THE AUTOLOGOUS SKIN CELL SUSPENSION (ASCS) IN CHRONIC WOUNDS: A CASE SERIES & PROTOCOL

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Introduction

Non-healing wounds fail to proceed through the normal stages of healing in a timely fashion, disproportionately affect the elderly and comorbid, and result in an enormous medico-socio-economic burden.[1,2]

Unfavorable patient demographics and wound characteristics lead to poor response to standard topical wound care. Primary closure is often unattainable, and meshed skin grafts carry elevated risk of poor take. [3,4]

The Autologous Skin Cell Suspension (ASCS) technology, recently FDA-approved (6/7/23) for full-thickness skin defects, offers a solution by minimizing donor size and stimulating epidermal regeneration.[5] Real-world data is crucial for understanding optimal application of ASCS.

Pilot Study Objective:
To develop an algorithm able to guide the use of ASCS for challenging wounds

Methodology

- A prospective analysis of patients with complex wounds reconstructed with ASCS by a single surgeon, 8/23-1/26/24
- Clinical photographs, demographics, treatments, and complications were reviewed.

Patient & Wound Characteristics

- To date, 9 patients with 13 wounds have been treated with ASCS.

Table 1: Patient Baseline Factors

		Total N=9
Age (years)	Mean (SE)	61 (2.9)
BMI (kg/m2)	Mean (SE)	29 (1.6)
Sex (male : female)	N(%)	8(89) : 1(11)
Comorbidities: Diabetes	N(%)	3(33)
CKD	N(%)	2(22)
Autoimmune	N(%)	1(11)
CVI	N(%)	5(56)
anticoagulated	N(%)	3(33)

Table 2: Wound Etiology & Characteristics

		Total N=13
Acute Surgical (NSTI)	*N(%)*	2(15)
Acute Surgical (fasciotomy)	*N(%)*	4(31)
Acute Traumatic (hematoma)	*N(%)*	1(8)
Chronic (PVD)	*N(%)*	2(15)
Other/unknown	*N(%)*	4(31)
Wound area (cm^2)	*Mean (SE)*	140(49)

Treatment Steps

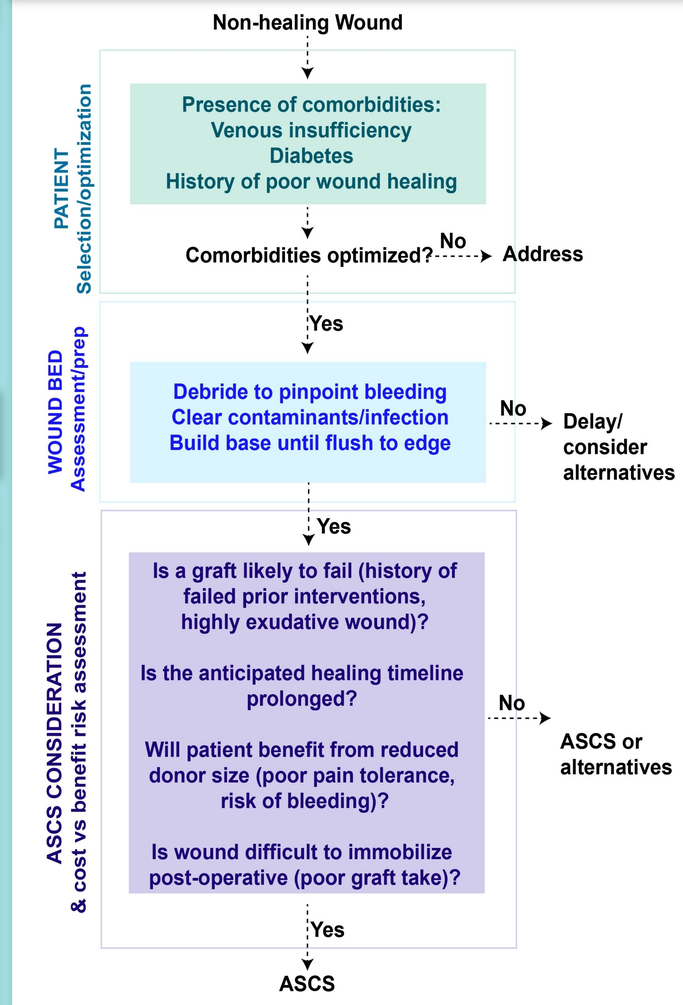
- All wounds underwent serial sharp debridement and application of a dermal regenerative template (DRT), topical wound care, and/or negative pressure wound therapy (NPWT).

Decision Algorithm for ASCS use

1. **Assessment of healing potential:** by review of comorbidities and prior history of wound healing.
2. **Risk-benefit analysis:** ASCS was favored in patients with an elevated risk of infection, delayed healing, bleeding, high drainage at the donor/treatment sites, poor pain tolerance, or wounds in areas difficult to immobilize for graft take.
3. **Cost effectiveness analysis:** considering device cost, total cost of care in terms of clinic follow-up, revisions, and need for additional advanced wound therapies.

- ASCS was applied to wounds with healthy granulating beds.
- Some wounds were treated with thin 3:1 meshed split-thickness skin grafts and over-sprayed with ASCS.
- A non-adherent contact dressing was applied for ≥1 week, combined with compression wraps or NPWT.

Protocol



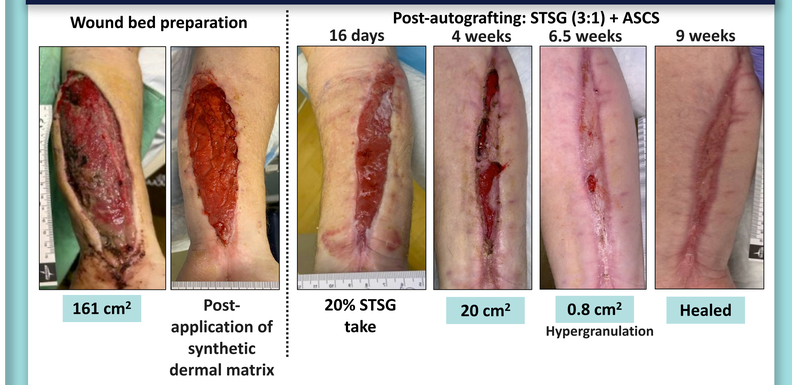
Results

- To date, 7/13 (54%) wounds have healed.
- Mean time to heal was 64 (SE 4.4) days, rate faster than expected from clinical experience (mean **healing rate: 15.3 cm² /week**).
- All wounds healed with durable epidermis, early repigmentation
- There were no post-operative infections, wound breakdown, or need for regrafting.

Table 3: Mean Time to Heal (Days)

		Total N=7
Treatment area	*Mean (SE)*	65(4.4)
Donor site	*Mean (SE)*	15.5(1.7)

Example Case 1: 57M | CAD w/ recent MI | Upper extremity fasciotomy wound to treat compartment syndrome induced from failed vascular access



Treatment area: 64 cm², time to heal: 9 wk, **7.11 cm²/wk**
Donor site: 12 cm² area (0.08"), time to heal: 13 days, **5.24 cm²/wk**

Example Case 2: 62M | Class I obesity, COPD, PVD, | Necrotizing soft tissue infection to thigh after shaving

Treatment area: 132 cm², time to heal: 9.2 wk, **14.35 cm²/wk.**
Donor site: 49 cm² area, time to heal: 13 days - **52.77 cm²/wk**

Conclusion

- ASCS can accelerate healing of complex wounds while reducing donor size in the presence of multiple factors compromising healing or poor graft take
- With expanding use of this technology, determining the appropriate use in wound care is critical. This pilot study is the first step toward a larger trial that will guide clinical decision making for grafting complex wounds. Additional cases are in progress.

References: 1 – Vowden et al. Wounds Int. 2016;7(2):10-5, 2 – Olsson et al. Wound Repair Regen, 2019;27(1):114-25, 3 – Eriksson et al. Wound Repair Regen, 2022;30(2):156-71, 4 – Mahmoudi et al Chronic Wound Care Manag Res, 2020:27-36, 5 - Henry et al. JTACS, 96(1):85-93. **Abbreviations:** ASCS – autologous skin cell suspension, CAD – coronary artery disease, COPD – chronic obstructive pulmonary disease, CVI – chronic venous insufficiency, DRT – dermal regenerative template, MI – myocardial infarction, N – number, NPWT – negative pressure wound therapy, NSTI – necrotizing soft tissue infection, PVD – peripheral vascular disease, SE – standard error of the mean, wk – week.