but they add cost to the procedure and may increase complications. In addition, many patients prefer to avoid human-based products if there is an autologous option. For this reason, surgeons have sought viable alternatives to ADM in breast reconstruction. Dermal autografts can be harvested at the time of mastectomy and represent a useful, autologous alternative to ADMs.

**METHODS:** One hundred four consecutive patients (171 breasts) underwent breast reconstruction using tissue expanders and dermal autograft over a 7-year period. Age ranged from 32 to 73 years (median, 53 years). Autografts were harvested from either the lower abdomen (n = 86) or the inferior breast (n = 18). Dermal autografts were used to cover the inferior pole of the tissue expander at the time of expander placement. Demographic data, clinical history, and harvest time were recorded. The initial fill volume, number of expansions, cost, and complications were compared to ADM-assisted reconstruction. Breast-Q surveys were mailed to all patients, and satisfaction ratings were compared with historical values of patients undergoing ADM-assisted breast reconstruction. A cost analysis was performed of dermal autograft assisted reconstruction, and this was compared with historical values for ADM-assisted reconstruction.

**RESULTS:** Follow-up ranged from 9 months to 7 years (mean, 31 months). Twenty-five patients were smokers. Mean BMI was 30.5 (range, 19.1–48.8). Thirty-six patients received chemotherapy between reconstructive stages, 7 required radiation. The mean time of autograft harvest was 27 minutes; however, there was no difference in mean operative times between the ADM and autograft groups. The mean initial fill was 151 ml, and the average number of expansions was 4.2. There were 3 infections resulting in implant loss (3%). There were 14 minor complications (13%). Mild capsular contracture was observed in 3 patients, and no patients underwent reoperation for capsular contracture. Initial expander fill, number of expansions, and complication rate were equivalent to historical values for ADM-assisted breast reconstruction. The mean per patient cost savings for dermal autograft versus ADM-assisted reconstruction was 3,600 USD for unilateral and 7,639 USD for bilateral reconstructions. Survey data (response 30%) showed no statistically significant difference in any Breast-Q category between the ADM and the dermal autograft groups.

**CONCLUSIONS:** The use of dermal autograft in tissue expander breast reconstruction offers the advantages of ADM at a lower cost. Dermal autograft-assisted breast reconstruction did not differ significantly from historical values for ADM regarding operative time, complication profile, capsular contracture, or patient-reported outcomes. However, cost was significantly lower in the dermal autograft group. Dermal autograft-assisted implant reconstruction should be considered in patients undergoing breast reconstruction, especially in patients who wish to avoid human-based products.

**Human Acellular Dermal Matrices Fabricated By Various Processes Elicit Diverse Host Responses in a Primate Model**

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**PURPOSE:** An assortment of human acellular dermal matrices (HADMs), manufactured using a variety of decellularization and antiseptic protocols, are commercially available and used for various surgical applications. Although several studies in the literature have made direct comparison among multiple HADMs, few have linked in vivo biologic host response to tissue manufacturing method or resulting out-of-package biochemical and biomechanical attributes of the matrix. Here, we aim to evaluate 5 distinctly processed and disinfected HADMs in a nonhuman primate.

**MATERIALS AND METHODS:** African Green monkeys were implanted either subcutaneously on the back with two, 1 × 1 cm pieces each of electron-beam irradiated HADM (AlloDerm/e-HADM) and gamma-irradiated HADM (DermACELL/g-HADM) for 1 month, or in the dynamically loaded site of the ventral abdominal wall with one, larger 3 × 7 cm piece of either electron-beam irradiated HADM (AlloDerm/e-HADM), freeze-dried gamma-irradiated HADM (AlloMax/g-HADM-FD), ethanol-stored aseptically processed HADM (Flex HD/EtOH-HADM), or freeze-dried aseptically processed HADM (DermaMatrix/HADM-FD) for either 1, 3, or 6 months. All HADM samples were harvested at the specified time points and evaluated histologically for cellular ingrowth, vascularity, and inflammatory response, whereas dynamically loaded
HADM samples were additionally evaluated for regenerative response as judged by HADM–host interface integration and neo-collagen alignment. Host response established in these NHP models was compared with out-of-package in vitro mechanical properties as well as in vitro attributes established in previous studies.

RESULTS: Out-of-package, e-HADM had significantly higher tensile strength (379.4 ± 26.2N) than g-HADM, EtOH-HADM, HADM-FD, and g-HADM-FD (233.2 ± 33.1N, 233.1 ± 126.2N, 211.6 ± 18.6N, and 104.0 ± 17.8N, respectively). In previous benchtop studies, e-HADM had also been found to have ultrastructural characteristics, acid-soluble collagen content, and degree of susceptibility to digestion by collagenase more similar to native tissues than g-HADM, EtOH-HADM, or g-HADM-FD.1 Subcutaneously implanted g-HADM samples demonstrated substantially greater inflammatory host response than e-HADM as determined through hematoxylin and eosin histologic analysis and immunohistochemically via anti–CD-68 antigen presence at 1-month implantation. In the dynamically loaded model, a greater inflammatory infiltrate was evident histologically and immunohistochemically (CD-68/CD-3/CD-20) for g-HADM-FD, EtOH-HADM, and HADM-FD, as compared with e-HADM. Subsequently, degree of HADMs to resist in vivo contraction and extent of incorporation was greater grossly for e-HADM than other HADMs and was supported by histologic fibroblast cell infiltration at the HADM–primate tissue interface. Likewise, collagen fibers could be observed to align linearly in the direction of dynamic forces for e-HADM, whereas other HADMs in the study tended to demonstrate a scar-like morphology histologically. Vascularization/integration was shown to increase in terms of vessel number and relative size for e-HADM and was generally not inflammation-associated, whereas g-HADM-FD, EtOH-HADM, and HADM-FD vessels were either less evident or associated with areas predominated by inflammatory cell infiltration.

CONCLUSIONS: The data presented here appear to demonstrate a relationship between in vivo host response to HADMs in a nonhuman primate and benchtop attributes of these differently processed HADMs. Maintenance of structural, biochemical, and mechanical attributes of HADM products appears to be crucial for positive host response in terms of cellular infiltration and vascularization, leading to improved incorporation with low inflammatory characteristics.

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Acellular Dermal Matrix, Smooth Tissue Expanders, and Betadine: Histologic Assessment in a Primate Model

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INTRODUCTION: It is known that an overabundance of pathogens in the setting of prosthetic breast devices can lead to infection, prolonged inflammation, and capsular contracture. As such, there has been increasing emphasis on the use of aseptic techniques that include antimicrobial irrigation solutions such as Betadine. The increasing use of human acellular dermal matrices (HADM) and prosthetic devices have raised questions as to whether exposure of the implant or tissue expander (TE) to Betadine may lead to deleterious effects related to HADM incorporation. The aim of this study was to determine if exposure of HADM to a Betadine-saturated TE would affect the corresponding biological response.

METHODS: Samples (1.5 × 1.5 cm) cut from custom-made smooth silicone TEs (Allergan plc) were soaked in 100% Betadine for 2 minutes, without a subsequent saline rinse, or soaked in control saline alone, and then sutured to equivalently sized HADM samples (AlloDerm, Allergan plc) to form an HADM:TE construct. Eighteen African Green monkeys were each implanted subcutaneously with a pair of Betadine and saline-treated HADM:TE constructs and evaluated for overall biologic response to Betadine treatment following implantation at 2 or 4 weeks as demonstrated by hematoxylin and eosin histologic staining and using a subjective scoring scale (0–9) inclusive of recellularization, neovascularization, and inflammatory responses. The presence of individual cell types involved in inflammation (eosinophils, lymphocytes, neutrophils, histiocytes, foreign body giant cells) and HADM remodeling (fibroblasts) was also evaluated based on hematoxylin and eosin histologic