

Exploring the Potential of Amnion Membrane Allografts

via Mobile Multispectral Near-Infrared Spectroscopy: A Case Series



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Introduction

Millions of patients globally are impacted by difficult-to-heal wounds, imposing a substantial burden on healthcare resources¹. Effectively addressing these wounds is crucial. Skin substitutes emerge as a promising treatment option, providing the necessary structural elements and growth factors for re-epithelialization and revascularization². Among these substitutes, amnion membrane (dHAM) allografts stand out as particularly promising, intended to repair tissue deficits and expedite healing for chronic and post-surgical wounds³. Despite their potential, there is a scarcity of published studies investigating the use of these grafts. This study aims to delve into the potential of skin substitutes, with a specific focus on dHAM allografts, utilizing mobile multispectral near-infrared spectroscopy (NIRS). The primary emphasis is on quantification of dHAM allografts impact on health outcomes.

Methods

Using an FDA-cleared handheld mobile multispectral near-infrared imaging device with thermal capabilities⁴, measurements of temperature and tissue oximetry (StO₂) were performed. This case series evaluates the effectiveness of an FDA-cleared skin substitute product⁵ on the healing rate of chronic non-healing wounds. Patients were longitudinally tracked to observe the healing trajectory, and relevant data, including demographics, clinical characteristics, and NIRS findings, were collected and analyzed.

Results

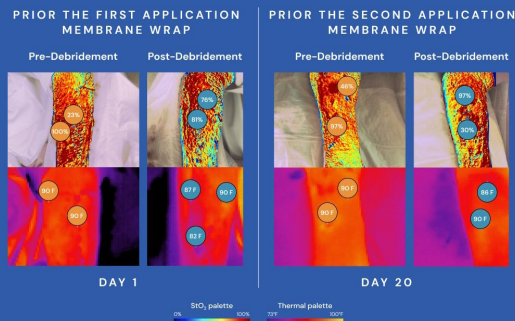
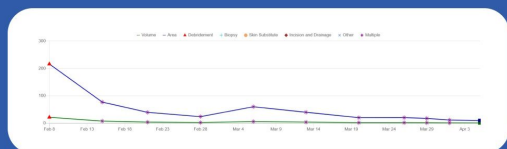
NIRS imaging provided a comprehensive visualization and documentation of the healing trajectory, capturing variations in tissue oximetry and temperature. The visualization of angiogenesis processes via NIRS imaging provided insights into the intricate mechanisms underlying successful wound closure.

Discussion

The management of difficult-to-heal wounds using dHAM highlights the regenerative potential of medicine in wound care. Mobile NIRS holds promise for assessing wound progression, appraising treatment efficacy, and pinpointing potential complications or impediments to healing. The integration of mobile NIRS imaging in post-application patient monitoring of skin substitutes provides healthcare professionals with invaluable insights. NIRS stands poised to assume a pivotal role in quantifying healing by measuring StO₂ levels and offering visual insights into the intricate processes of angiogenesis. This case study also underscores the significance of collaborative efforts from a multidisciplinary team, which can significantly improve patient outcomes and enhance their overall quality of life. Nevertheless, further research is imperative to refine optimal practices for managing difficult-to-heal wounds.

References

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- 3. Raza, A. A, Whaley, M. J, & Shakkir, M. Management and novel treatment of degloving soft tissue injuries: A case report. Cureus (2023) doi:10.7759/cureus.49999.
- 4. Mimosa Pro, Mimosa Diagnostics Inc., Toronto, Canada.
- 5. Membrane Wrap, Biolab Sciences, Scottsdale, AZ.



Pt #1 – 74 y/o gentleman presents with a right forearm trauma/skin tear due to a fall on 1/17/24. 1st visit with HP 2/8/24 minimal – non measurable signs of healing with standard of care. Fluorescence Imaging (-) for bacteria >10⁴, & NIRS imaging greater than 80% StO₂. Initiated Amnion Membrane Allograft after 5 applications patients wound is 95% healed



Pt #2 – 82 y/o male, injured his leg by hitting it on a piece of equipment at the gym. PMH: COPD otherwise good health. LLE: trauma wound, standard of care initiated including arterial assessment and edema management. 1st visit 72 sq cm – Fluorescence Imaging (-) for bacteria >10⁴, & NIRS imaging greater than 75% StO₂. Initiated Amnion Membrane Allograft after 6 applications. Wounds are improving and down to 4.5 sq cm



Pt #3 – 93 y/o female who resides in an assisted living facility, she is total care and on hospice (not wound related) and bed-bound. Onset 12/8/23 1st seen by provider on 12/25/23 standard therapy including nutritional supplements, offloading, infection management (fluorescence imaging) etc. Fluorescence Imaging (-) for bacteria >10⁴, & NIRS imaging greater than 80% StO₂. Initiated Amnion Membrane Allograft after 6 applications. Wound is almost closed.



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