**Comparison of Fully Synthetic Electrospun Matrix to Bi-Layered Xenograft in Healing Full Thickness Cutaneous Wounds in a Porcine Model**

Matthew R. MacEwan, PhD\(^1\); Sarah R. MacEwan, PhD\(^1\); Anna Pearl Wright\(^1\); Tamas Kovacs, MS\(^1\); Joel Batts, MA\(^2\); Luke Zhang, MD\(^3\)

\(^1\)Acera Surgical, Inc., St. Louis, MO, USA, 63132. \(^2\)Telos Partners, LLC, Denver, CO, USA, 80023. \(^3\)Sinclair Research Center, LLC, Auxvasse, MO, 65231.

**PRIMARY AIM:** Compare the performance of synthetic nanofiber wound matrix to commercially available xenograft in healing full thickness cutaneous wounds

**BACKGROUND:** Fully-Synthetic Nanofiber Wound Matrix Mimics Human ECM and Supports Cell Ingrowth, Retention, and Differentiation

**METHODS:** Porcine Full-thickness Wound Model Utilized to Compare Nanofiber / Xenogenic Grafts

- Full thickness wound model
- Wound healing efficacy of nanofiber wound matrix (Restrata \(^\text{TM}\) Wound Matrix) was compared to a bovine collagen xenograft (Integra \(^\text{TM}\) Bilayer Wound Matrix) in a full thickness porcine model.
- Full thickness wounds (full group; 30 cm²) were created using the dorsal and then treated with either nanofiber wound matrix, or bovine collagen xenograft, or gelatin, or control (healed by secondary intention)
- Wound area was measured over the course of healing, and wound edge was scored for epithelialization
- Animals were sacrificed at Day 15 and Day 28, and tissue samples from the wounds were harvested for histological analysis

**RESULTS:** Full-Synthetically Nanofiber Wound Matrix Supports Faster Time to Closure, Increased Granulation Tissue, Greater Neovascularization, and Reduced Inflammation

- Average wound area was significantly smaller wounds treated with Restrata \(^\text{TM}\) as compared to wounds treated with Integra \(^\text{TM}\) Wound Matrix at 15 and 30 days (p = 8.9 x 10^-9 and p = 3.8 x 10^-9, respectively)
- Histopathological analysis of wounds treated with Restrata \(^\text{TM}\) showed superior quality of healing in wounds treated with Restrata \(^\text{TM}\) as compared to Integra \(^\text{TM}\) Wound Matrix
- Histopathological analysis of wound sections also showed greater neovascularization and reduced infiltration of inflammatory cells in wounds treated with Restrata \(^\text{TM}\) as compared to Integra \(^\text{TM}\) Wound Matrix

**CONCLUSIONS:** Nanofiber Wound Matrix Accelerates Wound Healing and Increases the Quality of Newly Formed Tissue, Mirroring Results Observed in Chronic Wounds Treated with Restrata \(^\text{TM}\)

- Restrata \(^\text{TM}\) Wound Matrix reduced faster rates of wound closure with increased granulation tissue, neovascularization, and epithelialization compared to Integra \(^\text{TM}\) Wound Matrix
- Results of the present study mirror human clinical results, observed upon treatment of chronic wounds, diabetic ulcers, and pressure ulcers using Restrata \(^\text{TM}\)
- Restrata \(^\text{TM}\) unique and effective wound matrix, creating faster and better closure of chronic wounds, diabetic ulcers, and pressure ulcers, as well as severe wounds caused by trauma or surgery.