

# Chronic wound management with the innovative ovine extracellular matrix technology: a Honduran experience

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## INTRODUCTION

Complex wounds present a major challenge and significant reduction in the patient's quality of life. Where a large amount of tissue is damaged or missing the lengthy process of reconstruction leaves the exposed wound and underlying tissues susceptible to infection. The management of chronic wounds in Honduras can be relatively challenging due to underlying complications for both patient and clinician such as a lack of tools to improve circulation, inability to carry out surgical debridement and patient's circumstances such as a difficulty attending appointments and an insufficient diet to improve the immune system. Use of an extracellular matrix (ECM) biomaterial for the treatment of chronic wounds provides a structural and biological mimic of tissue ECM quickly, building healthy well vascularized tissue. In this study we analyzed the treatment of wounds using an ECM with or without silver (ECM<sup>#</sup> or ECM/Ag<sup>†</sup>). The ionic silver variant protects from microbial colonization and biofilm formation,<sup>‡</sup> providing protection for at-risk wounds. Treatment can then be switched to ECM without silver to complete wound healing when the risk of infection is reduced. These products are available for use off the shelf and are considerably less expensive than cell/tissue-based products (CTPs), which are not widely available in Honduras. This ECM has a long shelf life which is an advantage in countries like Honduras, making it cost-effective, as well as simple to store and distribute compared to many CTPs that require specialized training and equipment to apply. These materials can be used in an outpatient setting and do not require an operating room.

## METHODS

Chronic wounds (n=4) from spontaneous and traumatic causes were included in the study. The average wound size was 25 cm<sup>2</sup> (range 8.6 to 40 cm<sup>2</sup>), and average wound age was 264 months (range 24 to 528). All wounds received debridement and appropriate wound care followed by ECM/Ag application for the first five weeks. At this point, treatment was switched to ECM. One wound became infected at week 6, so was switched back to ECM/Ag.

## RESULTS

Cases 2 and 4 responded well and over the course of treatment reduced in area by 24% and 14% respectively. One case was lost to follow up and the treatment of another case was discontinued due to a persistent underlying infection resulting in lymphedema. This represents the first Honduran evaluation of this ECM-based product for the management of chronic wounds and we have seen some success using this approach. The ECM treatment regime is efficient, easy to apply and has produced positive outcomes for patients. The availability of this advanced technology provides another tool for the management of complex wounds in a challenging healthcare environment.

## REFERENCES AND DISCLOSURES

Product was provided by Aroa Biosurgery Limited (New Zealand); <sup>#</sup>Endoform Natural Dermal Template (Aroa Biosurgery Limited, New Zealand); <sup>†</sup>Endoform Antimicrobial (Aroa Biosurgery Limited, New Zealand); <sup>‡</sup>Plurigel dressing (Medline, Northfield, IL, USA); <sup>§</sup>Daffilon 500 mg (Laboratoires Servier, Suresnes, France). <sup>§</sup>EdemaWear®. 1. Karnik T, Dempsey SG, Jerram MJ, Nagarajan A, Rajam R, May BCH, et al. Ionic silver functionalized ovine forestomach matrix - a non-cytotoxic antimicrobial biomaterial for tissue regeneration applications. Biomater Res. 2019;23:6.


**CASE 2:**

92-Year old female presented with a 40 year-old ulcer of the right leg. Previous management included compression, antibiotics and regular dressing changes.


At the start of care the wound was partial thickness and measured 5.4 x 4.9 cm with surrounding dry skin. The treatment regime was repeated every 5 days or as required and involved treatment with HOCl followed by the application of ECM/Ag<sup>†</sup>, zinc oxide to the ulcer borders, ceramide to dry skin, edema wear and multivitamins\* twice a day. After 5 weeks, ECM treatment was changed to ECM (no silver).

Granulation of tissue improved after treatment and the wound reduced in size over the following months. At 12 weeks, the size of the wound was reduced to 3.7 x 3.7 cm or 52% of the original wound size by 31 weeks (7 months) the wound measured approximately 2.4 x 2.4 cm or 24% of the original wound size.


**Week 0: 5.4 x 4.9 cm (26.5 cm<sup>2</sup>)**




**Week 8: 4.1 x 3.8 cm (15.6 cm<sup>2</sup>)**




**Week 18: 3.4 x 3.0 (10.6 cm<sup>2</sup>)**




**Week 4: 5.7 x 4.7 cm (26.8 cm<sup>2</sup>)**



**Week 12: 3.7 x 3.7 (13.7 cm<sup>2</sup>)**



**Week 31: 2.7 x 2.4 (6.5 cm<sup>2</sup>)**



**CASE 4:**

61-Year old female presented with a 44 year-old ulcer of the left leg with moderate pain. Previous management included vein treatments by Hackett Hemwell Patterson Foundation (HHPF) for 3 years. Wound treatment with 0.25% acetic acid, silver sulfadiazine, system antibiotics, surfactant dressing<sup>‡</sup>.

At the start of care the wound was partial thickness and measured 4.1 x 2.1 cm (8.6 cm<sup>2</sup>). The treatment regime was repeated every 5 days or as required and involved treatment with HOCl followed by the application of ECM/Ag<sup>†</sup>, zinc oxide to the ulcer borders, ceramide lotion to dry skin, compression bandage<sup>§</sup> and multivitamins\* twice a day. After 5 weeks, ECM treatment was changed to ECM (no silver).

Granulation of tissue improved after treatment and the wound reduced in size over the following months. The size of the wound was reduced to 2.7 x 0.8 cm or 25% of the original wound size by 12 weeks. By 18 weeks the wound size measured 2.0 x 0.6 cm (1.2 cm<sup>2</sup>), around 14% of the original wound size.

**Week 0: 4.1 x 2.1 cm**



**Week 9: 3.3 x 1.2 cm**



**Week 12: 2.7 x 0.8 cm**



**Week 4: 4.7 x 1.4 cm**



**Week 10: 3.2 x 1.1 cm**



**Week 18: 2 x 0.6 cm**

