Combination Therapy with 3M™ Promogran Prisma™ Collagen Matrix ORC and Silver and Solventum™ ActiV.A.C.™ Therapy System for a Chronic Three-Year-Old Lower Extremity Wound: A Case Report

Robert J. Klein, DPM, FACFAS, CWS

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Dr. Robert Klein completed podiatric medical school in Chicago at the Rosalind Franklin University of Medicine and Science, Scholl College of Podiatric Medicine. Dr. Klein continued his surgical training as the Chief Resident at Michigan Health Center in Detroit. He is a Clinical Assistant Professor in the Department of Surgery at the University of South Carolina School of Medicine (USCSOM) Greenville and specializes in wound care, limb preservation, and surgery. Dr. Klein is a consultant for Solventum.

INTRODUCTION

Wound bed preparation is an essential framework for managing chronic wounds, focusing on optimizing the wound environment to promote healing. Schultz et al introduced a structured approach to wound management.[1] The TIME framework (Tissue management, Infection/Inflammation, Moisture balance, and Epithelial edge advancement) offers clinicians a practical strategy to overcome common barriers to wound healing. This model emphasizes a holistic approach to wound care that addresses the underlying pathological processes contributing to chronic wounds, rather than focusing solely on the surface wound.

The TIME model evolved to address the growing complexity of wound care. In 2019, the original TIME model was expanded to the TIMERS model, which added R for Repair and S for Social factors.[2] This updated approach acknowledged the importance of tissue repair and the role of social determinants on wound healing. Together, the TIME and TIMERS frameworks offer a comprehensive guide to wound bed preparation and the use of advanced wound care technologies.

ESSENTIAL STEPS IN WOUND BED PREPARATION

The TIME and TIMERS models outline the key steps necessary for preparing the wound bed for optimal healing.[1,2] These steps include:

1. Tissue Management: Removing necrotic and non-viable tissue is crucial for reducing bacterial load and stimulating granulation tissue formation.
2. Infection and Inflammation Control: Chronic wounds are often complicated by infection and persistent inflammation. Controlling these factors is essential for reducing biofilm formation and restoring the wound's ability to heal.
3. Moisture Balance: In wounds with excessive exudate, removing excess fluid and promoting moisture balance can help remove barriers to healing. Similarly, wounds that are too dry require moisture added back to the wound bed to re-establish moisture balance.
4. Epithelial Edge Advancement: Proper management of wound edges, including refashioning of wound edges, addressing undermining, and epibole, promotes epithelialization and wound closure.
5. Repair/Regeneration: Supporting tissue repair and regeneration through the use of topical or systemic interventions to promote cell infiltration and stimulate cell activity to encourage wound closure.
6. Social/Patient Factors: Social and patient-related factors can influence wound healing outcomes and affect the patient's ability to maintain a wound care treatment plan. These non-clinical risk factors include psychosocial aspects, treatment adherence factors, physical and comorbid conditions, and indirect extrinsic causes.

3M™ PROMOGRAN PRISMA™ COLLAGEN MATRIX WITH ORC AND SILVER

3M™ Promogran Prisma™ Collagen Matrix with ORC and Silver is a biodegradable wound dressing composed of oxidized regenerated cellulose (ORC),collagen, and silver-ORC.[3] This dressing plays a unique role in modulating the wound environment, particularly in chronic wounds. Promogran Prisma Matrix modifies the chronic wound environment, inactivating potentially harmful proteases, oxygen free radicals and excess metal ions, whilst simultaneously protecting positive factors such as growth factors.[4,5] Promogran Prisma Matrix also

provides an effective antibacterial barrier as demonstrated by the in vitro reduction of bacterial growth with common wound pathogens such as Pseudomonas aeruginosa, Staphylococcus aureus, Escherichia coli, and Streptococcus pyogenes.[6] This reduction in bacterial bioburden in the dressing may result in the reduced risk of infection.

Clinical evidence supports the use of Promogran Prisma Matrix for chronic wounds, including diabetic foot ulcerations, pressure injuries/ulcerations, venous leg ulcerations, full thickness and partial thickness wounds, donor sites and other bleeding surface wounds, abrasions, traumatic wounds healing by secondary intention, and dehisced surgical wounds.[7-9] This advanced dressing creates an environment that is conducive to granulation tissue formation, epithelialization, and wound healing.

SOLVENTUM™ ACTIV.A.C.™ THERAPY SYSTEM: MACROSTRAIN, MICROSTRAIN, AND WOUND HEALING

Solventum™ V.A.C.® Therapy is a cornerstone in wound management that is widely used to enhance wound bed preparation and reduce time to healing.[4] This therapy applies subatmospheric pressure to the wound bed, to help create an environment that promotes wound healing and by providing mechanical forces to create macrostrain and microstrain. Macrostrain causes the dressing to contract under a controlled negative pressure setting, drawing the wound edges together, reducing wound size, and helps with the removal of exudate and infectious material.[10-12] Microstrain, the transduction of pressure to the tissue surfaces, results in cell surface deformation and stimulates cellular proliferation, leading to angiogenesis and granulation tissue formation.[10,13]

In the United States, Promogran Prisma Matrix can be used in combination with Solventum™ ActiV.A.C.™ Therapy and the associated foam dressings and drapes. The use of both Promogran Prisma Matrix and ActiV.A.C. Therapy may combine the effects of negative pressure wound therapy with the benefits of Promogran Prisma Matrix. When used in conjunction, this combination therapy is intended for the management of exuding wounds such as venous leg ulcers, pressure injuries/ulcers, diabetic ulcers, partial-thickness burns, traumatic wounds healing by secondary intention, and dehisced surgical wounds. In 2024, a consensus document was published providing practical recommendations on integrating Promogran Prisma Matrix with V.A.C.® Therapy in the wound care pathway.[14]

CASE REPORT

The following case report illustrates the effectiveness of using Promogran Prisma Matrix in combination with the ActiV.A.C. Therapy System to achieve a positive clinical outcome.
A 51-year-old male presented with a chronic lower extremity wound of the left foot that had persisted for 3 years following a left great toe amputation (**Figure 1**). His medical history included poorly controlled diabetes mellitus, hypertension, osteomyelitis, depression, methicillin-susceptible Staphylococcus aureus and methicillin-resistant Staphylococcus aureus infections, and a prior below-knee amputation of the right leg.

The patient underwent magnetic resonance imaging, which confirmed osteomyelitis of the remaining proximal phalanx. An open first ray amputation was performed. Combination therapy consisting of fenestrated Promogran Prisma Matrix was applied to the wound bed followed by application of the ActiV.A.C. Therapy (**Figures 2-3**). Negative pressure at -125 mmHg was utilized, and dressing changes occurred every 48-72 hours. Any residual Promogran Prisma Matrix was removed from the wound before applying new dressings.

By 4 weeks post surgery, combination therapy was discontinued, and wound care transitioned solely to Promogran Prisma Matrix and a secondary dressing for an additional 2 weeks (**Figure 4**). At 6 weeks after surgery, the wound had fully closed (**Figure 5**). This case report demonstrates the effectiveness of combination therapy using Promogran Prisma Matrix with the ActiV.A.C. Therapy System. A chronic wound that had persisted for 3 years in a high-risk patient was successfully managed and closed, preventing further complications such as infection, and likely averting the need for a below-the-knee amputation.

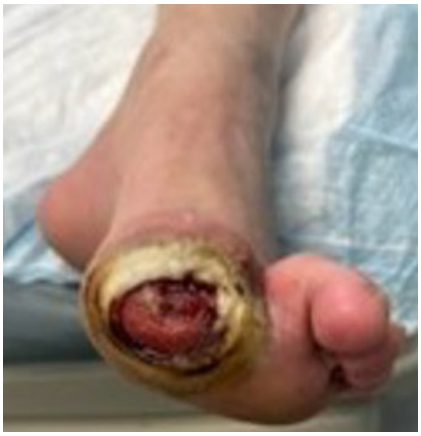

Figure 1. Pre-operative image of the patient's chronic left great toe wound; Patient data and images courtesy of Robert J. Klein, DPM, FACFAS, CWS, FFPM RCPS (Glasgow).

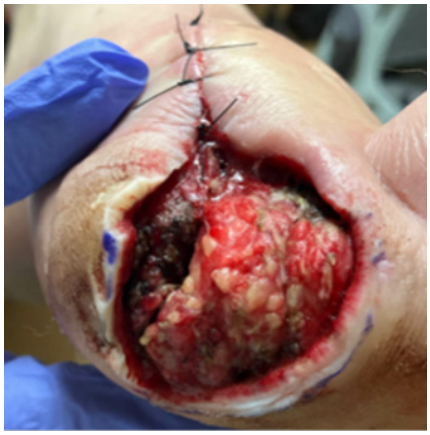

Figure 2. Left first ray amputation wound after 3 days of 3M™ Promogran Prisma™ Collagen Matrix with ORC and Silver and Solventum™ ActiV.A.C.™ Therapy System; Patient data and images courtesy of Robert J. Klein, DPM, FACFAS, CWS, FFPM RCPS (Glasgow)

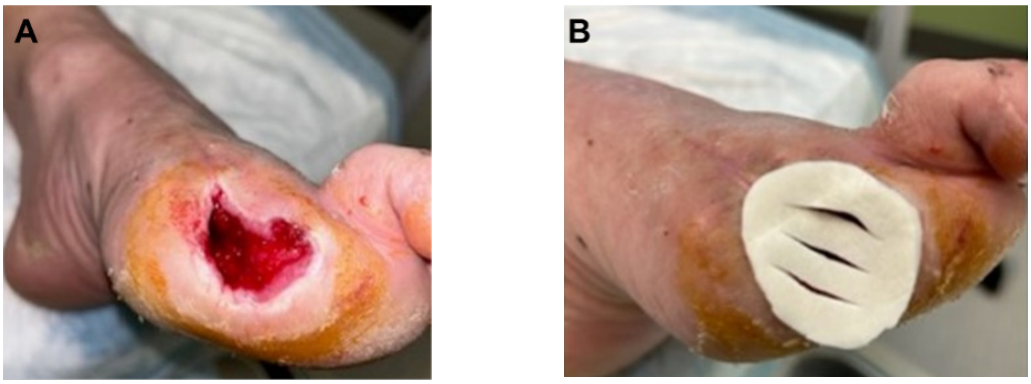

Figure 3. First ray amputation wound. A) Wound after 3 weeks of combination therapy; B) application of fenestrated 3M™ Promogran Prisma™ Collagen Matrix with ORC and Silver prior to application of Solventum™ ActiV.A.C.™ Therapy; (Patient data and images courtesy of Robert J. Klein, DPM, FACFAS, CWS, FFPM RCPS (Glasgow)

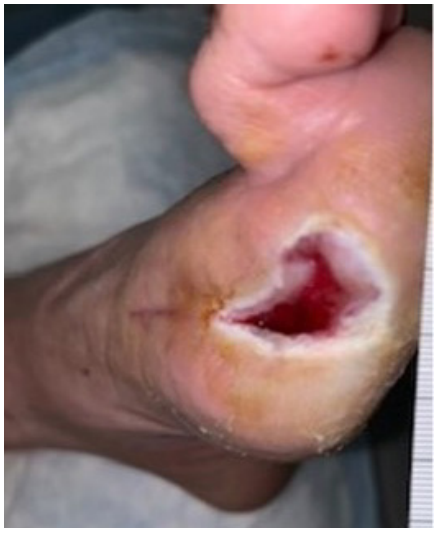

Figure 4. At 4 weeks post-surgery, granulation tissue filled the wound bed to the skin line and combination therapy was discontinued; Patient data and images courtesy of Robert J. Klein, DPM, FACFAS, CWS, FFPM RCPS (Glasgow)

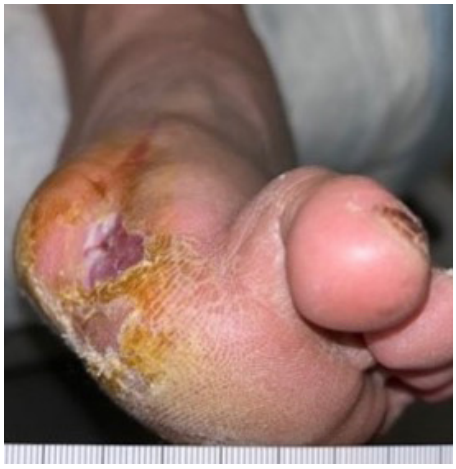

Figure 5. Wound closed 6 weeks after surgery; Patient data and images courtesy of Robert J. Klein, DPM, FACFAS, CWS, FFPM RCPS (Glasgow)

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Patient data on images courtesy of Robert J. Klein, DPM, FACFAS, CWS, FFPM RCPS (Glasgow).

NOTE: Specific indications, contraindications, warnings, precautions and safety information exist for these products and therapies. Please consult a clinician and product instructions for use prior to application. Rx only.

As with any case study, the results should not be interpreted as a guarantee or warranty of similar results. Individual results may vary depending on the patient's circumstances and condition.