



Boots, Bio-Matrix, and Breakthroughs: Healing a Chronic Diabetic Foot Ulcer

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Introduction

Synthetic dermal matrices expand reconstructive options for patients with comorbidities that limit autologous grafting. **The monolayer dermal matrix (MTX) and bilayer biodegradable temporizing matrix (BTM)** are fully synthetic polyurethane scaffolds designed to support neodermis formation while minimizing donor site morbidity and immunogenic risk. These matrices integrate successfully across diverse wound beds, including fascia, tendon, and periosteum, even in complex or infected wounds.

Compression therapy, particularly with zinc oxide-impregnated Unna boots, enhances venous return, reduces edema, and maintains a moist wound environment.

The purpose of this study is to illustrate the clinical utility of staged **synthetic dermal matrix therapy combined with compression support** in managing a chronic diabetic foot wound, and to highlight the role of **monolayer and bilayer polyurethane scaffolds in promoting neodermis formation, wound contraction, and epithelialization in a high-risk patient.**

Methods



A 76-year-old male with CAD post-CABG, HTN, Afib, T2 DM, and HLD presented with a chronic left foot wound persisting for five months. One month prior, he had undergone transmetatarsal amputation of the fifth digit abroad. Duplex ultrasound revealed preserved arterial flow.

Labs showed normal WBC (5.67), hyperglycemia (5.97), ESR 23, CRP < 3, and elevated A1c (8.3%).

Results

Debridement and application of **MTX and BTM**

Size: $5 \times 6 \times 0.3$ cm

Within 48 hours, the scaffold demonstrated excellent adherence.



1 Month → Removal of the BTM superficial layer revealed a healthy granular base and reduced wound size

Size: $4.5 \times 5 \times 0.2$ cm



2 Months → Unna boot therapy was initiated



3 Months → $1 \times 1 \times 0.1$ cm

Conclusion

Staged debridement, synthetic dermal scaffold application, and compression therapy synergistically promoted neodermis formation, wound contraction, and epithelialization.

This case demonstrates the value of integrating advanced biomaterials with foundational wound care principles to achieve durable healing in high-risk populations.

The patient achieved complete wound closure in less than six months, demonstrating durable resolution.

