Flowable Biomimetic Matrix Successfully Treats Pressure Injury with Undermining: A Case Report

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Purpose

This case report describes the therapeutic outcomes of a novel biomimetic matrix (BMM) in an undermined chronic pressure injury.

Background

In the United States, 2.5 million hospitalizations and >60,000 deaths occur annually due to pressure injuries and their complications. Pressure injuries also reduce patient autonomy and negatively impact mental health.[1] Here, we describe the use of BMM in a pressure injury with undermining that failed to improve with standard treatment. BMM is an FDA-cleared, flowable antibacterial polypeptide technology that promotes infection-free wound healing. Self-assembling peptides of the BMM form a three-dimensional scaffold that mimics the extracellular matrix, supporting tissue regrowth. When in contact with bacteria, these cationic peptides cause bacterial membrane disruption, serving as an antibacterial barrier.[2]

Day	BMM Application (#)	Wound Surface Area (cm^2)	Undermining
0	1	9	3.0 cm 11:00 → 6:00 o'clock
7	2	4.8	2.0 cm 10:00 → 6:00 o'clock
14	3	4.8	1.8 cm 11:00 → 6:00 o'clock
26	4	4.8	1.0 cm 10:00 → 2:00 o'clock
33	5	3.92	1.0 cm 10:00 → 2:00 o'clock
38	6	4.5	None

Table 1. Wound measurements following BMM application

Case

A 43-year-old male with a history of a below-knee amputation due to osteomyelitis presented with a stage 3 pressure injury on the left sacrum, secondary to an ill-fitting leg prosthesis. The undermined wound failed to improve after offloading, regular debridement, treatment with hydrocolloid and foam dressings, and wound packing for over one year. After a single BMM application [G4Derm™ Plus, Gel4Med Inc., MA, USA] following wound debridement, the wound size decreased from 9.0 cm^2 to 4.8 cm^2 (46.7% wound area reduction). Wound depth decreased from 1.0 cm to 0.3 cm (70% wound depth reduction), and 3.0 cm of undermining surrounding ~58.0% of the wound perimeter resolved. Complete resolution of undermining was observed after 5 weekly applications (Table 1). BMM was well-tolerated by the patient, with improved wound bed appearance and no pain, discomfort, or surrounding tissue irritation reported during or after application (Figures 1A-E). BMM application to undermined areas was enabled by the flexible nozzle applicator.

Day 0

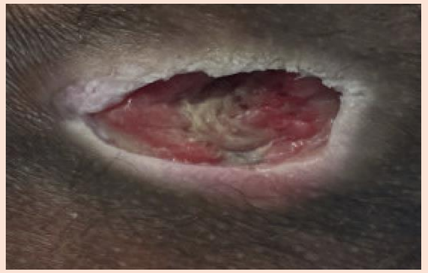

Figure 1A. Wound bed appearance before BMM application

Day 7

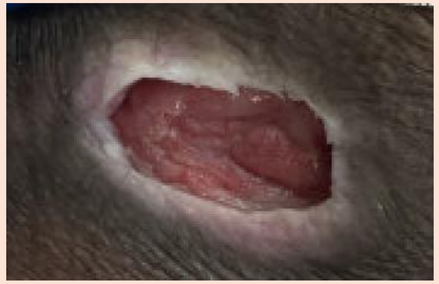

Figure 1B. Wound bed appearance after 1st BMM application

Day 14

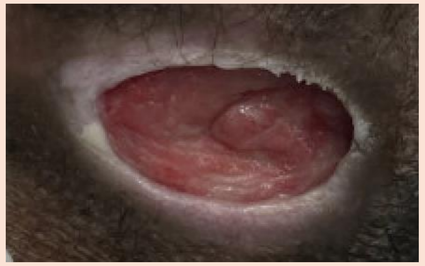

Figure 1C. Wound bed appearance after 2nd BMM application

Day 26

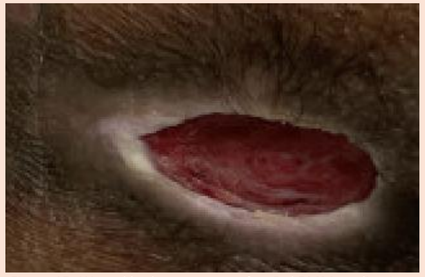

Figure 1D. Wound bed appearance after 3rd BMM application

Day 33

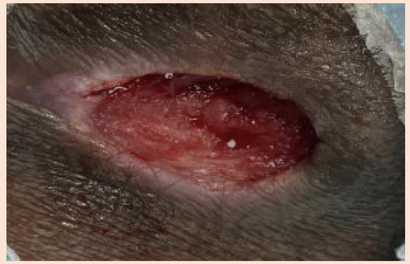

Figure 1D. Wound bed appearance after 4th BMM application

Day 38

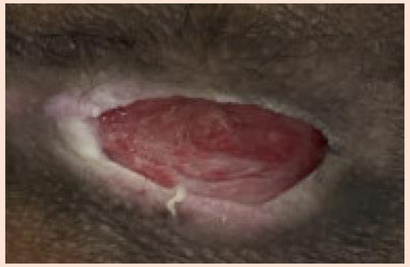

Figure 1E. Wound bed appearance after 5th BMM application

Figure 1. Wound Progression After Treatment with BMM

Discussion

This case report highlights the potential utility of the self-assembling peptide BMM in treating chronic, unresponsive wounds with undermining. Larger, controlled trials will validate our observations.

References

1) Afzali Borojeny L, Albatineh AN, Hasanpour Dehkordi A, Ghanei Gheshlagh R. The Incidence of Pressure Ulcers and its Associations in Different Wards of the Hospital: A Systematic Review and Meta-Analysis. Int J Prev Med. 2020 Oct 5;11:171.
2) Salick DA, Pochan DJ, Schneider JP. Design of an injectable β-hairpin peptide hydrogel that kills methicillin-resistant Staphylococcus aureus. Advanced Materials. 2009 Nov 6;21(41):4120-3.