Acular dermal matrices have been reported in the literature and have been studied and shown to successfully treat indolent diabetic foot wounds for over 20 years. In this study, we examined a novel, human reticular dermal matrix (HR-ADM) with an open, porous, and uniform framework adaptively processed to retain endogenous matrix proteins.

In a 12-week trial, 40 consecutive patients were enrolled with non-healing diabetic ulcers 1-25cm² in size. After a 2-week screening period if the wound failed to reduce in size by 20% using offloading and moist wound care, the patients were randomized to receive either standard of care alginate wound therapy or wound size-specific acular-human dermal matrices applied weekly. Patients were followed for 12 weeks or until one week after healing.

At 6 weeks, 65% of the reticular-dermal-tissue-treated wounds had healed (13/20) compared to 5% (1/20) of the wounds that received Standard of Care dressing (SOC) alone (adjusted p=0.00028). At 12 weeks 16/20 patients (80%) healed completely with the human dermis versus only 4/20 (20%) with SOC (p=0.00036). There was no incidence of increased adverse or serious adverse events between either group. The mean and median cost to closure in the human dermis group was $1475.00 and $963.00 respectively per healed wound.

These findings demonstrate that weekly application of acular human dermal matrix is an effective treatment for the non-healing diabetic foot wound. Wound size specific pieces may allow for decreased cost to closure and wastage.

Inclusion/Exclusion Criteria

#### Inclusion Criteria

- Type 1 or type 2 diabetes mellitus (ADA diagnostic criteria).
- Limb salvage surgery (above knee, below knee, or malleoli of the ankle).
- ABI with results of ≥0.7 and ≤1.2
- Dorsum transcutaneous oxygen test (TCOM) ≥30mmHg
- Male or female age 18 or older
- Wound probing to bone (UT Grade IIIA – IIIb)
- Active infection at index wound site
- Patients previously randomized into this study, or presently participating in any clinical trial
- Patients who are pregnant or breast feeding.
- Patients currently receiving radiation therapy or chemotherapy.
- Patients with known or suspected local skin malignancy to the index wound site
- Patients who have received a biomedical or topical growth factor for treatment of the index wound.
- Serum creatinine level 3.0mg/dL or greater

#### Exclusion Criteria

- Patients with wounds healing greater than 20% during the screening period.
- Active infection at the index wound site
- Patients with known or suspected local skin malignancy to the index wound site
- Patients with osteomyelitis or underlying infection.
- Patients who have received a biomedical or topical growth factor for treatment of the index wound.
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### RESULTS

#### Study design:

- Patients demonstrating <20% wound area healing within 2 weeks of initial screening were randomized into either of the two treatment arms.
- Weekly patient visits included sharp debridement, cleaning, graft application, dressing change, photography, and wound measurement via acurate tracing and length/width/ruler measurement. Offloading was also employed.
- Validation visit one week after 100% epithelialization of wound was required to confirm closure.

#### Data analysis:

#### CONCLUSIONS

This study demonstrated that DFUs treated weekly with HR-ADM healed more rapidly compared to DFUs treated with SOC at 6 and 12 weeks. Level 1 evidence supports the use of HR-ADM for the treatment of chronic DFUs. Wound size specific pieces may allow for decreased cost to closure and wastage.

### METHODS

#### Study groups:

N=20 each for HR-ADM and SOC only

#### Endpoints:

- Primary: Proportion of patients healed at 6 weeks
- Secondary: Proportion of patients healed at 12 weeks

#### Study design:

1. Patients demonstrating <20% wound area healing within 2 weeks of initial screening were randomized into either of the two treatment arms.
2. Weekly patient visits included sharp debridement, cleaning, graft application, dressing change, photography, and wound measurement via acurate tracing and length/width/ruler measurement. Offloading was also employed.
3. Validation visit one week after 100% epithelialization of wound was required to confirm closure.

#### Data analysis:

1. Parametric or non-parametric tests used as appropriate
2. Adjusted two-sided p values <0.05 were considered significant
3. PASW 19 (BM, Chicago, IL) was used to perform all statistical testing

### Table 1. Inclusion/Exclusion Criteria

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### Figure 1. Representative case example of patient healed with HR-ADM

- **Patient history:**
  - 41 y/o Type 2 diabetes with peripheral neuropathy presenting with chronic, non-healing right plantar ulceration
  - 4 week ulcer history, with history of recurrent ulcerations

- **HR-ADM**
  - HbA1C 9.3%, Serum creatinine 0.9 mg/dl

### Figure 2a. Percentage of wounds closed by week by treatment group.

### Figure 2b. Percentage of wound area reduction by week by treatment group.

### References:

2. Crook K. The use of Alloderm and allograft to augment a mandibular arch for implant development. New Mexico Dental Journal **;
3. Chnari, E et al. Aseptically Processed Human Reticular Dermis Promotes Cell Attachment, Proliferation and New Matrix Deposit **.
4. *Pliable* is a registered trademark of Musculoskeletal Transplant Foundation, Edison, NJ

*Study sponsored by: Musculoskeletal Transplant Foundation, Edison, NJ*