Wound Bed Preparation With A Topical Dehydrating Agent Followed By Wool-Derived Keratin Matrix Xenograft In A Hard-To-Heal Lower-Extremity Diabetic Ulcer: A Case From The Kingdom Of Tonga

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BACKGROUND

Lower-extremity diabetic ulcers (LEDUs) are a common and morbid complication of diabetes, and infection-related complications may be especially consequential in low-resource settings. This report presents a single clinical case of a hard-to-heal LEDU treated with wound bed preparation using a topical dehydrating agent (TDA) [DEBRICHEM, DEBx Medical, Amsterdam, Netherlands] followed by repeated applications of a wool-derived keratin-based matrix (KBM) [Keramatrix, Biowound Solutions Inc., Las Vegas, NV, USA], alongside standard care including debridement and offloading. The keratin-based matrix utilizes Replicine technology. The case report aims to describe the treatment sequence, clinical course, and observed healing trajectory in a hospital-based outpatient clinic in the Kingdom of Tonga.

METHODS

An elderly female with poorly controlled diabetes (HbA1c >10%) had an LEDU that had not meaningfully improved after >30 days of standard dressings (alginate, normal saline) and selective sharp debridement. On 07/14/2025, a TDA (methane sulfonic acid) was applied for chemical debridement. On 07/17/2025, following surgical debridement to healthy bleeding tissue, a KBM xenograft moistened with stabilized hypochlorous acid solution was applied and packed into undermined areas. A properly fitted offloading boot was initiated. Weekly visits included sharp debridement, nutritional counselling with emphasis on protein intake, and KBM re-application every 7–10 days.

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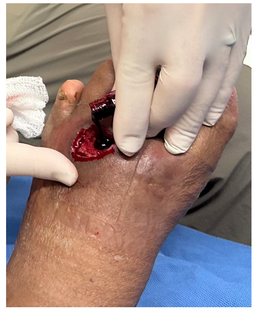
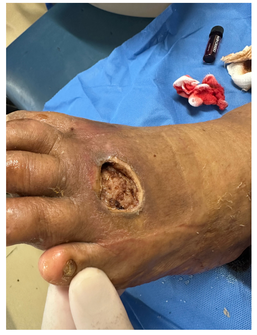
RESULTS

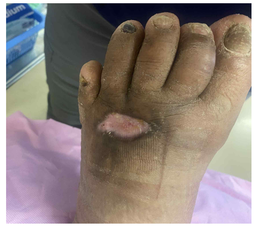
Following initiation of this treatment sequence and concurrent standard measures, the wound demonstrated progressive granulation, reduction in undermining, and ongoing epithelial advancement at serial weekly assessments. Complete epithelialization was documented on 23/08/2025. Duration of treatment involving advanced products was 48 days.



On 07/14/2025 following basic cleaning of the wound and peri-wound area, the single-use vial of the TDA should be applied over the wound bed and one cm of the peri-wound skin. After being left in place for 60 seconds, the gel is diluted and removed by rinsing with saline or sterile water. After application, there is no specific requirement for dressings or other interventions, and these can be used at the clinician's discretion.



07/14/2025: The wound base may have a caramelized appearance after removal of the dehydrating gel. The dehydrating agent is indicated for non-surgical debridement and treatment of hard-to-heal wounds that are infected and contain biofilm and/or necrotic tissue. Several contraindications apply, including ischemic wounds before effective revascularization; neoplastic wounds; underlying abscesses or fasciitis that requires incision/excision and drainage; underlying osteomyelitis; exposed cartilage and/or intolerance or allergies to any of the product ingredients.



By 08/23/2025 the hard-to-heal LEDU had 100% epithelialized with limb preservation in a patient considered at elevated risk for amputation.

DISCUSSION

This case suggests that structured wound bed preparation may be an important step in the management of hard-to-heal LEDUs. The TDA is intended to disaggregate biofilm and reduce overall bioburden within the wound bed, which may help decrease local inflammation and create a more favorable environment for cellular proliferation, migration, and progression toward closure. In this context, subsequent application of a keratin-based matrix, together with offloading, debridement, and supportive care, reflects a comprehensive treatment strategy designed to support wound progression through the normal phases of repair.

CONCLUSION

In this single case, a structured sequence of wound bed preparation with TDA followed by serial KBM application, together with offloading, regular debridement, and supportive care, was feasible in a resource-limited outpatient setting and was associated with progressive healing to closure. As an uncontrolled single-patient observation, causality and comparative effectiveness cannot be inferred; prospective studies or comparative real-world cohorts are warranted to evaluate outcomes, patient selection, and incremental benefit beyond standard care components.

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