Soft Tissue Reconstruction and Complex Soft Tissue Closure:

The Use of Human Reticular Acellular Dermal Matrix for Complex Soft Tissue Injuries: Insights from Animal Study and Clinical Evidence

Animal Study

Evaluated in conjunction with MTF Biologics, Robert Galiano, MD and Thomas Mustoe, MD, Professor/Faculty, Northwestern University Feinberg School of Medicine.

Overview

Double-arm preclinical study evaluating the application of human reticular acellular dermal matrix (HR-ADM) to splinted excisional wounds in diabetic mice, compared to a control group receiving standard care with dressing alone. Outcomes were assessed through histological and genomic analyses, focusing on wound closure, re-epithelialization, granulation, vascularization, and graft integration.

Results

The study revealed HR-ADM application:

HR-ADM Animal Study Conclusions

- Facilitates wound closure by providing a sub-epidermal structure allowing for early re-epithelialization of the wound
- Replaces the need for de novo granulation tissue formation before re-epithelialization, creating a shortcut in wound closure
- The matrix facilitates expedited host tissue infiltration, supported by evidence of revascularization and active collagen remodeling

Citation

Dolivo, D., Xie, P., Hou, C., Li, Y., Phipps, A., Mustoe, T., Hong, S., & Galiano, R. (2021). Application of decellularized human reticular allograft dermal matrix promotes rapid re-epithelialization in a diabetic murine excisional wound model. *Cytotherapy*, 23(8), 672–676. https://doi.org/10.1016/j.jcyt.2020.11.009

Clinical Evidence

SomaGen® ALLOGRAFT DERMAL MATRIX

Traumatic Crush Injury Open Fracture, Anterior Tibia

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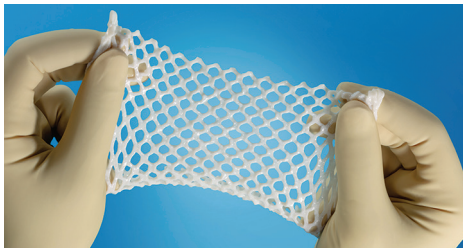
80-year-old female with a traumatic crush injury sustained in a motor vehicle accident, during which she also suffered a heart attack. Due to medical contraindications, surgery was approached with caution. The surgical team aimed to identify the least invasive method for reconstruction.

Surgeon Goal: Preservation of limb to maintain ambulation, Somagen Membrane chosen to cover the exposed anterior tibia, avoiding the need of a flap.



Day 0

Intra operative, initial injury with exposed bone.

Day 0

Debridement revealed partial periosteum and bone denuded of periosteum.

Day 0

Application SomaGen Allograft. Negative Pressure Wound Therapy (NPWT) used to allow for integration for 2 weeks.

Day 14

Granulation and vascularization emerging in the interstices.

SomaGen Allograft fully attached.

Day 22

Application of full-thickness skin graft.

NPWT applied.

Day 90

Complete wound closure.

Conclusion: SomaGen Allograft facilitated timely closure of a full-thickness injury, effectively avoiding the need for a more invasive pedicle flap in a patient with contraindications and less stable condition. It provided a durable and reliable wound bed, ideal for subsequent full-thickness skin grafting and take.

Eschar Over An Untreated Hematoma

Jimmy Chim, MD, Associate Professor of Plastic Surgery, Banner Hospital University of Arizona

90+ year-old female with an eschar over a large, untreated hematoma. Comorbidities included severe pulmonary hypertension, diabetes, atrial fibrillation, low albumin levels, tobacco use, and advanced age. The necrosed tissue was unroofed, revealing a deep partial-thickness injury.

Surgeon Goal: To replace the lost sub-epidermal tissue and avoid using a split-thickness skin graft (STSG) for a mature patient with serious comorbidities.

Day 0

Initial injury, large untreated hematoma.

Day 14

Debridement and application of SomaGen Allograft.

Day 28

SomaGen Allograft fully attached.

Reduction in wound size with contraction and beginning epithelization observed.

Day 80

Complete wound closure (without skin grafting).

Conclusion: SomaGen Allograft successfully closed a complex injury and promoted re-epithelialization of the wound without the need for a STSG.

As with any case study, the results and outcomes should not be interpreted as a guarantee or warranty of similar results. Individual results may vary depending on the patient's circumstances and condition.

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