

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

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INTRODUCTION:

Tendons are anatomical structures that connect muscle to bone. They are composed of parallel bundles of collagen fiber and often appear as 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 2



Week 4 Wound measurement:
7.5 cm x 5.5 cm



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



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



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



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



Week 9
100% re-epithelialized.

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



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.



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



Week 6
Re-epithelialized

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



Week 10
Wound Description:
Re-epithelialized

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- Hydrofera Blue Ready foam. Distributed by Hollister Incorporated.
- Hydrofera Blue classic foam. Distributed by Hollister Incorporated.