

The Use of a Novel Antimicrobial Matrix That Promotes Human Cell Growth in Conjunction with Epidermal Autografts

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Background

The combined use of autologous skin cell suspension (ASCS) with STSG has been recently introduced (2018) as a viable addition to the SOC for patients with extensive and mixed-depth burns, to minimize donor site size, improve healing time, and reduce post-operative pain and scarring^{1,2,3}.

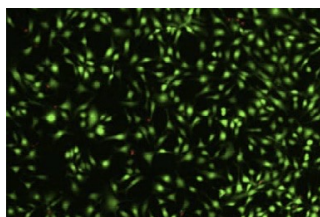
A novel antimicrobial matrix that supports human cell growth has been used in second degree burns and in complex skin graft cases. We wanted to examine our outcomes using the matrix in conjunction with ASCS.

How can we optimize the known benefits of combination STSG + ASCS therapy through perioperative wound care?

Bacterial control and keratinocyte growth are essential components of burn wound closure. Attempts to decrease wound bioburden with debridement and topical antimicrobials are not always effective, as residual microbes can regrow in as little as 5 minutes and reform biofilm within 24 hours. Commonly used silver containing compounds are antimicrobial but typically are not impregnated into the wound.

A potential solution is the use of a synthetic, ultrathin, resorbable wound matrix that not only decreases wound bioburden with nanoparticles of silver but also promotes cell migration. The matrix has been used safely and effectively on burn patients and in conjunctions with complex biologics, skin grafts, and donor sites.

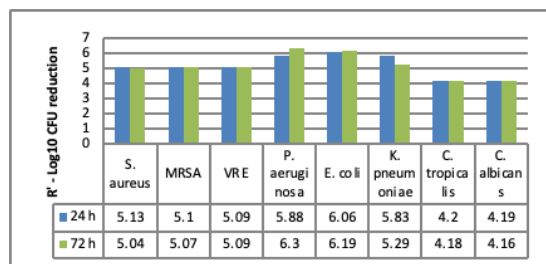
Fibroblast Growth on Matrix



Epidermal autografts can also facilitate burn wound closure and reduce donor site size, but there has been minimal experience with epidermal autografts in conjunction with a resorbable antimicrobial matrix. This report details our initial experience with this combination technique.

Disclosure statement: the authors have no relevant financial relationships for the past 24 months to disclose. Dr. Schurr is a founder of Imbed Biosciences.

Antimicrobial Activity of Matrix



Materials and Methods

This was a single-center retrospective study: 21 patients treated between 2023-2025 (average age 48.5 yrs, range 7-83, 70% male) were treated with the combination technique.

Insult Type	Number of Cases
Thermal Burn	11
Trauma	5
Necrotizing Soft Tissue	3
Chemical Burn	1
Venous Stasis Ulcer	1

All patients had mesh autografts over-sprayed with epidermal autografts and immediately covered by the resorbable antimicrobial matrix. Half were meshed 2:1 and half were meshed 3:1.

Results

Average graft size was 379 cm² (range 24 – 2400 cm²). Donor sites were treated in a similar fashion. A nonadherent layer, bismuth impregnated gauze and outer dressing was used in all and changed per previously published protocols. Average f/u was 74 days (range, 12-426 days).

All patients had 100% graft take and accelerated donor site closure

Conclusion

The purpose of this study was to detail our experience with combination STSG+ASCS and antimicrobial matrix in the perioperative care of burn wounds and comorbidity reduction. **Our results demonstrated that the antimicrobial resorbable matrix could be an ideal adjunct for epidermal autograft use in complex skin grafting cases and is an important adjunct for a burn surgeon managing a wide variety of complex wounds.**

Potential advantages as a new post-operative dressing and wound care modality for combination STSG + ASCS:

- Technique advantage: retained autologous skin cell suspension on the wound bed
- Safe practice
- Novel use of antimicrobial matrix: supports cell growth and is antimicrobial without risk of killing regenerating cells unlike other antibiotics used in wound management
- Potential reduction in post-graft/operative complications and comorbidities

Limitations:

1. Low sample size, decreased power of study results
2. Single surgeon, single center
3. Wide age and f/u range
4. Not RCT

Future Directions:

1. Implement this technique in a larger cohort of patients with complex wounds that require STSG+ASCS, comparing to use of transparent breathable film (control), commonly used in burn care practices
2. Record metrics at multiple time points during post-operative care to understand possible benefits to reduction of associated complications (pain, pruritus, infection, dyschromia, dyspigmentation, delayed healing, and hypertrophic scarring).
3. Broaden selection criteria to include larger variety of wound types.

References

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