

# Treatment of Plantar Diabetic Ulcer with Human Acellular Dermal Matrix (ADM)

Eric J. Buchbaum, DPM

Shoreline Podiatry, Wakefield, RI

CASE STUDY

Diabetes is a group of metabolic disorders characterized by poor insulin secretion or impaired insulin function both leading to hyperglycemia. One of the long-term complications of this disease process is neuropathy. Neuropathy, particularly in the extremities, leads to poor sensation, which contributes to the occurrence of ulcers typically observed on the feet of diabetic patients.<sup>1</sup> Current treatments for diabetic ulcers include wound dressing, hyperbaric oxygen therapy, negative pressure therapy<sup>2</sup>, and, in advanced cases, amputation of the limb.

An alternative treatment for plantar ulcers related to diabetes involves the use of an Acellular Dermal Matrix (ADM), which has demonstrated application in a variety of medical procedures, including wound healing, soft tissue reconstruction, and sports medicine applications.<sup>5-8</sup> These dermal matrices have been demonstrated to support cellular and vascular in-growth in vitro and in vivo.<sup>9-11</sup> One particular human allograft ADM, Dermacell<sup>®</sup>, is uniquely prepared, resulting in at least 97% DNA removal, and provided sterile at room temperature, ready to use.

**The following case presentation involves treatment of a plantar ulcer using this novel human ADM allograft, Dermacell AWM.**

## Patient

- 41-year-old male, Type 2 diabetic

## Diagnosis

- Left plantar diabetic ulcer
- Caused by soft tissue trauma
- Resulted in blister formation with an underlying grade 2 ulceration

## Treatment

- After four weeks without significant improvement, Dermacell AWM was applied
- Non-adherent dressing applied and changed daily
- Foot immobilized with surgical shoe
- Weekly follow-up until wound closure

## Conclusion

- Progressive reduction in wound length and width over approximately one month
- The wound's area and volume had significant reductions of 92.4%
- Reduction in all dimensions, including depth, were observed after one week post-application of ADM
- In this case study, ADM was successfully used to provide wound resurfacing to correct a plantar diabetic ulcer

# Treatment of Plantar Diabetic Ulcer with Human Acellular Dermal Matrix (ADM)

## CASE STUDY



**Day 7.**  
Sharp debridement of the necrotic tissue



**Day 16.**  
Excisional debridement, level skin/subcutaneous tissue



**Day 31.**  
Dermacell application – 16 cm<sup>2</sup>



**Day 38.**  
Excisional debridement, level skin/subcutaneous tissues

**Table 1. Wound dimensions and percent reduction from initial observation**

Day of Study	Length (cm)	Width (cm)	Depth (cm)	Area (cm <sup>2</sup> )	Volume (cm <sup>3</sup> )
0	2.1 (0%)	5 (0%)	0.1 (0%)	8.25 (0%)	0.82 (0%)
7	3 (-42.9%)	3.5 (30%)	0.1 (0%)	8.25 (0%)	0.82 (0%)
16	2.1 (0%)	3.1 (38%)	0.1 (0%)	5.11 (38%)	0.51 (38.1%)
31	0.6 (71.4%)	2.5 (50%)	0.2 (-100%)	1.18 (85.7%)	0.24 (71.4%)
38	0.5 (76.2%)	1.6 (68%)	0.1 (0%)	0.63 (92.4%)	0.06 (92.4%)

## References

- Hozibal, Kimberly B., and Dane K. Wukich. 2012. Diabetic foot infections: current concept review. *Diabetic Foot Ankle*; 3:1-8.
- Dumville, Jo. C., Sohan Deshpande, Susan O'Meara, and Katharine Speak. 2011. Foam dressings for healing diabetic foot ulcers (Review). *Cochrane Database System Rev*; 9:1-46.
- Gupta, Subhas, Barbara Bates-Jensen, Allen Gabriel, Allen Holloway, Jeffrey Niezgod, and Dot Weir. 2007. Differentiating negative pressure wound therapy devices: an illustrative case series. *Wounds*; 19(1):1-9.
- Zamboni, W. A., H. P. Wong, L. L. Stephenson, and M. A. Pfeifer. 1997. Evaluation for hyperbaric oxygen for diabetic wounds: a prospective study. *Undersea Hyperb Med*; 24(3):175-179.
- Wong I, Burns J, Snyder S. 2010. Arthroscopic GraftJacket Repair of Rotator Cuff Tears. *J Shoulder Elbow Surg*; 19(2):104-109.
- Wilkins, R. 2010. Acellular Dermal Graft Augmentation in Quadriceps Tendon Rupture Repair. *Curr Orthop Pract*, 21(3):315-319.
- Lee, Daniel. 2007. Achilles Tendon Repair with Acellular Tissue Graft Augmentation in Neglected Ruptures. *J Foot Ankle Surg*; 46(6): 451-455.
- Sbitany, H., Sandeen, S., Amalfi, A., Davenport, M., Langstein, H. 2009. Acellular Dermis-Assisted Prosthetic Breast Reconstruction versus Complete Submuscular Coverage: A Head-to-Head Comparison of Outcomes. *Plast Reconstr Surg*; 124:1735-1740.
- Wainwright, DJ, Bury, SB. 2011. Acellular Dermal Matrix in the Management of the Burn Patient. *Aesthet Surg J*; 31(7):235-235.
- Capito AR, Tholpady SS, Agrawal H, Drake DB, Katz AJ. Evaluation of host tissue integration, revascularization, and cellular infiltration within various dermal substrates. *Ann Plast Surg*. 2012;68:495-500.
- Armour AD, Fish JS, Woodhouse KA, Semple JL. A comparison of human and porcine acellularized dermis: Interactions with human fibroblasts in vitro. *Plast Reconstr Surg*. 2006;117(3):845-56.

LifeNet Health helps to save lives, restore health and give hope to thousands of patients each year. We are the world's most trusted provider of transplant solutions, from organ procurement to new innovations in bio-implant technologies and cellular therapies—a leader in the field of regenerative medicine, while always honoring the donors and healthcare professionals who allow the healing process.

## LifeNetHealth.org

The LifeNet Health logo and Dermacell are registered trademarks of LifeNet Health. ©2018 LifeNet Health, Virginia Beach, VA. All rights reserved. 68-20-06702