

Restoration of Full Thickness Soft Tissue Defects with Spray Skin Epidermal Regenerative Technology in Conjunction with Dermal Regenerate

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Purpose:

Full thickness skin and soft tissue losses secondary to traumatic and war-related injuries remain a challenge for reconstructive surgeons. Strategies to restore skin barrier functions while also being durable and possessing appropriate pigmentation are of interest. Herein, the outcomes, function and appearance of a restorative skin strategy employing a dermal regenerate template with a spray-on epidermal regenerative modality utilized to address full thickness traumatic injuries are reported.

Methods:

A retrospective review of the first two trauma patients treated at our institution for full thickness skin injuries utilizing a dermal regenerate template (Integra, Integra Lifesciences Corporation) and spray skin technology was performed (ReCell, Avita Medical Americas LLC). The mechanism of injury, total defect and treatment size, time to complete re-epithelialization, length of follow-up, outcomes and complications were reviewed. The treatment was standardized between each case as follows: In the first stage, a dermal regenerate matrix was applied to the wound bed. Three-four weeks following matrix placement, the second stage autologous cell harvesting with immediate intraoperative application of spray skin was performed in combination with 6:1 meshed STSG. The spray skin technique was estimated to cover approximately 80cm² of skin defect per 1cm² of donor skin processed.

Results:

For the two patient case series, both cases were males aged 29 and 36 years of age, had follow-up ranges of 3 and 16 months, with mechanisms of injury consisting of a blast and motorcycle crash-related trauma, respectively.

Table 1:

	Patient 1	Patient 2
Recipient Wound Defect Size (cm2)	600	1190

STSG Donor Site (cm2)	140	461.5
Spray Skin Donor Site (cm2)	10	24
Total Effective Treatment Area (cm2)	750	1675.5

In both patients, complete re-epithelialization of donor sites was achieved by 2 weeks and recipient wound sites at 4 weeks, respectively. In patient 1 (Fitzpatrick I), matching pigmentation of recipient wound sites to native skin occurred at 6 months follow-up, whereas patient 2 (Fitzpatrick V) showed evidence of progressing re-pigmentation nearly matching native skin at 3 months follow-up.

Conclusion:

Our case series illustrates safe and successful staged use of dermal regenerate matrices and epidermal spray skin technology. While the primary goals were to re-establish stable, functional skin coverage in patients with large soft tissue defects while attempting to minimize donor site morbidity, the secondary promising finding involving re-pigmentation may expand the application of such technology in the treatment of disease processes with pigmentation or melanocytes disorders such as melasma, vitiligo and certain burns.