

Introduction

- Acellular dermal matrices (ADMs) are frequently employed in immediate prosthesis-based breast reconstruction (iPBBR) to provide structural support and optimize outcomes.¹⁻⁵

- Despite differences in ADM derivatives (e.g., fetal bovine, porcine, human), few studies directly compare their outcomes in the setting of iPBBR.^{6,7}

Objective

- We thus sought to conduct a large head-to-head study comparing three types of ADMs.

Methods

Study Design:

- Multicenter retrospective review
- January 2014 through July 2022

Inclusion criteria:

- Patients undergoing iPBBR with ADMs

Cohorts:

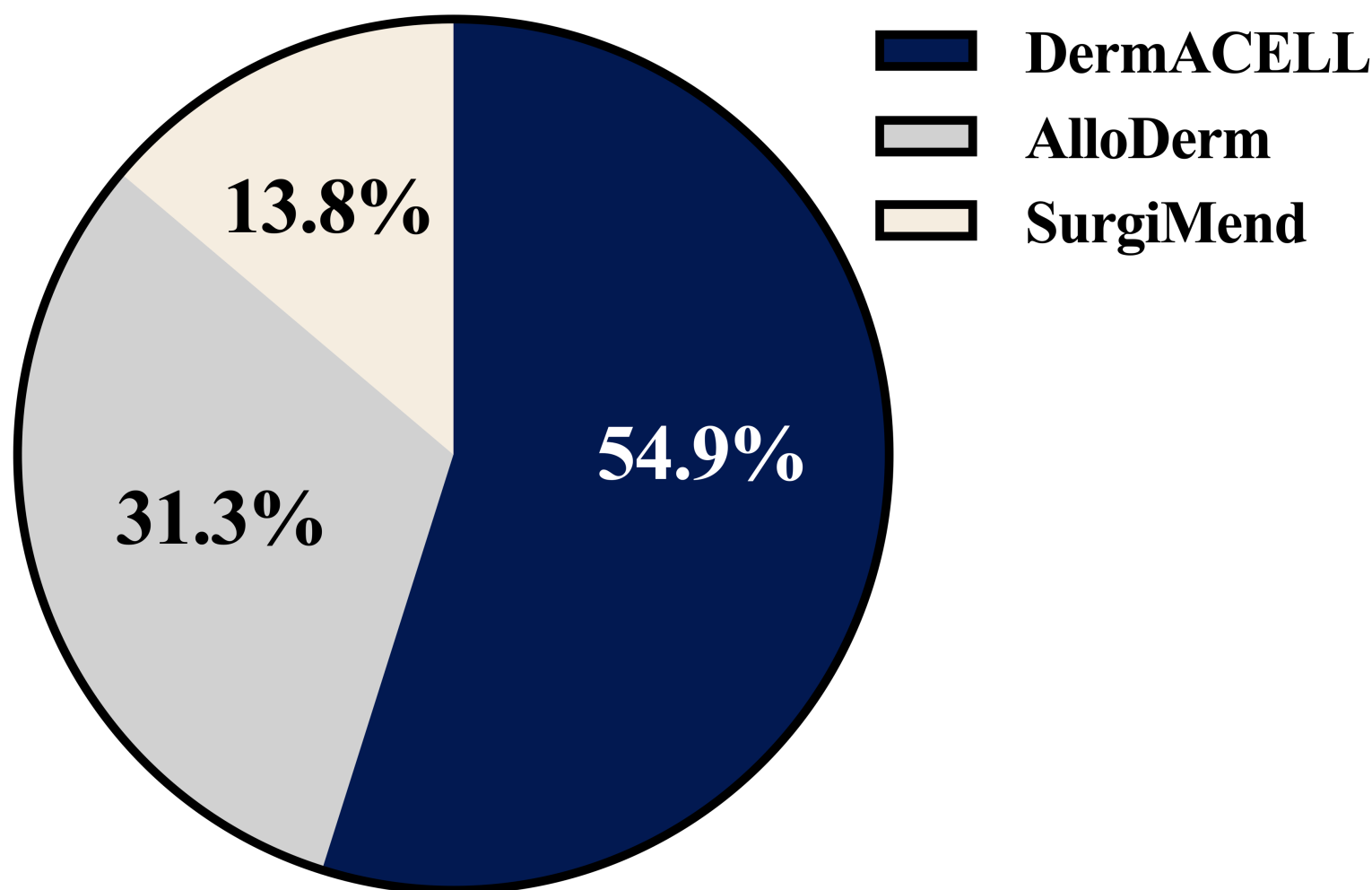
- SurgiMend (bovine-derived; TEI Biosciences Inc., Waltham, MA)
- AlloDerm (human-derived; LifeCell Corp., Bridgewater, NJ)
- DermACELL (human-derived; Stryker Corp., Kalamazoo, MI)

Retrospective Review:

- Patient preoperative characteristics
- Operative details
- Postoperative complications
- Long-term patient outcomes

Results

- A total of 738 patients (1,228 breasts) underwent iPBR during the study period.
- DermACELL (405 patients)
- AlloDerm (231 patients),
- SurgiMend (102 patients).



Patient Characteristics

- Mean age: 50 (IQR: 16) years
- Mean body mass index of 24.7 (7.3) kg/m²

	SurgiMend	AlloDerm	DermACELL	p-value
<i>Obesity (BMI≥30)</i>	26 (25.5%)	68 (29.4%)	69 (17.0%)	0.00
<i>Smoking</i>				0.11
<i>Never</i>	68 (66.7%)	155 (67.1%)	300 (74.1%)	
<i>Former</i>	28 (27.5%)	58 (25.1%)	90 (22.2%)	
<i>Current</i>	7 (6.9%)	18 (7.8%)	15 (3.7%)	
<i>Diabetes mellitus</i>	8 (7.8%)	26 (11.3%)	27 (6.7%)	0.13
<i>Adjuvant radiation</i>	28 (27.5%)	76 (32.9%)	105 (25.9%)	0.17
<i>Chemotherapy</i>				0.6
<i>Neoadjuvant</i>	29 (28.4%)	70 (30.3%)	102 (25.2%)	
<i>Adjuvant</i>	15 (14.7%)	40 (17.3%)	57 (14.1%)	
<i>Both</i>	6 (5.9%)	15 (6.5%)	26 (6.4%)	

Operative Details

	SurgiMend	AlloDerm	DermACELL	p-value
<i>Mastectomy type</i>				0.000
<i>NSM</i>	78 (47.3%)	147 (41.9%)	513 (72.1%)	
<i>SSM</i>	74 (44.8%)	112 (31.9%)	153 (21.5%)	
<i>Simple</i>	8 (4.8%)	58 (16.5%)	22 (3.1%)	
<i>MRM</i>	3 (1.8%)	31 (8.8%)	18 (2.5%)	

Breast Reconstruction Details

	SurgiMend	AlloDerm	DermACELL	p-value
<i>Incision type</i>				0.019
<i>Inframammary</i>	75 (45.5%)	184 (52.4%)	411 (57.7%)	
<i>Wise pattern</i>	18 (10.9%)	40 (11.4%)	77 (10.8%)	
<i>Elliptical</i>	37 (22.4%)	95 (27.1%)	158 (22.2%)	
<i>Oblique</i>	4 (2.4%)	12 (3.4%)	22 (3.1%)	
<i>Periareolar</i>	15 (9.1%)	13 (3.7%)	23 (3.2%)	
<i>Prosthesis type</i>				0.000
<i>DTI</i>	95 (57.6%)	82 (23.4%)	376 (52.8%)	
<i>TE</i>	59 (35.8%)	245 (69.8%)	273 (38.3%)	
<i>Plane of insertion</i>				0.034
<i>Pre-pec</i>	92 (55.8%)	167 (47.6%)	417 (58.6%)	
<i>Sub-pec/Dual-plane</i>	72 (43.6%)	137 (39.0%)	245 (34.4%)	

Postoperative Complications and Outcomes

Short-term Postoperative Complications (<90 days)

	SurgiMend	AlloDerm	DermACELL	p-value
Seroma	14 (8.5%)	29 (8.3%)	53 (7.4%)	0.8390
Hematoma	4 (2.4%)	6 (1.7%)	18 (2.5%)	0.6950
Dehiscence	7 (4.2%)	8 (2.3%)	15 (2.1%)	0.2700
Mastectomy flap necrosis	8 (4.8%)	15 (4.3%)	25 (3.5%)	0.6590
Red breast syndrome	0 (0.0%)	2 (0.6%)	5 (0.7%)	0.5600
Cellulitis	6 (3.6%)	11 (3.1%)	19 (2.7%)	0.7680
Surgical Site Infection	6 (3.6%)	13 (3.7%)	14 (2.0%)	0.1840
Total Reconstructive Failure	9 (5.5%)	12 (3.4%)	18 (2.5%)	0.1480

Long-term Outcomes (>90 days)

	SurgiMend	AlloDerm	DermACELL	p-value
Capsular contracture	10 (6.1%)	32 (9.1%)	53 (7.4%)	0.4340
Unplanned explantation	17 (10.3%)	35 (10.0%)	51 (7.2%)	0.1710
Reoperation	28 (17.0%)	62 (17.7%)	104 (14.6%)	0.3990
Cancer recurrence	3 (2.9%)	17 (7.4%)	17 (4.2%)	0.1230
Mortality	2 (2.0%)	11 (4.8%)	8 (2.0%)	0.0630

Multivariate Logistic Regression

DermACELL, AlloDerm, and SurgiMend had comparable outcomes

- Short-term complications were predicted by patient factors (BMI, diabetes, chemotherapy) and operative details (tissue expanders and dual plane approaches)
- Long-term, capsular contracture was predicted by adjuvant radiation, explantation predicted by former smoking, diabetes, and wise incisions.

Conclusions

This multicenter, retrospective cohort of 738 patients undergoing iPBBR procedures revealed low complication rates regardless of the ADM type used.

These findings **support the continued usage of ADMs and the comparability of DermACELL, AlloDerm, and SurgiMend.**

Our analysis suggests that **patient characteristics and operative approaches** are likely **more predictive of postoperative outcomes** than the ADM derivative alone.

Limitations

- Findings are limited by the retrospective design, rarity of complications, and lack of patient-reported outcomes.
- While this work was externally funded, the potential for bias is low given the retrospective design.

References

- Pittman TA, Fan KL, Knapp A, Frantz S, Spear SL. Comparison of different acellular dermal matrices in breast reconstruction: the 50/50 study. Plastic and reconstructive surgery. 2017;139(3):521-528.
- Plastic Surgery Statistics Report 2020. ASPS. <https://www.plasticsurgery.org/documents/News/Statistics/2020/plastic-surgery-statistics-full-report-2020.pdf>. Published 2021. Accessed April 10, 2023, 2023.
- Wainwright D. Use of an acellular allograft dermal matrix (AlloDerm) in the management of full-thickness burns. Burns. 1995;21(4):243-248.
- Petrie K, Cox CT, Becker BC, MacKay BJ. Clinical applications of acellular dermal matrices: A review. Scars, Burns & Healing. 2022;8:20595131211038313.
- Arnaout A, Zhang J, Frank S, et al. A randomized controlled trial comparing Alloderm-RTU with DermACELL in immediate subpectoral implant-based breast reconstruction. Current Oncology. 2020;28(1):184-195.
- Butterfield JL. 440 Consecutive immediate, implant-based, single-surgeon breast reconstructions in 281 patients: a comparison of early outcomes and costs between SurgiMend fetal bovine and AlloDerm human cadaveric acellular dermal matrices. Plastic and Reconstructive Surgery. 2013;131(5):940-951.
- Asaad M, Morris N, Selber JC, et al. No Differences in Surgical and Patient-reported Outcomes Between Alloderm, Surgimend, and Dermacell for Prepectoral Implant-based Breast Reconstruction. Plastic and Reconstructive Surgery. 2022;10:1097.