Managing Diabetic Foot Ulcers Using a Three Pronged Approach: V.I.P.

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Introduction:

Diabetic foot ulcers (DFUs) are a complication of diabetes that can be costly to treat, reduce quality of life, may lead to amputation, and even death.[1] An excess of matrix metalloproteinases (MMPs) and decreased tissue inhibitors of metalloproteinases (TIMPs) may contribute to diabetic ulcers not healing.[2] Vascular management (V), infection management and prevention (I), and pressure relief (P) are essential to DFU healing.[1] Total contact casting is the gold standard for DFU management. However, off-loading alone will fail to present optimal outcomes if vascular disease or infection is not appropriately managed.[1] Utilizing a total contact cast (TCC) system comprised of a clamshell cast with off-loading footplate* that includes products needed to address the V.I.P.s can be helpful to manage DFUs.

Method:

Three DFU patient's wounds were managed using ovine collagen with an intact extra cellular matrix (CECM) ** as a primary dressing and methylene blue and gentian violet (MB/GV) polyurethane (PU) antibacterial foam*** dressing to help manage bioburden as a secondary dressing and placed in a TCC system. The off-loading system provided a multilayer footplate that the clinician custom cuts for each patient. The unique clamshell cast provided a 7-layer fiberglass structure to accommodate different sized patients while maintaining durability. All patients were placed in a CAM boot and were able to ambulate immediately after TCC system comprised of a clamshell cast with off-loading footplate was applied. Patients returned to the clinician's office weekly for wound dressing and TCC system changes.

Results:

All three patients had wound closure within 12 weeks and without infection. The TCC system comprised of a clamshell cast with off-loading footplate provided the needed solution to provide V.I.P. treatment to these DFU patients.

Case Study 1

Patient: 56 year-old.

Past medical history:
- Hypertension, chronic obstructive pulmonary disease, diabetes, peripheral vascular disease, peripheral neuropathy, Charcot foot. Recurrent wound for the last 2 years. Current wound is six months old.

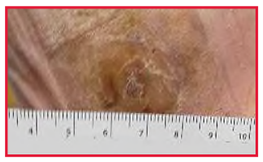
Previous wound management:
- Cellular tissue product, collagen with oxidized regenerated cellulose, debridement, and foam dressings were used for 21 weeks.
- CECM, GV/MB antibacterial PVA foam used with an offloading diabetic shoe for 3 weeks. Despite advanced wound dressings and diabetic shoe, wound did not progress.

Wound management:
- CECM covered with GV/MB PU antibacterial foam were applied to the wound and secured with tape.
- Applied with TCC system comprised of a clamshell cast with offloading footplate.
- Changed weekly for a total of 8 applications.

Week 0
Wound measurement:
0.8 cm x 0.7 cm x 0.7 cm

Week 1
Wound measurement:
0.6 cm x 0.5 cm x 0.2 cm

Week 5
Wound measurement:
Wound size decreased with healthy granulating tissues



Week 8
Wound measurement:
100% re-epithelialized

Case Study 2

Patient: 48 year-old.

Past medical history:
- Diabetes, CVA, Charcot deformity.

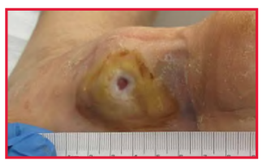
Age of wound:
- 3 weeks.

Previous wound management:
- Antibiotic ointment and off-loading with post-operative shoe.

Wound management:
- CECM covered with GV/MB PU antibacterial foam were applied to the wound and secured with tape.
- Applied TCC system comprised of a clamshell cast with off-loading footplate

Week 0
Wound measurement: Post-debridement
2.4 cm x 1.4 cm x 0.3 cm

Week 1
Wound measurement: Post-debridement
1.0 cm x 0.8 cm x 0.2 cm



Week 2
Wound measurement: Pre-debridement
0.5cm x 0.4cm x 0.2cm
No debridement performed

Week 3
Wound measurement: Post-debridement
1.0cm x 0.8cm x 0.3cm

Week 4
Wound measurement: Post-debridement
0.7cm x 0.6cm x 0.1cm

Week 5
Wound measurement:
Wound Closure

Case Study 3

Patient: 69 year-old who was initially seen prior for idiopathic peripheral neuropathy and a bilateral charcot deformity with a wound on the plantar aspect of the right foot.

Past medical history:
- Hypertension, Dyslipidemia, Coronary artery bypass graft x 3, Atrial fibrillation.

Previous wound management:
- Patient was treated conservatively for 8 weeks and refused casting until the wound failed to respond and close.

Wound management:
- CECM covered with GV/MB PU antibacterial foam were applied to the wound and secured with tape.
- Applied TCC system comprised of a clamshell cast with off-loading footplate
- Wound closure was achieved in 6 weeks after adding these to the overall wound management plan.

Week 0
Wound measurement:
1.0 cm x 1.4 cm x 0.3 cm

Week 2
Wound measurement:
0.8 cm x 0.5 cm x 0.3 cm

Week 5
Wound measurement:
Wound Closure

Conclusion:

Without proper pressure relief, successful healing will be unlikely even when using advanced therapeutics.[1] In these cases, the addition of the TCC system comprised of a clamshell cast with offloading footplate, which includes CECM and GV/MB PU antibacterial foam dressings, helped the wounds get back on a healing trajectory.

REFERENCES
1. Snyder, RJ, et al. The Management of Diabetic Foot Ulcers Through Optimal Offloading Building Consensus Guidelines and Practical Recommendations to Improve Outcomes; Journal of American Podiatric Medical Association. 2014; 104(6): 555-567.
2. Lobmann, R., et al, (2002). Expression of matrix-metalloproteinases and their inhibitors in the wounds of diabetic and non-diabetic patients. Diabetologia, (45), 1011–1016-1011–1016. doi:DOI 10.1007/s00125-002-0868-8
3. Hollister, Incorporated. (n.d.). Endoform dermal template brochure

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

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