

# Use of a collagen dermal template with extracellular matrix (ECM) to treat complex lower extremity wounds

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**Introduction:**

There is an urgent need for new technologies to reduce the societal and economic burden of recalcitrant non-healing wounds. These chronic wounds are characterized by a complex etiology that in addition to an underlying medical condition (e.g. diabetes) can also include an imbalance of matrix-metalloproteinases, bioburden, bacterial biofilms, and an inflammatory response that has failed to resolve.<sup>1</sup> A collagen dermal template with ECM\* is one option for use on acute and chronic wounds. Collagen dermal template with ECM\* is comprised of approximately 90% natural, non-reconstituted collagen with the balance being secondary extracellular matrix that has been shown to retain native collagen architecture and important ECM-associated macromolecules including elastin, fibronectin, glycosaminoglycans and laminin.<sup>2</sup> One purpose of using a collagen dermal template with ECM\* is to reduce the activity of broad spectrum of MMPs and provide an extracellular matrix to help support the structure of the wound.<sup>3</sup> This current study seeks to show how collagen dermal template with ECM\* is used in the treatment of complex difficult to heal wounds.

**Objective:**

Demonstrate the efficacy of a collagen dermal template with ECM\* dressing on complex lower extremity wounds in the clinical setting.

**Method:**

Patients were seen at an outpatient wound healing center presenting with complex lower extremity wounds of various etiologies. These wounds had failed to progress to healing over a period of months despite utilization of various advanced topical therapies. A collagen dermal template with ECM\* was initiated.

**Outcome:**

This clinician observed consistent progress toward wound closure with the use of the collagen dermal template with ECM\* based on an increase in granulation tissue formation in the wound bed as well as reductions in wound size through wound measurement tracking and photographic documentation. The dressings were reapplied up to seven days as per manufacturer's instructions. Offloading and compression were used as necessary.

**Conclusion:**

Collagen dermal template with ECM\* dressings have demonstrated efficacy in this limited case series. In this case series, the chronic wounds exhibiting delayed wound healing progressed to wound closure while utilizing this treatment modality. When considering the chronic wound environment, this modality may be considered as a first choice dressing for progression toward healing chronic wounds.

**Case Study 1 - Left anterior leg wound**

92-year-old male patient underwent Moh's micrographic repair to left anterior leg.

- Past medical history: Congestive Heart Failure, Peripheral Artery Disease, and Hypertension.

- Previous treatment: Wound was non-healing for 6 weeks using hydrogen peroxide, topical antibiotic ointment, and non-adherent gauze. Systemic antibiotics were given to patient for 2 weeks prior to referral for further care.

- Wound treatment: Collagen dermal template with ECM\* was applied to the wound, covered with a contact layer dressing\*\* and secured with two-layer compression bandaging. Patient was seen weekly for 6 weeks.



**Week 1 - Wound Dimensions:**  
2.5 cm x 2.5 cm x 0.4 cm  
(surface area of 4.4 cm<sup>2</sup>)



**Week 2 - Wound Dimensions:**  
2.5 cm x 2.5 cm x 0.3 cm



**Week 3 - Wound Dimensions:**  
1.6 cm x 1.7 cm x 0.1 cm



**Week 4 - Wound Dimensions:**  
0.8 cm x 0.8 cm x 0.1 cm



**Week 5 - Wound Dimensions:**  
0.3 cm x 0.3 cm x 0.1 cm



**Week 6**  
Wound healed

**Case Study 2 - Surgical dehiscence of the toe**

66-year-old male patient was seen for a surgical dehiscence of the right great toe following a 1st metacarpophalangeal joint replacement.

- Past medical history: Diabetes, obesity, and hypertension.

- Previous treatment: Patient was started immediately on a bioelectric antimicrobial dressing after wound dehiscence.

- Wound treatment: Collagen dermal template with ECM\* was applied to the wound, covered with a contact layer dressing\*\*, a 4x4 gauze, held in place with rolled gauze, and secured with tape. Patient was seen weekly for 11 weeks.



**Week 1 - Wound Dimensions:**  
3.4 cm x 5.5 cm x 0.2 cm



**Week 2 - Wound Dimensions:**  
3.0 cm x 4.5 cm x 0.2 cm



**Week 3 - Wound Dimensions:**  
2.5 cm x 4.0 cm x 0.2 cm



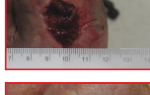
**Week 4 - Wound Dimensions:**  
2.0 cm x 3.5 cm x 0.1 cm



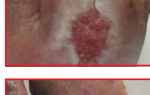
**Week 5 - Wound Dimensions:**  
2.0 cm x 3.2 cm x 0.1 cm



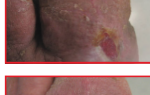
**Week 6 - Wound Dimensions:**  
1.9 cm x 2.6 cm x 0.1 cm



**Week 7 - Wound Dimensions:**  
1.5 cm x 2.0 cm x 0.1 cm



**Week 8 - Wound Dimensions:**  
1.4 cm x 2.0 cm x 0.1 cm



**Week 9 - Wound Dimensions:**  
1.0 cm x 1.7 cm x 0.1 cm



**Week 10**  
Last application of collagen dermal template with ECM\* at week 10. Wound healed by week 11.

**Case Study 3 - Left anterior leg wound**

76-year-old female with traumatic injury to left anterior leg.

- Past medical history: Diabetes Mellitus, hypertension, Peripheral Artery Disease, and an abnormal gait.

- Previous treatment: Wound was non-progressive for 2 weeks using topical antibiotic ointment and hydrogen peroxide. Patient was self-caring at home under direction of primary care physician.

- Wound treatment: Collagen dermal template with ECM\* was applied to the wound, covered with a contact layer dressing\*\*, a 4x4 gauze, held in place with rolled gauze, and secured with tape. Patient was seen weekly for 3 weeks.



**Week 1 - Wound Dimensions:**  
0.9 cm x 1.0 cm x 0.3 cm



**Week 2 - Wound Dimensions:**  
0.6 cm x 0.6 cm x 0.2 cm



**Week 3**  
Wound healed

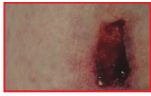
**Case Study 4**

85-year-old female patient was seen for a laceration injury to her anterior right leg.

- Past medical history: Peripheral Artery Disease, A-Fib, anti-coagulant therapy, abnormal gait, neuropathy, and dementia.

- Previous treatment: Wound was non-healing for 3 weeks using dry dressings and hydrogen peroxide.

- Wound treatment: Collagen dermal template with ECM\* was applied to the wound, covered with a contact layer dressing\*\*, a 4x4 gauze, held in place with rolled gauze, and secured with tape. Patient was seen weekly for 3 weeks.



**Week 1 - Wound Dimensions:**  
1.0 cm x 1.3 cm x 0.15 cm



**Week 2 - Wound Dimensions:**  
0.4 cm x 0.4 cm x 0.1 cm



**Week 3**  
Wound healed

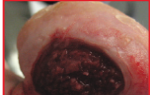
**Case Study 5 - Foot ulcer**

56-year-old male presented with a partial hallux amputation resulting from MRSA in a recurrent neuropathic plantar foot ulcer.

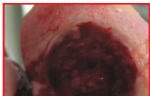
- Past medical history: Insulin dependent Diabetes Mellitus and hypertension.

- Previous treatment: Hydrogel, collagen gel, porcine skin substitute x 3, total contact cast for 6 weeks, foam dressings, and collagen dressings.

- Wound treatment: Collagen dermal template with ECM\* was applied to the wound, covered with a contact layer dressing\*\*, a 4x4 gauze, held in place with rolled gauze, and secured with tape. Patient was seen every 5 days for 1 month. Due to a change in the patient's health insurance during treatment, patient was lost to follow up for 4 weeks. Collagen dermal template with ECM\* was given to the patient for continued dressing application at home every 5 days. Patient returned for follow-up at 8 weeks with resultant healed wound. Patient did not seek other treatment or therapy other than using collagen dermal template with ECM\*.



**Week 1 - Wound Dimensions:**  
2.2 cm x 2.0 cm x 0.2 cm



**Week 2 - Wound Dimensions:**  
1.9 cm x 2.0 cm x 0.2 cm



**Week 3 - Wound Dimensions:**  
1.8 cm x 1.6 cm x 0.1 cm



**Week 4 - Wound Dimensions:**  
1.5 cm x 1.5 cm x 0.1 cm



**Week 8**  
Wound healed

**REFERENCES**

1. Wolcott, R.D., Roads, D. D., Dowd, S.E. (2008) Biofilms and chronic wound inflammation. *Journal of Wound Care.* 17(8):333-41.
2. Endoform dermal template instructions for use.
3. Negron, S., Lun, S., May, B., & May, C.H. (2012). Ovine forestomach matrix biomaterial is a broad spectrum inhibitor of matrix metalloproteinase's and neutrophil elastase. *International Wound Journal.* doi: 10.1111/j.1742-481X.2012.01106.x

\* Endoform dermal template, Hollister Incorporated, Libertyville, IL  
\*\* Restore Contact Layer FLEX dressing, Hollister Incorporated, Libertyville, IL