

Bridging the Gap: Synthetic Borate-Based Bioactive Glass Fiber Matrix as a Catalyst for Successful Closure in Complex Surgical Wounds



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INTRODUCTION

Complex surgical wounds remain a significant source of morbidity, frequently leading to high rates of postoperative infection, wound dehiscence, prolonged hospitalization, and repeat surgical intervention.^{1,2} These challenges are markedly amplified in patients with contaminated wounds or those requiring deep surgical debridement, where compromised vascularity, fluid accumulation, and bacterial burden undermine successful closure attempts.^{3,4} The case highlighted illustrates the clinical burden of such wounds and the potential role of a borate-based bioactive glass fiber matrix (BBGFM) in optimizing wound bed preparation prior to definitive surgical closure.

METHODS

The case describes a 63-year-old male admitted with a severely complicated left knee wound following a fall shortly after total knee replacement surgery. The patient presented with wound infection, skin necrosis, and a hematoma, conditions that required surgical revision and placed the patient at high risk for further complications and graft failure. After thorough debridement, the BBGFM was applied to support the development of healthy, vascularized granulation tissue and to reduce wound depth prior to grafting.

RESULTS

Over subsequent dressing changes, residual material was left in place, eliminating the need for repeated debridement and enabling progressive wound improvement. By the time of the planned skin graft procedure, the wound bed had fully filled in, demonstrating a flatter surface with a significantly reduced footprint. At one-month follow-up, the patient achieved complete graft take, indicating successful integration and closure, an outcome often challenged by infection, fluid accumulation, and compromised tissue integrity in similar cases.

DISCUSSION

This case exemplifies the high-risk nature of complex surgical wounds and the systemic burden they place on both surgical teams and inpatient resources. It further highlights how the BBGFM's synthetic composition, fluid-handling capacity, and ability to facilitate robust granulation tissue, increased the likelihood of successful reconstructive closure in this case. Such outcomes suggest a valuable role for BBGFM as a bridging therapy in complex surgical wounds, particularly where enhanced wound bed preparation is critical to reducing reoperation and improving surgical success rates across disciplines.

REFERENCES

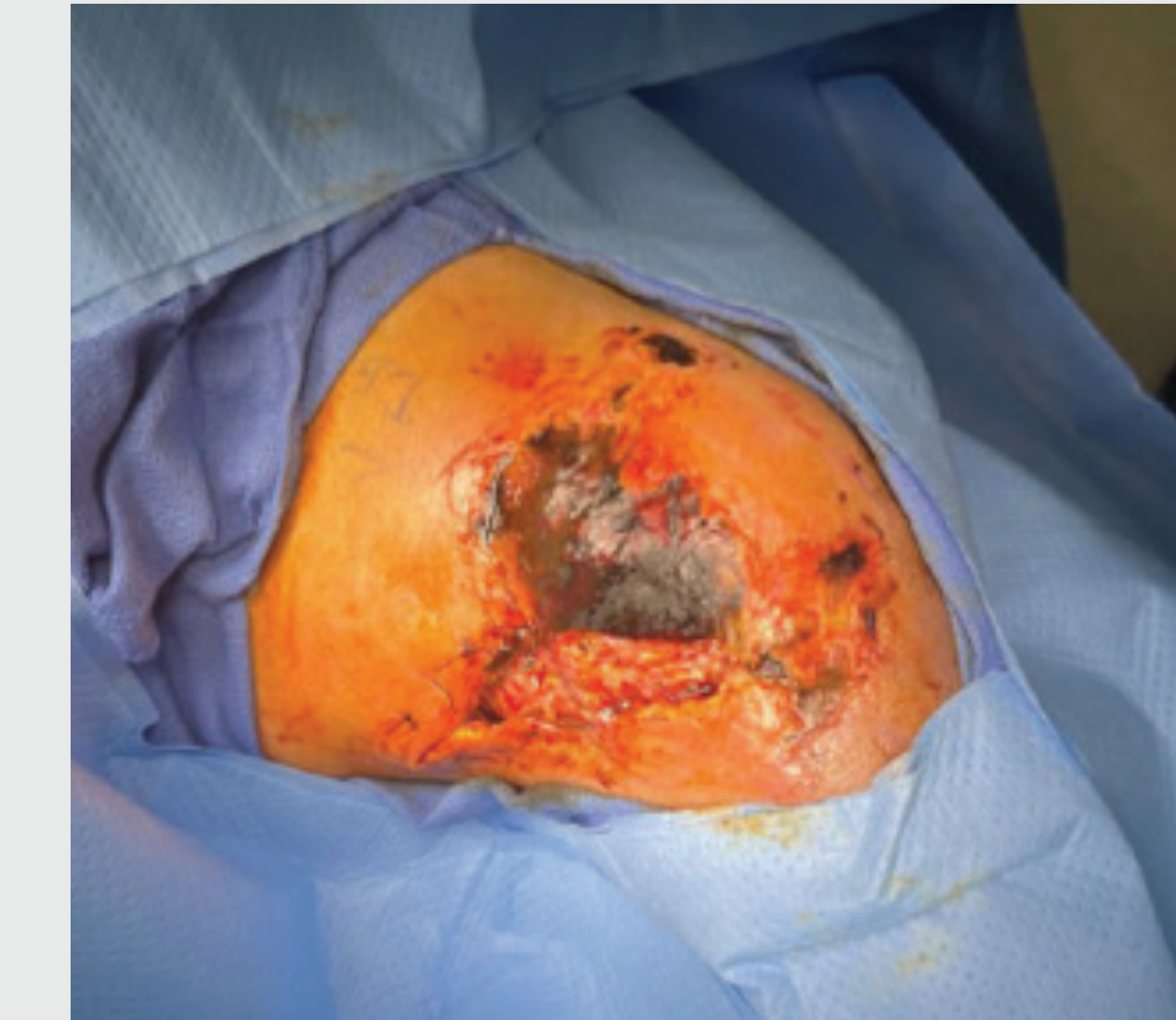
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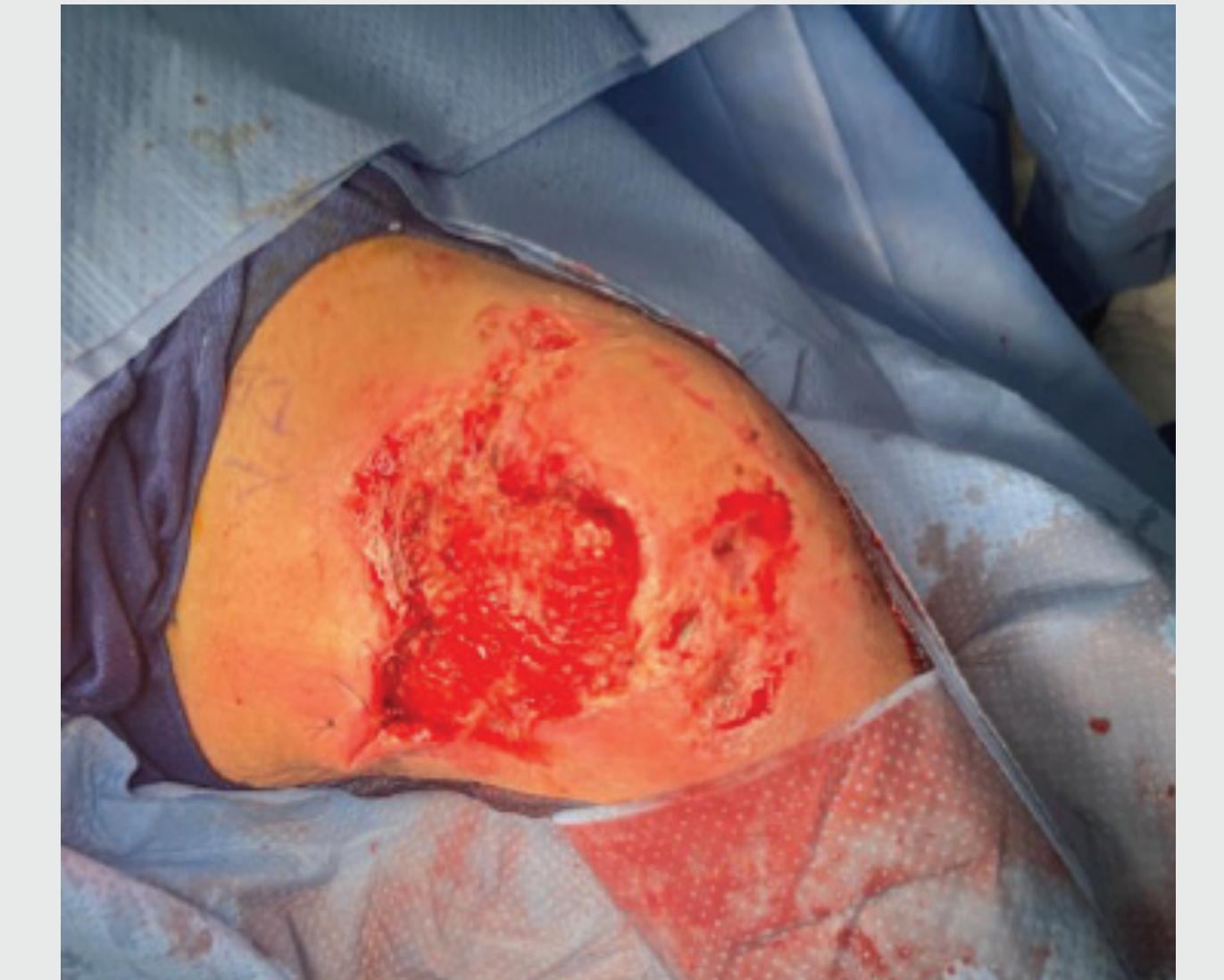
*Mirragen Advanced Wound Matrix, ETS Wound Care, LLC. This poster was prepared in collaboration with ETS Wound Care, LLC. All protocols and clinical assessments were conducted and reported independently by Mercy Health without any financial compensation from the manufacturer. For application instructions and risks of this device, please refer to the Mirragen Instructions for Use.



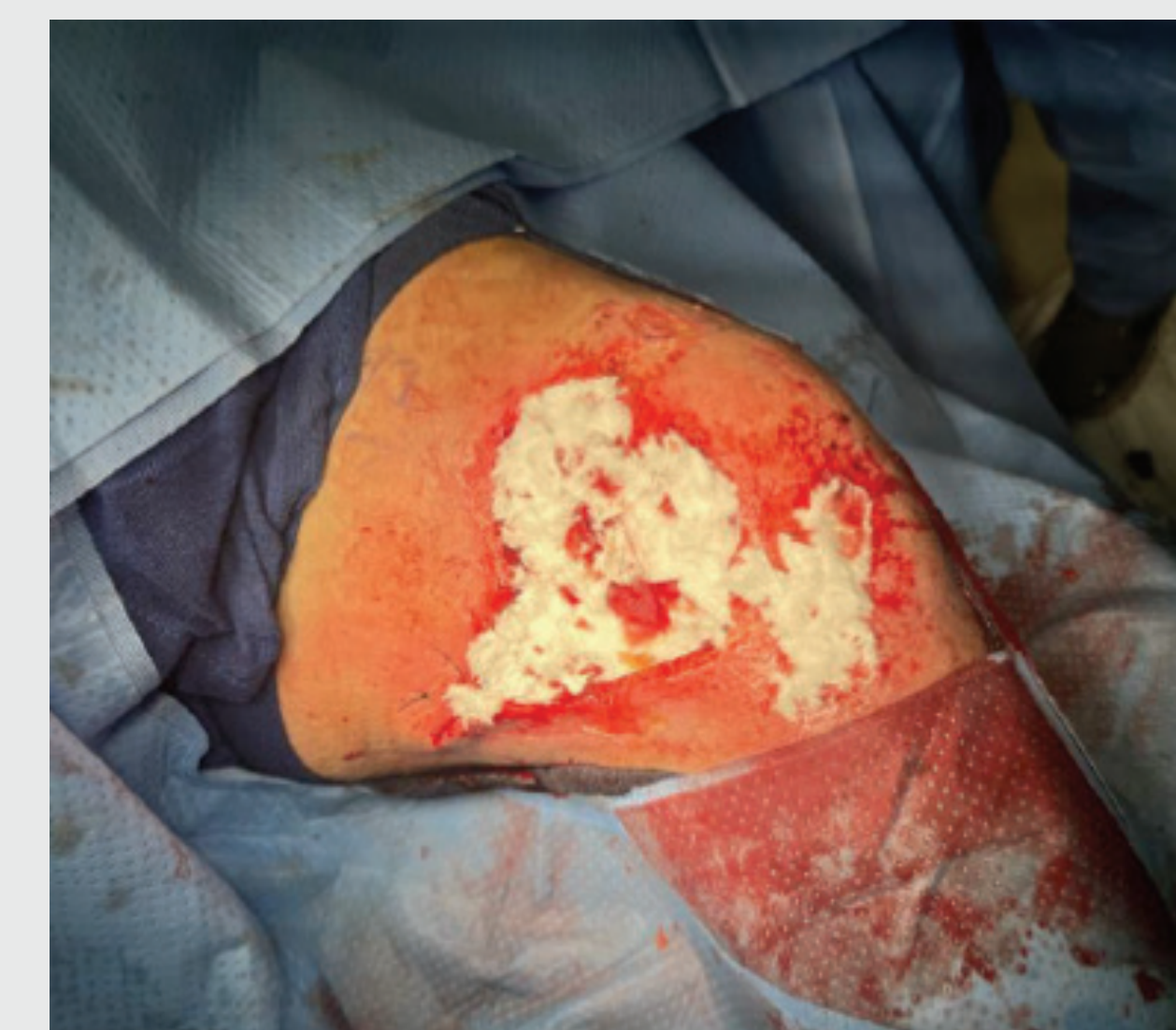
Complex surgical wound caused by a standing fall following a left total knee arthroplasty.



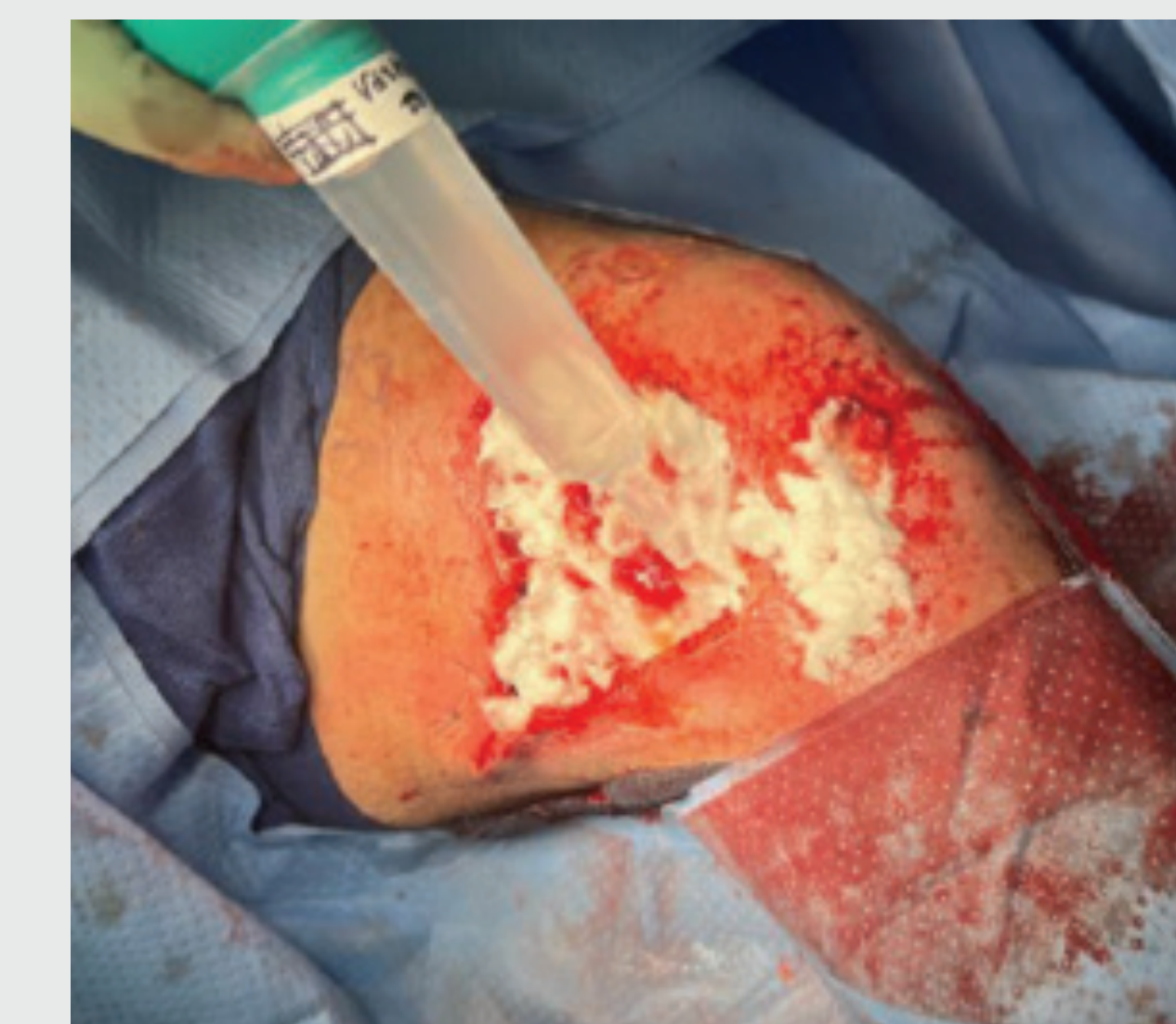
Necrotic skin and soft-tissue of the lower extremity in proximity to a total knee prosthesis.



Necrotic tissue has been debrided tangentially down to viable, bleeding tissue.



MirraSurg bioactive glass matrix has been applied to the wound surface, using a thin layer cover full surface of exposed tissue.



Due to minimal exudate and planned use of NPWT to manage wound drainage, the MirraSurg is hydrated by wetting with saline to assist with dissolution process.



MirraSurg bolstered with a NPWT device by placing a non-adherent layer over the matrix prior to placement of the NPWT sponge and adhesive cover dressing.



First dressing change (Note: residual MirraSurg not removed, debridement unnecessary) and new absorbent secondary dressing applied.



Preoperative for skin graft (Note: wound depth completely filled in and flat, smaller footprint than original wound).



Complete skin graft integration was apparent at 1 month follow up.