HEALING OF A COMPLEX SURGICAL WOUND USING A NOVEL SELF-ASSEMBLING PEPTIDE-BASED ADVANCED WOUND DRESSING

Daniel Kapp MD
Chief of Surgery, Palm Beach Gardens Medical Center

Terrence Norchi MD
President and CEO, Arch Therapeutics, Inc.

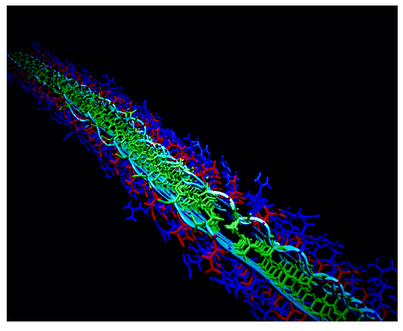
Background

Lower extremity ulcers can be debilitating and can have a detrimental impact on the patients' quality of life. Some lower extremity ulcers may fail to respond to conventional modalities, despite a comprehensive treatment strategy, necessitating the use of emergent technologies.[1] Novel technologies, such as the proprietary self-assembling peptide-based advanced wound dressing that was studied, can help treat wounds that have failed to respond to conventional treatments.

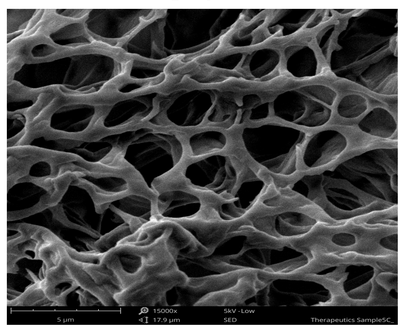
Technology: AC5 Advanced Wound System[2]

AC5 Advanced Wound System (AC5) is a novel dressing. The mechanism of action derives from the physiochemical properties of its synthetic peptide. Upon exposure to ions in wounds, peptide units self-assemble into higher ordered nanofibrils and nanofibers before culminating in an entangled network. An extracellular matrix-like structure that contours to the macro and micro architecture of the wound milieu is formed. The network resembles that of collagen and provides a scaffold, enabling cell migration and proliferation as well as repair of damaged tissue.

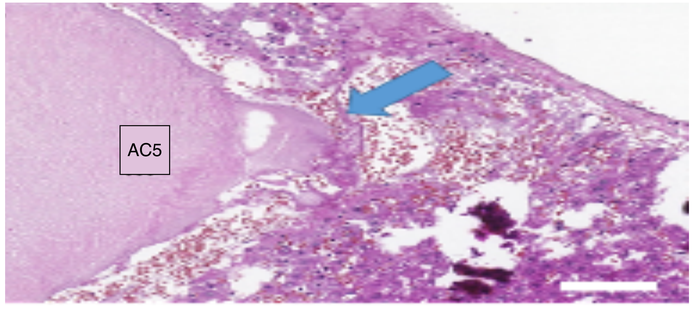
AC5 Nanofibril[3]



Electron Micrograph of AC5[3]



Contiguous Cohesive AC5 Nanofiber Network[3]



Case Study

A 66-year-old female who underwent an emergency vascular bypass operation for a limb-threatening posterior tibial ischemia, developed a non-healing surgical site wound from local infection and wound dehiscence. The patient had 6 weeks of care consisting of wet to dry dressings with no change in the wound. She was subsequently treated with a collagenase ointment for 2 weeks followed by a skin graft which failed. The surgeon decided to use excisional debridement and concomitant application of a novel self-assembling peptide-based advanced wound dressing weekly for 3 weeks. Due to peripheral arterial disease the patient was not a candidate for compression dressings.

Methods: Preparation

Using an 18-gauge needle attached to a 3ml syringe, 1.5ml of sterile water was transferred to the vial containing the lyophilized peptide. Leaving the needle in place, this vial was then gently shaken until the peptide was completely dissolved in the sterile water. The solution was then drawn directly into the syringe and the needle removed from the vial. An 18-gauge blunt applicator was attached the syringe. A small amount of the solution was expressed to prime the blunt applicator.

Methods: Procedure & Application

A surgical excisional debridement was performed to prepare the wound bed for application of the peptide-based advanced wound dressing. The wound site was cleansed with normal sterile saline and patted dry. Using the syringe with blunt applicator, the solution was directly applied to the wound completely covering the wound bed. A non-adherent xeroform dressing was then applied followed by sterile gauze and kerlix. Application of the solution was performed approximately 5 minutes following reconstituting the peptide in sterile water.

References

[1] Agale SV. Chronic Leg Ulcers: Epidemiology, Aetiopathogenesis, and Management. Ulcers. 2013; 2013:1-9. doi:10.1155/2013/413604
[2] AC5® Advanced Wound System, Arch Therapeutics, Inc., Framingham, MA
[3] © 2019 Arch Therapeutics, All Rights Reserved; Data on File
[4] © 2020 Arch Therapeutics, All Rights Reserved; Data on File

Results

The surgeon observed that the use of this novel self-assembling peptide-based advanced wound dressing promoted the formation of a healthy granulation tissue, thus allowing the patient to resume at-home wound care. The development of a stable granular wound bed and wound closure was achieved without the need for additional skin grafts.

Pre-treatment: 7/1/2020[4]

Post-treatment: 8/31/2020[4]

Final appointment 9/30/2020[4]

Conclusions

In this case study, AC5 Advanced Wound System, a novel self-assembling peptide-based advanced wound dressing, quickly restarted the previously stalled healing process in this complex surgical wound. The results indicate that the use of this dressing may obviate the need for continued costly treatments and procedures, thus reducing the total cost of lower extremity wound care, while improving patient's quality of life.

Disclosures

This case study may discuss indications for use which are not currently approved by the FDA. AC5 is a registered trademark of Arch Therapeutics, Inc, which owns commercial rights to AC5. Dr. Kapp is a clinical advisor to Arch Therapeutics.

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