

Purpose

- Autologous Skin Cell Suspension (ASCS), or “spray-on skin,” has documented success in closing partial-thickness burns, but far less is known about the efficacy of ASCS in full-thickness wounds and defects
- This study examines the utility of ASCS in closing full-thickness wounds and defects, from a variety of thermal and non-thermal causes

Methods

- Fifty consecutive patients with full-thickness wounds and defects were treated at an urban, Level 1 trauma center
- A bilayer technique of 3:1 widely-meshed, thin autograft and 80:1 expanded ASCS was utilized
- Single-cell suspension of keratinocytes, melanocytes, & fibroblasts underwent point-of-care preparation in the operating theater, using trypsin, buffer, & micro-filtration
- Aerosolized cells were sprayed over grafts and donor sites, with tissue glue fixation
- End points (limb salvage rate, donor site reduction, operative and hospital throughput, incidence of complications, and complete re-epithelialization) were evaluated at 4, 8, and 12 weeks
- Burn patients were compared to non-burn patients with 2-tailed T tests using unequal variance. P values <0.05 were assigned statistical significance

Patient Population

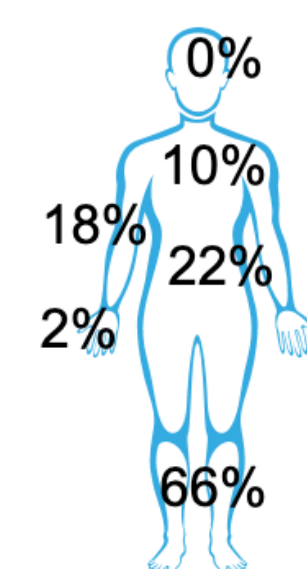
- Mean patient age:** 33.1 years (burn), 56.7 years (non-burn)
- Gender:** Male (30), Female (20)
- Race:** White (26), Black (17), Hispanic (3), Asian (2), and other (2)

ETIOLOGY of WOUNDS

Burns	17
NSTI	13
Crush	7
Open abdomen	5
Degloving	5
IVDA	1
Keloid	1
PVD	1

- Depth**
 - FT only 76%
 - Mixed PT/FT 24%

- Locations**



Results: Case Study

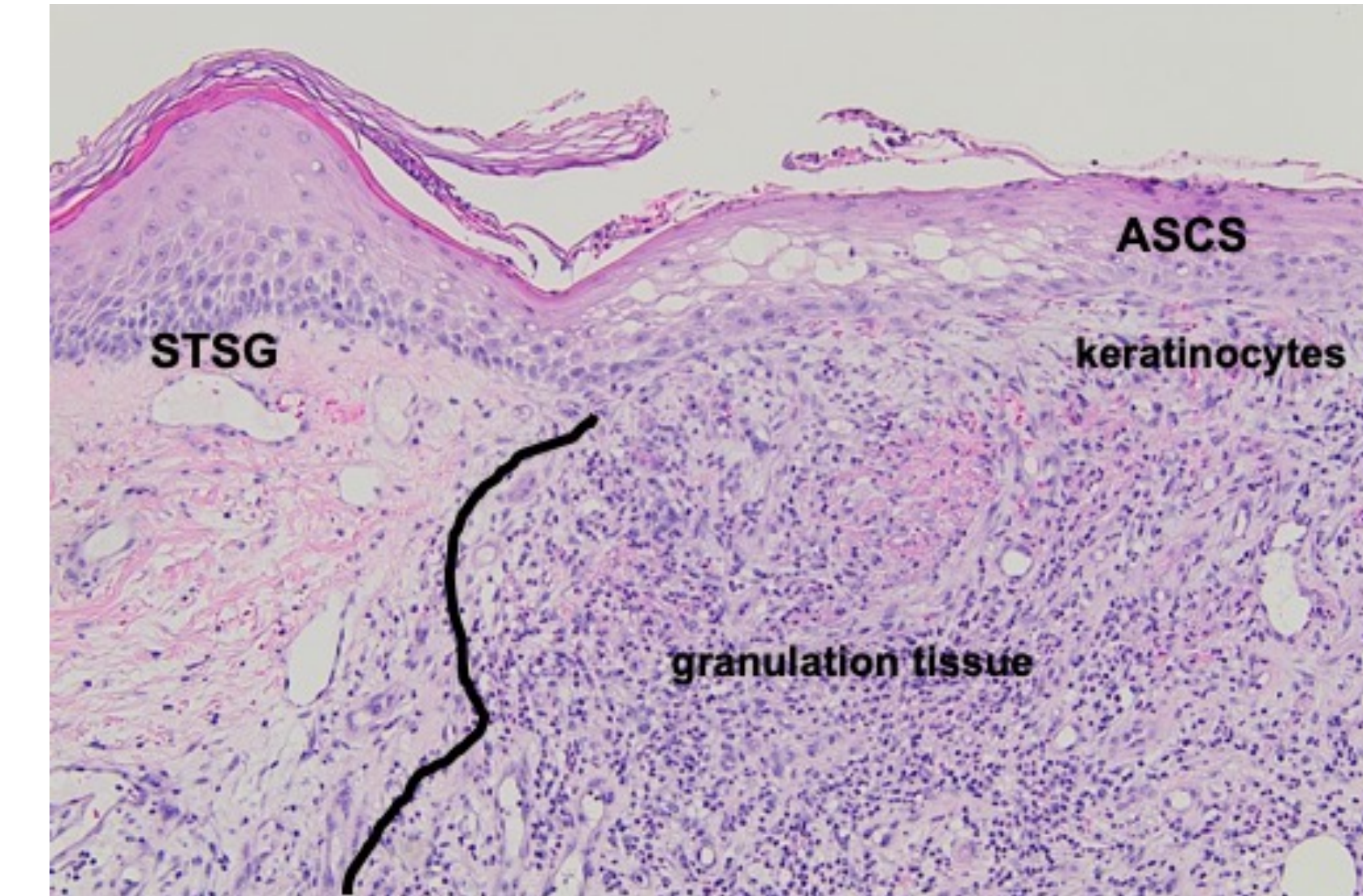


Figure 1: 80 y/o F with a degloving full thickness injury, treated with Piscine Xenograft, STSG 3:1, ASCS

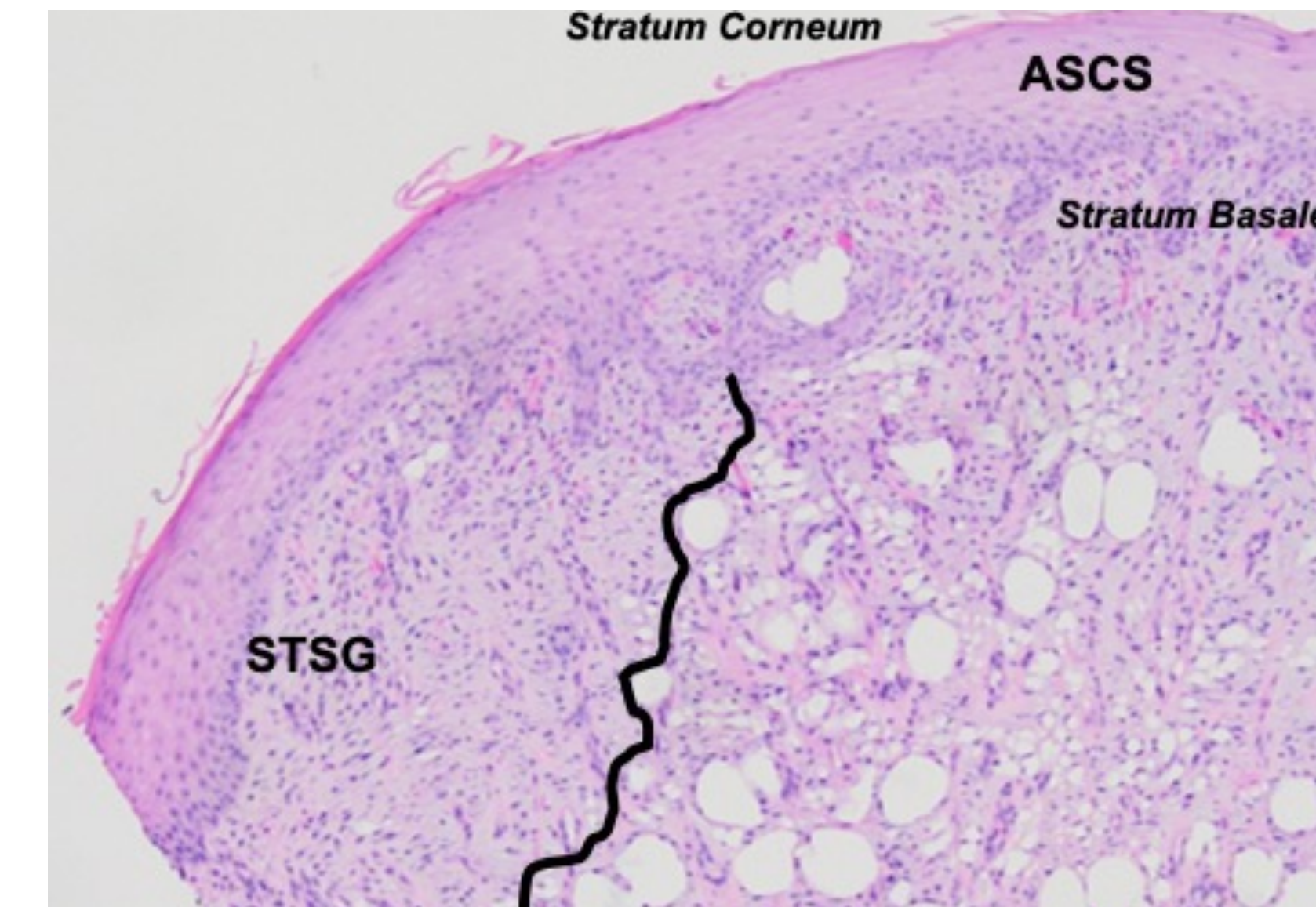
Results: Burn vs. Non-Burn Cases

	Burn n=17	Non-Burn n=33	P value
Age (years)	33.1	56.7	P<0.001
ASA class	2.5	3.2	P<0.01
Significant PMH	41%	91%	P<0.01
Size (cm ²)	406	451	NS
Staged closure	58.8%	86.1%	p=0.03
EBL (cc)	81.8	59.6	NS
Cut-to-close time (mins)	72	70	NS
In-room to out time (mins)	130	121	NS
OR to DC (days)	6.8	13.2	P=0.055
LOS (days)	13.6	32.5	P<0.001
Complications	23.5%	24.2%	NS
F/U (days)	77.4	102.7	NS
Total Hospital Charges (\$)	469,131	185,391	P<0.001
Total Physician Charges (\$)	23,852	20,960	NS

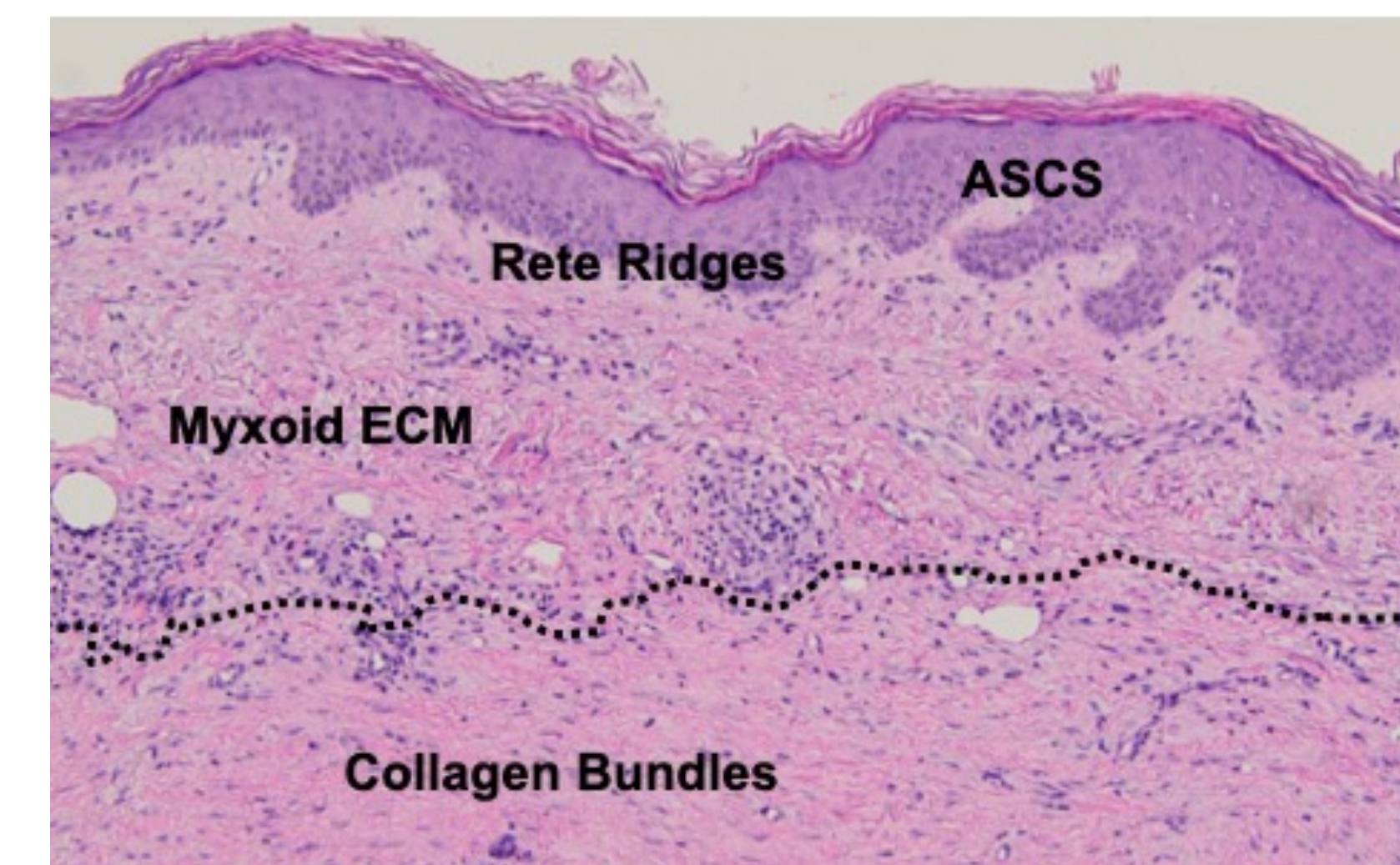
Results: Punch Biopsy Analyses



WEEK 1 POSTOP



WEEK 2 POSTOP



WEEK 6 POSTOP

Results: End-Points and Complications

Endpoints:

- Wound closure:** 76%, 94%, and 98% of patients, at 4, 8, and 12 weeks, respectively
- Limb salvage:** 42/43 patients (10 upper, 33 lower extremities).
- Mean area grafted:** 435 cm²
- Donor site size:** 212 cm²
 - Representing a 51% reduction
- Mean surgical time:** 71 minutes
- Mean length-of-stay:** 13.6 vs. 32.5 days in burn vs non-burn patients, respectively
- Mean ASCS to discharge:** 6.8 vs. 13.2 days burn vs non-burn patients, respectively
- Mean follow-up:** 92.7 days
- Wound size, donor site reduction, estimated blood loss, case time, operating room time, wound closure rates, complication rates, and length of follow-up were similar between burn and non-burn patients.

Complications:

- 4/50 patients (8%) required reoperation for bleeding (1), breakdown (2), and amputation (1).
- 4/50 patients (8%) developed hypertrophic scarring, which responded to laser resurfacing or silicone sheeting

Conclusion

- When used for closure of full-thickness wounds and defects, point-of-care ASCS is effective and safe for both burn and non-burn patients
- Particular benefits include rapid re-epithelialization, high rate of limb salvage, reduction of donor site size and morbidity, and low incidence of hypertrophic scarring
- ASCS should be considered as a method of wound closure for most full-thickness defects

Conflict of Interest

MP, the presenter, has no conflict of interest to disclose. CSH is a consultant for Avita Medical. CM is a consultant for Kerecis. No other conflicts to disclose.

References

A comparative study of spray keratinocytes and autologous meshed split-thickness skin graft in the treatment of acute burn injuries. Sood R, Roggy DE, Zieger MJ, Nazim M, Hartman BC, Gibbs JT. Wounds. 2015 Feb;27(2):31-40.PMID: 25785905

Local Treatment of Burns with Cell-Based Therapies Tested in Clinical Studies. Domaszewska-Szostek AP, Krzyzanowska MO, Czarniecka AM, Siemionow M. J Clin Med. 2021 Jan 21;10(3):396. doi: 10.3390/jcm10030396.PMID: 33494318