

TREATMENT OF HARD TO HEAL ACUTE AND CHRONIC WOUNDS WITH A SYNTHETIC SELF-ASSEMBLING PEPTIDE MATRIX

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Introduction

Healthcare practitioners continue to seek advanced tools and techniques for the management of challenging acute and chronic wounds. When wounds do not, or are unlikely to, respond to standard of care treatment, more advanced therapies are recommended.^{1,2} One approach is to use a matrix scaffold as a guide and template to enhance cell adhesion, migration, multiplication and differentiation.³ One such matrix consists of a synthetic self-assembling peptide. This synthetic self-assembling peptide matrix* functions as a dense nanofiber network that allows for accelerated granulation and epithelialization to help heal these difficult acute and chronic wounds.⁴ Upon application to a wound, the unique peptide self-assembles into a physical-mechanical structure, providing a barrier that mitigates contamination and modulates inflammation, all the while protecting the wound from external shear forces. The scaffold resembles a bioresorbable collagen meshwork of extracellular matrix^{5,6} and has been found to exhibit hemostatic properties, which is particularly useful following sharp debridement.⁴

Methods

To analyze the efficacy of this synthetic self-assembling peptide matrix, 12 patients with hard to heal wounds (traumatic wounds, postoperative wounds, diabetic foot ulcers, and venous ulcers) were randomized 2:1 and treated with the matrix weekly (n=8) or every other week (n=4) for 8 weeks. Wounds were cleansed and debrided as needed prior to treatment. After 8 weeks, follow up treatment consisted of standard of care (SOC) for up to 12 weeks. In addition to the overall results, the following cases specifically highlight the use of the synthetic self-assembling peptide matrix treatment and outcome of each case.

References

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Case 1 – Surgical wound

- 34-year-old, female. History of IDDM
- Developed ulcer on left lateral foot with osteomyelitis requiring amputation of the 5th toe and metatarsal head.
- Age of wound: 8 weeks
- Previous treatments: NPWT for 3 weeks followed with 5 weeks of standard of care.
- Study treatment: received 3 peptide matrix applications
- Outcome: wound closed at week 7



Case 2 – Traumatic wound

- 75-year-old, male
- Slipped off ladder and injured the same site that had healed 3 years previously
- Age of wound: 7 weeks
- Previous treatments: Silvadene cream, oral antibiotics, collagen dressings
- Study treatment: received 8 peptide matrix applications followed with SOC (collagen dressings) for 8 weeks
- Outcome: 88% percent area reduction at week 8



Case 3 – Traumatic wound

- 80-year-old, female
- History of post-polio syndrome and partial paralysis
- Fell, hitting her knee and leg resulting in hospitalization
- Previous treatment: Hematoma was aspirated, and patient sent home
- 6 weeks post injury, patient was referred due to a large necrotic lesion of her knee (with undermining) and increased hematoma
- Study treatment: received 8 peptide matrix applications
- Outcome: wound closed at week 9



Case 4 – Pressure Injury

- 63-year-old, female, history of IDDM, left foot TMA due to osteomyelitis
- Developed pressure injury to left heel during hospitalization. Ulcer healed but reopened 1 month later
- Age of wound: 5 months
- Previous treatments: silver foam, enzymatic debrider, collagen dressings
- Study treatment: received 7 peptide matrix applications
- Outcome: wound closed at week 7



Results

In the overall study, 12 patients were evaluated. The baseline mean wound age was 18 months and the oldest wound age was 5 years. The mean wound surface area was 9.71 cm², and the largest wound was 32 cm². The results of the study indicate that 75% of patients treated weekly had > 50% reduction in wound area at 4 weeks and 88% had > 70% wound area reduction at 8 weeks. For those patients treated every other week, 50% achieved 50% wound area reduction at 4 weeks and > 60% at 8 weeks. The synthetic self-assembling peptide matrix was easy to apply on uneven wound geometry, especially to undermined areas. No adverse events occurred during the course of the study. Figure 1 shows wound progression at week 4 and week 8.

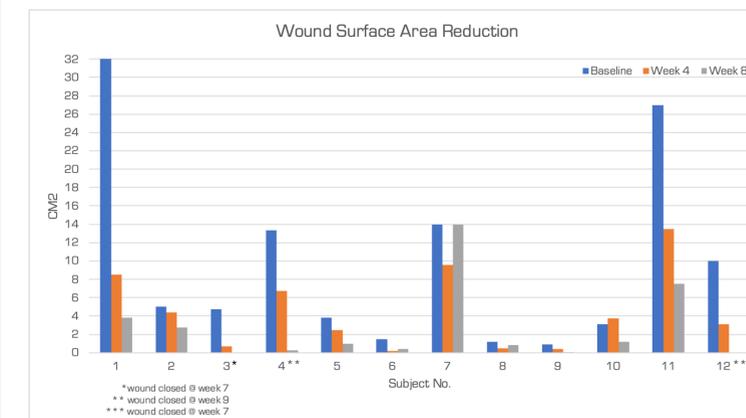


Figure: 1

Conclusions

The synthetic self-assembling peptide matrix was effective in the treatment of hard to heal wounds. Further studies are recommended to confirm the optimal application frequency for different wound types.

*AC5® Advanced Wound System, Arch Therapeutics, Inc., Framingham, MA