New Biomimetic Matrix Results in Rapid Healing Response of Complex Pressure Ulcers with Exposed Structures

Robert Frykberg, DPM, MPH, MAPWCA, FRSM, FFPM (Glasg)[1,2] and Ryan P. Dirks, MS, PA-C, CWS[2,3]
[1]University of Texas Health Science Center San Antonio; [2]Open Wound Research; [3]United Wound Healing

Introduction

With an underreported prevalence of 2.5 million in the United States, pressure ulcers are associated with pain, infection, and high mortality rates[1]. The estimated costs of hospital-acquired pressure ulcers are $26.8 billion per year, with over 50% attributed to managing Stage 3 and Stage 4 injuries[1]. The ideal treatment provides an environment conducive to healing while preventing infection, reducing pain, and preserving peri-wound skin quality. This small case series evaluates the efficacy of a novel **self-assembling peptide biomimetic matrix (BMM*)** in pressure ulcers with exposed structures. As a wound-conforming extracellular matrix-like scaffold with antibacterial protection, BMM was engineered to facilitate healing of complex wounds.

Figure 1: Features of the novel self-assembling peptide biomimetic matrix (BMM)

Methods

Four patients with multiple comorbidities presenting with hard-to-heal stage 4 pressure ulcers were selected to receive a novel **FDA-approved flowable BMM*** in addition to standard of care (SOC). Amongst the four patients, five wounds (four of which presented tunneling / undermining) were treated with BMM, applied as per manufacturer's instructions. Wound measurements, pain, exudate, and peri-wound skin appearance were assessed at baseline and monitored during following visits.

Table 1: Patient medical history and wound characteristics

Patient # - Wound #	Medical History	Wound type	Wound location	Wound age (months)	Previous treatments
1-01	Paraplegia, Sepsis, Osteomyelitis, COPD, Smoking	Stage 4 Pressure Ulcer	Left Hip	2	SOC, Antimicrobials
2-01	Paraplegia, PVD, Neuropathy, Hypertension, Hyperlipidemia	Stage 4 Pressure Ulcer	Left Hip	30	SOC, Antimicrobials
3-01	Heart Failure, Diabetes, COPD	Stage 4 Pressure Ulcer	Left Hip	10	SOC
4-01	Quadriplegia, Diabetes, Heart Failure, Osteomyelitis, Sepsis	Stage 4 Pressure Ulcer	Right Hip	24	SOC, Antimicrobials, Ultrasound therapy
4-02	Quadriplegia, Diabetes, Heart Failure, Osteomyelitis, Sepsis	Stage 4 Pressure Ulcer	Left Hip	24	SOC, Antimicrobials, Ultrasound therapy

References

[1]Gould LJ, et al. WHS guidelines for the treatment of pressure ulcers-2023 update. Wound Repair Regen. 2024. PMID: 37970711.
***BMM:** G4Derm™ Plus, Gel4Med Inc. MA, USA.

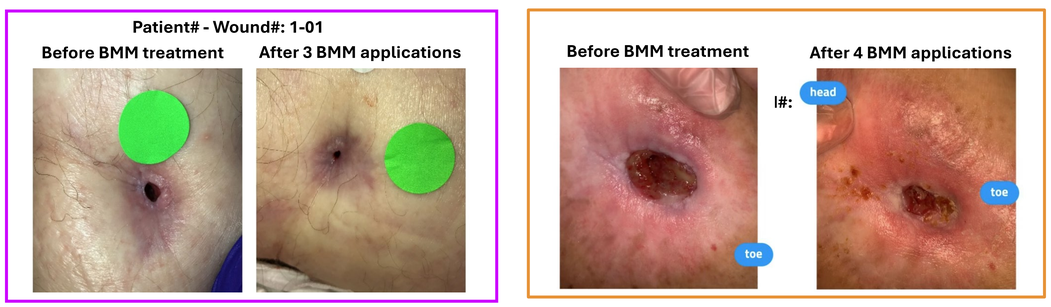
Results

Despite the wound chronicity, severity, and previous treatment failures, all the pressure ulcers in this case series responded positively to BMM, showing **rapid healing progression**. All five wounds showed a **substantial wound volume reduction after a single application** of BMM. Easy access of BMM to hard-to-reach areas was also noted and, in most cases, resulted in rapid **progress towards resolution of tunneling**. A substantial **improvement in exudate** was also observed along with an overall **improvement in the peri-wound skin** appearance and integrity. No pain, signs of infection, or other adverse events were noted after BMM treatment.

Table 2: Baseline wound measurements and changes after BMM treatment

Patient # - Wound #	Baseline Wound Area	Baseline Wound Depth	# BMM applications	% Area Reduction	% Volume Reduction	Change in tunneling
1-01	0.10 cm^2	3.0 cm	**3**	10.0%	**34.0%**	From 3.0 cm to 2.2 cm
2-01	0.90 cm^2	1.2 cm	**3**	55.6%	**70.4%**	From 3.1 cm to 2.1 cm
3-01	6.25 cm^2	0.3 cm	**2**	76.0%	**76.0%**	NA
4-01	1.40 cm^2	5.3 cm	**4**	57.1%	**66.0%**	From 5.4 cm to 4.4 cm
4-02	0.15 cm^2	2.4 cm	**4**	60.0%	**71.7%**	From 2.4 cm to 1.9 cm

Figure 2: Representative images of wounds before and after BMM treatment



Discussion

This case series demonstrates the efficacy of the self-assembling peptide BMM for treating hard-to-heal stage 4 pressure ulcers with exposed structures and tunneling or undermining. BMM intimately contacted all wound areas, creating an environment that **promoted rapid tissue regrowth** and **prevented re-infection**. This technology has potential to change clinical practice in the management of complex stage 4 pressure ulcers. Larger clinical trials with longer follow-up period are required to expand on these findings.