

A novel wound matrix containing antimicrobial silver and local anesthetic lidocaine for managing infection risk and pain in burns

Anjay Khandelwal, MD, FACS, FICS, FABA, *Adult and Pediatric Burn Institute, Akron Children's Hospital, Akron, OH*

Introduction

Burn management requires addressing both microbial contamination and pain, which significantly influence patient adherence and healing outcomes. This work characterized the antimicrobial performance, biocompatibility, and early clinical response to a **novel ultra-thin synthetic matrix containing ionic and metallic silver with lidocaine HCl at 4% w/w**.

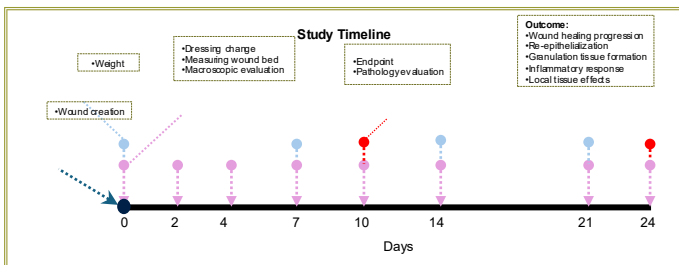
Methods

ISO 22196 Evaluation

- Quantify antibacterial efficacy against 8 clinically relevant species

Porcine Wound Model

- Comparison of biocompatibility and wound healing effects vs. a non-adherent dressing
- Histological assessment of healing progression, epithelial coverage, and inflammatory response
- Collection of case observations in burn patients to assess clinical utility



Results

- Matrix achieved $\geq 4 \log_{10}$ reductions in bacterial load at 24 and 72 hrs relative to controls
- Normal epithelial and granulation tissue development & no adverse inflammatory changes in *in vivo* testing

Figure 1. Antimicrobial Activity of Synthetic Matrix Against Clinically Relevant Bacterial Strains

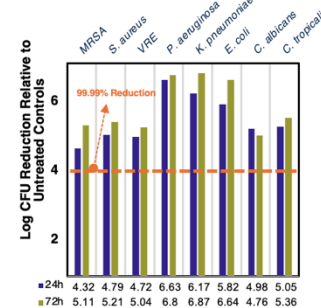


Fig 2. Wound Area Reduction & Re-ep with Application of Synthetic Matrix vs. Non-adherent Dressing

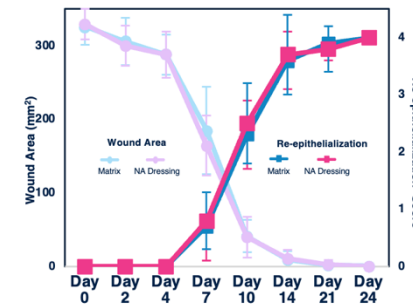
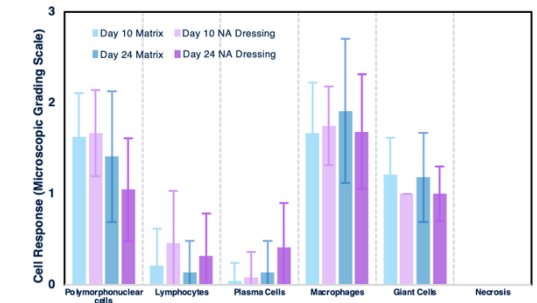


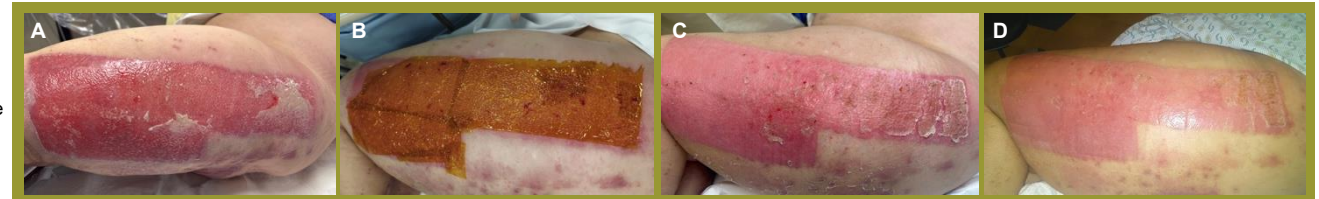
Fig 3. Inflammatory Cell Response Following Application of Synthetic Matrix vs. Non-adherent Dressing



Clinical observations: wound protection, re-epithelialization, and pain reduction — no infection-related complications

Case 1 | Stalled STSG donor site

61-year-old female with morbid obesity, diabetes, hypertension and COPD, treated for infected full-thickness burns of the leg. Donor site stalled at postoperative day 13, with significant pain (A). Matrix applied (B); donor-site pain resolved within 4 hrs. Completely healed 5 days after application (C–D).



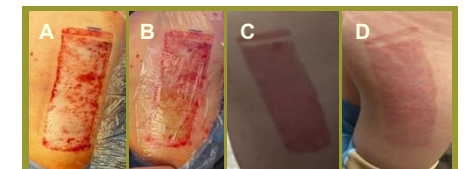
Case 2 | Partial-thickness burn

Pain 9/10 at 24 hrs pre-presentation (A), on narcotics. After application (B–C): pain 2/10 within 5 hrs on acetaminophen/NSAIDs only. Healed infection-free at 10 days (D).



Case 3 | STSG donor site

No donor-site pain at 1 hr post-op or throughout hospital stay after application (A–B). No bupivacaine needed. Healed infection-free at 10 days post-op (C).



Conclusion

Silver + lidocaine HCl in one ultra-thin matrix: broad-spectrum antimicrobial coverage with localized analgesia, rapid pain relief, and unit-dose protection against lidocaine overdose.