint

Intraoperative Findings:

- Cortical defect of the proximal phalanx of the right middle finger with no apparent clinical instability of the proximal phalanx fracture.
- Traumatic arthrotomy of the distal interphalangeal joint, right small finger with obliteration of the distal articular end of the middle finger middle phalanx.
- A 2 cm x 3 cm defect of the dorsal aspect of the right ring finger with partial disruption of the extensor mechanism.
- Gross contamination of the wounds.

Figure 1. Mutilating right hand injury.

Figure 2. Definitive skin coverage right ring finger with DermaPure®.

Surgeon Perspective:

"Given the complexity of the open wound with the associated exposed extensor mechanism, local coverage options were limited. We desired coverage options that would provide limited scar tissue adhesion for the extensor hood and limited wound contracture. DermaPure® provided sufficient full thickness coverage without additional trauma of a donor site, as well as, reduced wound contracture risk to enable the patient improved potential for a more functional range of motion."

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Surgical Procedure:

- General anesthesia with tourniquet application to the right upper arm at 250 mmHg.
- Excisional debridement of skin, soft tissue, bone and extensor tendons. The wounds were irrigated with copious amounts of sterile saline and bacitracin.
- Curettage of the cortical defect of the right proximal phalanx and middle finger was performed and supplemented with allograft bone graft chips. Extensor tendon zone four laceration of the middle finger repaired with 4-0 nylon suture.
- The distal tip of the right small finger was well-perfused; given the amount of articular surface loss, an arthrodesis was performed and stabilized with two retrograde 0.035 inch K-wires and the cerclage FiberWire® technique. Portions of the bone loss were supplemented with allograft bone graft chips.
- A 2 cm x 3 cm defect exposing the dorsal extensor mechanism of the right ring finger was covered with DermaPure®, a decellularized dermal allograft, which was sewn into place with absorbable sutures. (Figure 2) The skin graft was covered with a bulky moist bolster dressing and a sterile soft dressing. The hand was placed in a volar resting splint.

Figure 3. Post-op week six.

Figure 4. Post-op week ten.

Post-Operative Notes:

DermaPure Application
2 cm x 3 cm
Basement Membrane Outer-Most

- At the six day post-op visit, DermaPure® on the dorsal aspect of the right ring finger was moist without congestion and adhered to the wound bed. Bolster dressing with bacitracin/non-adherent pad was applied over the dermal allograft; Cobra cast applied to the right hand.
- Weekly management consisted of changing the cast and bacitracin to the DermaPure® application site, covered with a non-adherent pad.
- At six weeks post-op, successful integration of DermaPure® noted (Figure 3); Bacitracin changed to xeroform and the cast changed to a thermoplastic splint.
- At eight weeks post-op, xeroform was changed to a wet to dry dressing.
- 100% closure of wound by week 10. (Figure 4)

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