# Human amniotic membrane accelerates healing in a hard-to-heal diabetic foot ulcer

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## Introduction

Human amniotic membrane (HAM) is acquired from the human placenta. This advanced regenerative therapy rich in growth factors, stem cells and cytokines, limits the extent of continuing inflammatory damage, decreases the microbial bioburden, and promotes progression into the proliferative phase of healing.[1] HAM provides a natural cellular scaffold for cellular adhesion facilitating keratinocyte migration to promote re-epithelialisation and enable remodelling to accelerate wound healing.[1] High quality studies with good evidence specify the safe and effective use of HAM in the management of diabetic foot ulcers.[2,3]

A diabetic foot ulcer (DFU) is considered hard-to-heal when the wound surface area has not reduced by 50% after 4 weeks of appropriate moist wound management and offloading.[2] This case study aimed to evaluate the use of dehydrated HAM (dHAM) in the management of a hard-to-heal DFU.

## Case study details

| | |
|---|---|
| Gender | Male |
| Age | 68 yrs |
| Medical & surgical history | • Coronary bypass artery graft (2013)<br>• Type 2 diabetes mellitus<br>• Renal calculi +/-4 x<br>• Gout |
| Social habits | • Non-smoker.<br>• Consumes 2 units of alcohol (16 g) daily |
| Wound Infection Continuum (WIC) | Colonised (patient immunocompromised) |
| Location of wound | Medial distal aspect of the right foot |
| Duration of wound | 18 weeks |
| Wound history | Commenced as a blister on the plantar aspect of right hallux. Self-care.<br>Surgical debridement followed by a table angiogram, right femoral stent, tibial angioplasty.<br>Amputation of the right hallux. |
| Previous treatment of patient and wound | Clinic visits twice a week included:<br>• Blood glucose monitoring and control.<br>• Offloading of the affected area with the use of a postoperative shoe with an orthotic insert altered to specification.<br>• Sharp debridement.<br>• Infection and moist wound therapy included: antiseptic cleanses and soaks, varied topical antiseptic dressings, negative pressure wound therapy, non adhesive foams, silicone tape, and periwound skin protectant. |
| Wound assessment | Tissue: 100% granulation uneven and pocketing from 4 to 10 o'clock<br>Inflammation/Infection: colonised<br>Moisture:<br>• 40% clear, serous, exudate<br>• Periwound macerated from 3.30 to 9 o'clock.<br>Edges: Non-advancing, epibole from 4 to 10 o'clock<br>Regeneration: Stalled closure, failing conservative therapy<br>Social factors:<br>• A farmer who lives 3½ hours drive away in a rural area with his supportive family on a farm.<br>• Anxious – due to death threats<br>• Pain 3/10<br>• No odour |
| Wound treatment summary | Weekly clinic visits included:<br>• Antiseptic cleanse.<br>• Sharp debridement if required.<br>• Antiseptic soak.<br>• Sterile water rinse.<br>• dHAM applications on week 0, 2, and 4.<br>• Non-adherent silicone contact layer and a foam dressing.<br>• Offloading of the affected area with the use of a postoperative shoe with an orthotic insert altered to specification.<br>• Blood glucose monitoring and control. |
| Patient education | Ongoing education provided regarding:<br>• Blood glucose monitoring and control (HbA1c:6.6 mmol/l)<br>• Nutrition and alcohol intake, offloading, foot wear, exercise, regular position changes. |

**Week 0 | 4.59 cm²**

**dHAM applied**

**Week 1 | 2.53 cm²**

**Week 5 | 0.15 cm²**

## Method

Informed and signed consent obtained from the study participant according to the Protection of Personal Information Act, 2013 (Act No. 4 of 2013) South Africa.

- Wound was assessed and managed using TIMERS wound preparation.[4]
- The wound surface area was measured and calculated weekly, and the results were plotted on a line graph.
- The wound exudate level was assessed weekly using the Bates Jensen Wound Assessment Tool measurement method.[5]
- Pain was assessed weekly using the Numeric Pain Rating scale.[6]
- Assessment of infection utilising the International Wound Infection Continuum (IWII) wound infection continuum was performed weekly.[7]

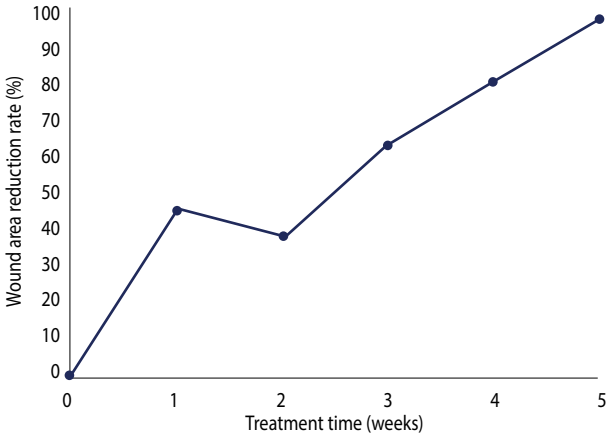


**Figure 1:** Wound closure

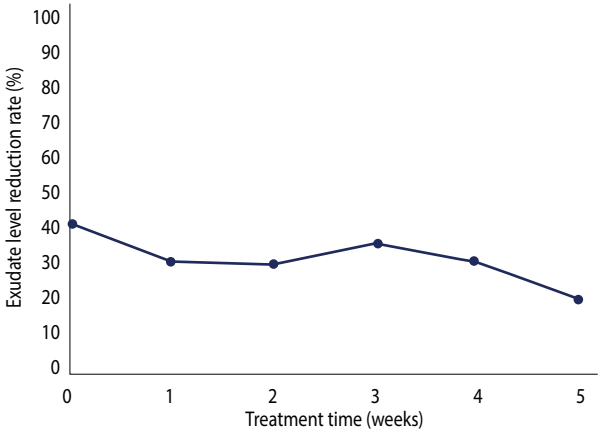


**Figure 2:** Exudate level

## Summary of outcomes

- The wound area reduced by 45% at week 1 and 97% at week 5 (Figure 1).
- The exudate level reduced by 25% at week 1 and 50% at week 5 (Figure 2).
- Severity of pain decreased from 3/10 at week 0 to 0/10 at week 1 and remained 0/10 at week 5. This reduction is regarded as clinically significant.[5]
- The wound remained colonised from week 1 to week 5.
- No adverse events were observed.

## Conclusion

The application of dHAM accelerated wound closure, reduced the pain experienced significantly and reduced the exudate level in an individual with a hard-to-heal DFU, in this case study. Larger clinical studies within the South African population are recommended.

## References


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