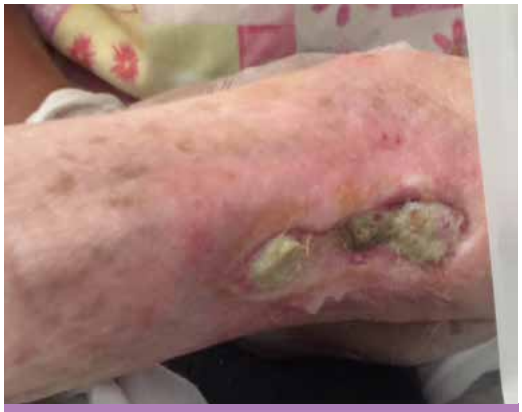
endoform®

CLINICAL EVIDENCE | Pressure Injury

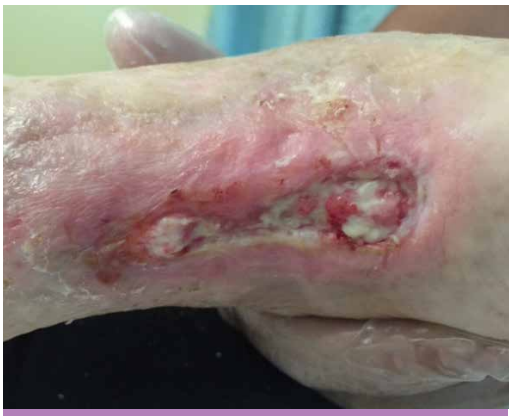
Endoform® helps to improves the clinical outcome in the treatment of pressure injuries

- **Endoform®**, in combination with antibacterial foam, helped lead to timely closure of stage three pressure injuries in a clinical study (63.2 % completely healed in 4 weeks).[1]
- **Endoform®** treatment of a 3 month old pressure ulcer of the achillies in an 80 year-old patient helped lead to re-epithelialization after 6 weeks of treatment.[2]
- A clinical study showed that **Endoform®** treatment for pressure injuries helped to result in a 91.3 % surface area reduction in 12 weeks.[3]



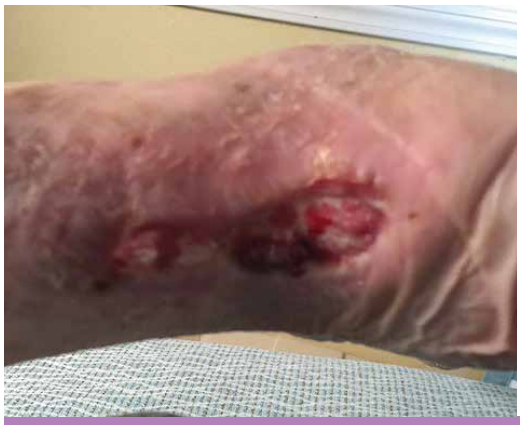
Week 0:

Wound measurement:
5.5 cm x 2.5 cm x 1 cm
Description:
Achilles tendon exposed



Week 3:

Wound split into 2.
Wound measurements:
Proximal - 1 cm x 1 cm x 0.2 cm,
Distal - 3 cm x 1.2 x 0.2 cm
Granulating tissues, tendon recovered

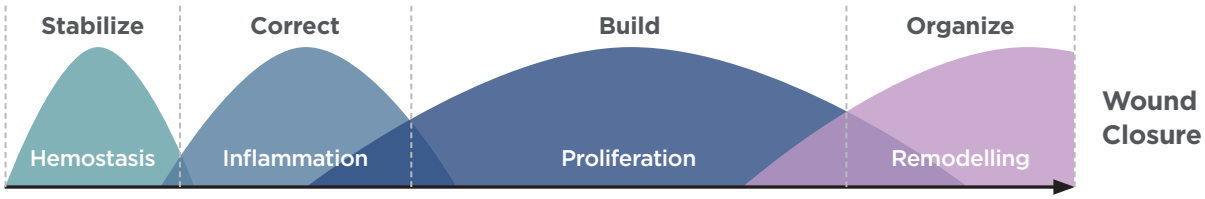


Week 6:

Re-epithelialized

*Treatment of pressure ulcer of Achilles using **Endoform®***

Endoform® can be used at all phases of wound management



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CLINICAL EVIDENCE | Pressure Injury

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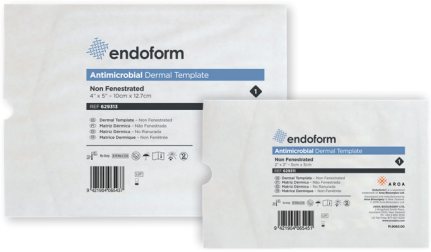

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1. Bohn, G. Champion, S. (2016). Improved healing of Stage 3 pressure ulcers using extracellular matrix collagen dressings. Symposium on Advanced Wound Care Fall, Los Vegas. 2. Zilberman, I. and N. Zolfaghari (2016). Innovative solutions in the management of wounds with exposed tendons utilizing ovine collagen extracellular matrix and gentian violet and methylene blue antibacterial foams. Symposium on Advaanced Wound Care - Atlanta, GA3. 3. Lullove, E. J. (2017). "Use of Ovine-based Collagen Extracellular Matrix and Gentian Violet/Methylene Blue Antibacterial Foam Dressings to Help Improve Clinical Outcomes in Lower Extremity Wounds: A Retrospective Cohort Study." Wounds 29(4): 107-114.

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MKT 1440.01 | May 2018

Improved Healing of Stage 3 Pressure Ulcers Using Extracellular Matrix Collagen Dressings.

• Gregory Bohn, MD, FACS, ABPM/UHM, CWSP, FACHM • Sue Champion RN, CWOCN
West Shore Center for Wound Care and Hyperbaric Medicine, Manistee, MI

Purpose:

A retrospective case review was conducted to evaluate the benefit of a combination wound dressing protocol for treating Stage 3 pressure ulcers that could be left on the wound for a week.

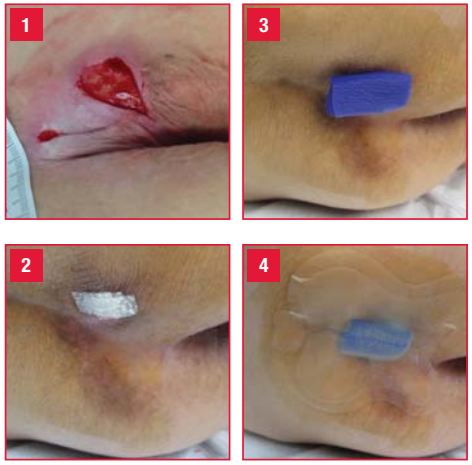
Introduction:

Stage 3 pressure ulcers are a major challenge for the clinician to heal. Using a combination dressing protocol may improve healing. Multiple randomized controlled trials have demonstrated the superiority of hydrocolloid dressings over plain gauze in the treatment of pressure ulcers.[1] One RCT including 65 residents with Stage 3 pressure ulcers in long term care facilities demonstrated similar healing rates of hydrocolloid dressings vs standard collagen dressings.[3] The benefits of collagen to modulate excess matrix metalloproteinase (MMP) activity in a wound have been documented. A low MMP level is conducive to healing rather than a high level which can delay or retard healing.[2] When treated in the outpatient setting, using a dressing that would be effective for the weekly episode of care would be ideal. A combination dressing protocol was developed and evaluated for the treatment of Stage 3 pressure ulcers.

Methodology:

A retrospective case review of 17 patients with Stage 3 pressure ulcers from long term care facilities patients were followed on a weekly basis at the wound care center. Initial excisional debridement was performed in all cases followed by subsequent debridement as needed during the treatment phase. Pressure reduction with mattress overlays and or seat cushions were ordered as needed. As part of the overall wound care plan, the combination dressing protocol developed consisted of a ovine collagen extracellular matrix dressing* (CECM) used as the primary dressing (Photo 2), a hydrogel (if needed for moisture balance), and methylene blue/gentian violet (MB/GV) polyurethane (PU) antibacterial foam** (Photo 3) for management of biodurden, which was held in place with a generic hydrocolloid cover dressing (Photo 4). Dressing changes were performed weekly. Peri-wound skin was prepped with tincture of benzoin swabs to improve adherence of the hydrocolloid cover dressing. If the dressing dislodged before the next weekly clinic visit, care givers were instructed to reapply the collagen and foam portion of the dressing with a hydrocolloid cover. Wound assessment, simple wound measurements, and wound photographs were obtained at each weekly patient visit.

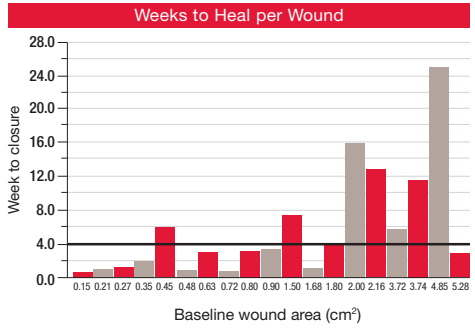
Combination Dressing Protocol



Results:

N patients	17
N wounds	21
Gender	7 males, 10 females
Age (mean, range)	75 years (41 – 93)
BMI (mean, range)	29.1 (13.6 – 64.2)
Braden Scale (mean, range)	15.2 (11 – 17)
Baseline Wound Area (mean, range)	1.62 cm^2 (0.15 – 5.28)

Seventeen patients presented with 21 Stage 3 sacrococcygeal area pressure ulcers. Nineteen wounds were followed to closure. Twelve of nineteen (12/19), 63.2% of the wounds healed in 4 weeks or less. All 19 wounds healed in a mean of 5.6 weeks (range .9-25.1 weeks). Median time to healing was 2.9 weeks. Two patients did not complete the study: One patient moved out of the area, but the wound volume reduced 71% in 6.6 weeks and the other patient deceased with the wound volume reduced 67% at 1 week.



Discussion:

In a comparative randomized controlled trial of 65 residents of skilled nursing home facilities with pressure ulcers, 13 patients had Stage 3 pressure ulcers.[3] Either a collagen dressing or a hydrocolloid dressing were used to treat the wounds. When a collagen or hydrocolloid dressing were used alone, healing at 4 weeks did not occur.

In this retrospective case review, it appeared that using this combination dressing protocol with the CECM collagen dressing used in conjunction with MB/GV PU antibacterial foam and a hydrocolloid, complete healing was observed in 12 of 19 (63.2%) of stage 3 pressure ulcers at 4 weeks.

Conclusion:

Given that wound closure occurred in the majority of these Stage 3 pressure ulcers within 4 weeks, in this retrospective case review it appears to suggest that this dressing protocol did show effective wound closure on a timely basis.

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3. Graumlich JF, et al, Healing Pressure Ulcers with Collagen or Hydrocolloid: A Randomized Controlled Trial. JAGS 2003. 51:147-154.

* Endoform dermal template, Distributed by Hollister Incorporated.
** Hydrofera Blue Ready foam, Distributed by Hollister Incorporated.

Financial Disclosure: The author received an honorarium from Hollister Incorporated.

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Bohn, G. and S. Champion (2016). Improved Healing of Stage 3 Pressure Ulcers Using Extracellular Matrix Collagen Dressing. Sympiosium on Advanced Wound Care. Las Vegas, NA.

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Innovative solutions in the management of wounds with exposed tendons utilizing ovine collagen extracellular matrix and gentian violet and methylene blue antibacterial foams.

• **Dr. Igor Zilberman, DPM** • **Nooshin Zolfaghari DPM, CWS, MPH,** South Florida Lower Extremity Center, Hollywood, FL

INTRODUCTION:

Tendons are anatomical structures that connect muscle to bone. They are composed of parallel bundles of collagen fiber and often appear at striated white or cream yellow structures in wound beds.[1] Tendons are nourished by blood vessels and by diffusion of nutrients from synovial fluid.[2] Because nourishment is disrupted when the tendon is exposed, meticulous care must be provided to prevent infection and desiccation. Either of these two may result in loss of tendon viability.[3]

Tendons may be exposed in trauma wounds, stage IV pressure wounds, diabetic wounds, and contaminated or infected surgical wounds.[4] Chronic wounds represent a failure in the normal order and sequence of wound healing. Changes in local pH, temperature, and amounts of chemical reactants are all factors influencing wound healing.

The three main components of local wound management include debridement, infection/inflammation, and moisture balance. Bioburden, or critical bacterial colonization, leads to persistently high levels of matrix metalloproteinases (MMP) being released from inflammatory cells that digest the normal collagen scaffold in the base of a healing wound.[5] Addressing these key barriers to wound healing with use of advanced wound care products may assist to achieve tendon coverage and promote wound healing.

OBJECTIVE:

To describe the use of an ovine collagen with an intact ECM* (CECM) and gentian violet and methylene blue (GV/MB) polyurethane (PU) and/or polyvinyl alcohol (PVA) antibacterial foam**, *** in wounds with exposed tendons.

METHODS AND MATERIALS:

Patients were selected with wounds containing either partial or complete tendon exposure. The CECM dressings and GV/MB foams were changed according to product instructions. Assessments and measurements were performed by the clinician weekly.

CONCLUSION:

The use of the CECM dressing with GV/MB antibacterial foams in this case series were helpful in the management of these complex wounds. Complete tendon coverage and resolution of wounds were without complication.

Case Study 1 - Surgical wound- Right Dorsal Foot

Patient: 41 year-old male presented to emergency room with cellulitis, swelling and a blister on right hallux and metatarsal. Abscess was noted on the right lateral dorsal foot. MRI revealed osteomyelitis.

Past medical history:
- Hypertension, diabetes.

Wound history:
- First ray resection on right foot with debridement of abscess on right dorsal foot. IV antibiotics. Hospitalized for 1½ weeks.

Previous treatment:
- Negative pressure wound therapy (NPWT) alone during hospital stay. CECM, hydrogel, covered with non-adherent contact layer and NPWT for 5 weeks.

Treatment:
- NPWT discontinued. Treatment changed to CECM covered with MB/GV PVA antibacterial foam covered with dry gauze and secured with gauze wrap. Dressings changed every other day.

Week 0 Wound measurement:
9.8 cm x 7.0 cm x 0.5 cm
Wound Description:
Granulating tissues with some non-viable tissues. Extensor tendon 3, 4 and 5 exposed.

Week 6 Wound measurement:
7.4 cm X 5.0 cm
Wound Description:
Hypergranulating tissues. 20% of tendon exposed.

Week 2

Week 8 Wound measurement:
5.0 cm X 3.4 cm
Wound Description:
100% granulating wound bed with smooth flat wound edges. No tendons exposed.

Week 4 Wound measurement:
7.5 cm x 5.5 cm

Week 15
100% re-epithelialized.

Case Study 2 - Dehisced surgical wound - 2nd right toe

Patient: 59 year-old female presented to clinic with dehisced surgical incision on 2nd right toe osteomyelitis.

Past medical history:
- Hypertension, hepatitis C.

Wound history:
- Revision of hammertoe on right 2nd toe.

Previous treatment:
- N/A.

Treatment:
- Sutures removed. Applied CECM, hydrogel and covered with MB/GV antibacterial PU foam dressing. Dressings changed weekly.

Week 0 Wound measurement:
2.0 cm x 1.4 cm x 0.3 cm
Wound Description:
Granulating tissues with extensor tendon exposed.

Week 7
Wound Description:
100% granulating tissues. Tendon covered.

Week 3 Wound measurement:
1.5 cm x 0.7 cm x 0.3 cm

Week 9
100% re-epithelialized.

Week 5 Wound measurement:
0.8 cm x 0.4 cm x 0.2 cm

Case Study 3 - Pressure Ulcer - Achilles

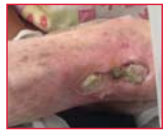
Patient: 80 year-old male living in a skilled nursing facility, bed bound with 3 month old pressure ulcer to the achilles.

Past medical history:
- Peripheral vascular disease, congestive heart failure.

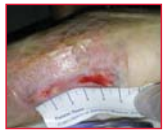
Wound history:
- N/A

Previous treatment:
- Enzymatic debrider for 4 weeks to remove black eschar.

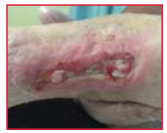
Treatment:
- Applied CECM, covered with MB/GV PU antibacterial foam, secured with gauze wrap. Dressings changed every other day.



Week 0 Wound measurement:
5.5 cm x 2.5 cm x 1.0 cm
Wound Description:
Achilles tendon exposed.

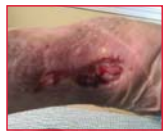


Week 5 Wound measurement:
Proximal - 0.8 cm x 0.3 cm
Distal - 2.0 cm x 0.5 cm



Week 2 Wound measurement:
4.5 cm x 1.2 cm x 1.0 cm

Week 6
Re-epithelialized



Week 3 Wound measurement:
Wound split into 2.
Proximal - 1.0 cm x 1.0 cm x 0.2cm
Distal - 3.0 cm x 1.2 cm x 0.2 cm
Granulating tissues, tendon covered.

Case Study 4 - Diabetic Foot Ulcer – Left First Metatarsal

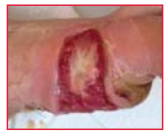
Patient: 51 year-old male with diabetic foot ulcer.

Past medical history:
- Diabetic with abscess on left first metatarsal.

Wound history:
- N/A

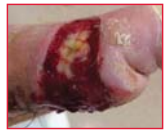
Previous treatment:
- Incision and drainage of abscess with debridement of necrotic tissues.
- Systemic antibiotic for 2 weeks.
- Wound dressings: Wet to dry dressings for 2 weeks.

Treatment:
- Applied CECM, covered with MB/GV PU antibacterial foam, secured with stretch gauze and elastic bandage. Dressings changed weekly.



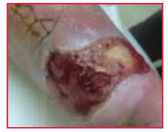
Week 0 Wound measurement:
8.5 cm x 4.0 cm x 0.5 cm
Wound Description:
70% Red granulating tissues with 30% tendon exposed.

Week 4 Wound measurement:
8.0 cm x 3.0 cm x 0.2 cm
Wound Description:
100% red granulating tissues. Tendon completely covered with granulation tissues.

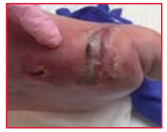


Week 1 Wound measurement:
8.5 cm x 3.5 cm x 0.5 cm
Wound Description:
80% red granulating tissues with 20% tendon exposed.

Week 8 Wound measurement:
4.6 cm x 3.0 cm x 0.2 cm
Wound Description:
Wound continues to reduce in size.



Week 2 Wound measurement:
8.5 cm x 3.5 cm x 0.2 cm
Wound Description:
Tendon continued to be covered with granulation tissue.



Week 10
Wound Description:
Re-epithelialized

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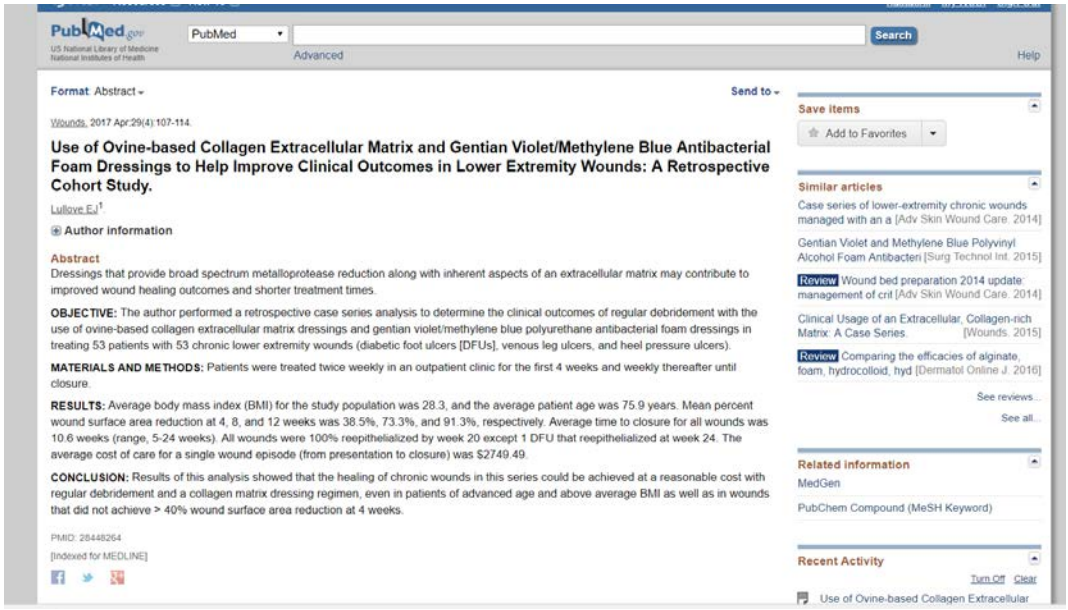

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Use of Ovine-based Collagen Extracellular Matrix and Gentian Violet/Methylene Blue Antibacterial Foam Dressings to Help Improve Clinical Outcomes in Lower Extremity Wounds: A Retrospective Cohort Study.

Lullove EJ[1]

Author information

Abstract

Dressings that provide broad spectrum metalloprotease reduction along with inherent aspects of an extracellular matrix may contribute to improved wound healing outcomes and shorter treatment times.

OBJECTIVE: The author performed a retrospective case series analysis to determine the clinical outcomes of regular debridement with the use of ovine-based collagen extracellular matrix dressings and gentian violet/methylene blue polyurethane antibacterial foam dressings in treating 53 patients with 53 chronic lower extremity wounds (diabetic foot ulcers [DFUs], venous leg ulcers, and heel pressure ulcers).

MATERIALS AND METHODS: Patients were treated twice weekly in an outpatient clinic for the first 4 weeks and weekly thereafter until closure.

RESULTS: Average body mass index (BMI) for the study population was 28.3, and the average patient age was 75.9 years. Mean percent wound surface area reduction at 4, 8, and 12 weeks was 38.5%, 73.3%, and 91.3%, respectively. Average time to closure for all wounds was 10.6 weeks (range, 5-24 weeks). All wounds were 100% reepithelialized by week 20 except 1 DFU that reepithelialized at week 24. The average cost of care for a single wound episode (from presentation to closure) was $2749.49.

CONCLUSION: Results of this analysis showed that the healing of chronic wounds in this series could be achieved at a reasonable cost with regular debridement and a collagen matrix dressing regimen, even in patients of advanced age and above average BMI as well as in wounds that did not achieve > 40% wound surface area reduction at 4 weeks.

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