HEALING OF A CHRONIC REFRACTORY BURN WOUND WITH A NOVEL SELF-ASSEMBLING PEPTIDE-BASED ADVANCED WOUND DRESSING

Randall Wolcott MD
Wound & Burn Specialist, Southwest Regional Wound Care Center

Kalpana Kamath PhD
Clinical Consultant, Arch Therapeutics, Inc.

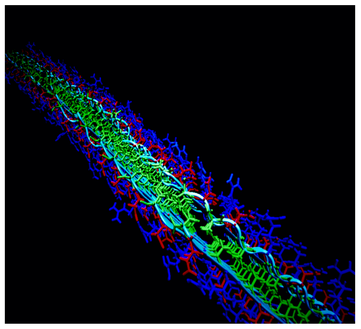
Background

Chronic wounds secondary to severe burns pose a challenge due to the need for extended duration of follow-up beyond the acute hospitalization phase. Management of patients with such chronic refractory wounds requires a multi-pronged approach due to a complex pathophysiological cascade involving persistent inflammation, infection, prolonged remodeling, and improper scarring, all of which impacts both the wound healing and the burn survivors' quality-of-life.[1]

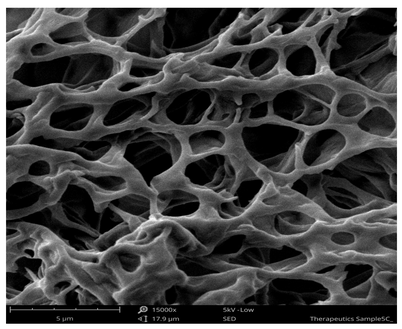
Technology: AC5 Advanced Wound System[2]

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.

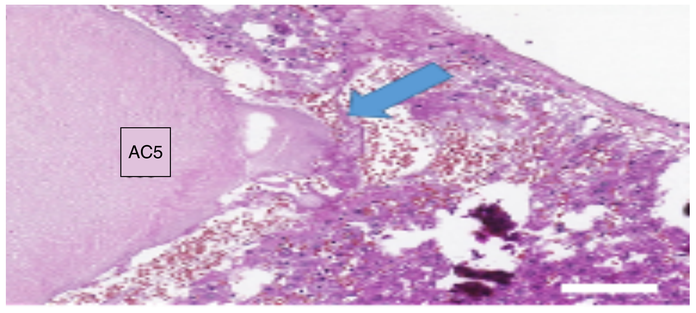
AC5 Nanofibril[3]



Electron Micrograph of AC5[3]



Contiguous Cohesive AC5 Nanofiber Network[3]



Case Study

A 49-year-old patient presented with a chronic open friable wound due to the breakdown of severe scarring. The initial injury was an extensive burn across his chest and flank that had occurred over two decades ago. The wound had been previously managed with repeat surgical debridement and a variety of products, including APG (antibiofilm gel), non-adherent foams and dressings, yet it persisted despite multiple interventions over many years. The extreme friability of the wound, coupled with its presence in areas prone to continued friction with clothing, led to frequent and extensive bleeding. It was suspected that the friable tissue was due to the wound microbiota, which was subsequently confirmed in the laboratory analysis showing a polymicrobial nature of the biofilm with strong fungal (Aspergillus) and bacterial (E. Faecalis and C. Jeikeium) components.

Methods

As the first critical step in the center's biofilm-focused wound care treatment regimen, the wound was effectively and aggressively debrided. This was followed by application of AC5 Advanced Wound System, a novel self-assembling peptide-based advanced wound dressing. The dressing was applied once weekly for 4 weeks with concomitant debridement.

Results

The self-assembling peptide-based dressing formed a clear conforming seal on the wound. It remained affixed to the surface of the irregular wound bed, even in the presence of copious bleeding. On the second debridement, the wound bed surface was found to be much less friable and, therefore, produced by less bleeding. After two interventions, the wound bed quality improved exhibiting a healthier tissue appearance, less exudate, less accumulation of slough on the wound surface, and new evidence of granulation buds.

More importantly for the patient, cessation of intermittent bleeding episodes was noted, thus alleviating the burden of at-home wound care.

Since the wound is embedded in a significant scar, wound contracture would not be expected and reduction in size cannot be followed as a metric for healing.

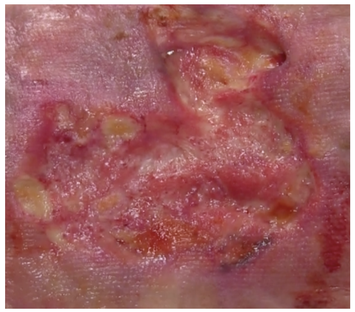
Conclusions

The aggressive debridement made possible by the application of AC5 Advanced Wound System, the novel self-assembling peptide-based advanced dressing, facilitated the removal of the infected granulation tissue. This reduction in the wound bioburden likely helped address one of the major stimuli contributing to the chronicity and severity of these types of wounds. Subsequently, the advanced wound dressing appears to have not only enabled accelerated healing of this stalled refractory burn wound, but it also provided a marked improvement in the patient's quality-of-life.

July 1, 2020[4]

Illustrating AC5 coverage of wound bed

July 24, 2020[4]



Illustrating Wound healing progression

References

[1] Ramos-Gallordo G., Chronic wounds in burn injury: A case report on importance of biofilms, World J Plast Surg 2016; 5(2): 175-180
[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

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.

ARCH THERAPEUTICS