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Title: Resistance of Human Acellular Dermal Matrix (Alloderm) to Capsule Formation: A Prospective Clinical and Histologic Observation

Purpose / Hypothesis: Human acellular dermal matrix (Alloderm, LifeCell Corp., Branchburg, N.J.) is resistant to the fibroblastic response typically observed with foreign body implantation. Alloderm is often used as a soft tissue filler and as coverage and support for subpectoral tissue expanders inserted for post mastectomy breast reconstruction. Clinical observations indicate that Alloderm is resistant to fibroblastic response as observed with implanted foreign bodies. Alloderm used as a soft tissue filler has been observed to be without encapsulation or adhesion formation. Therefore we set out to prove our hypothesis that Alloderm is resistant to capsule formation and possibly capsular contracture.

Methods: 15 female patients who underwent post mastectomy breast reconstruction with tissue expanders and Alloderm were evaluated for clinical and histologic evidence of capsule formation . The tissue expanders were explanted at 2 months and the implant pocket was examined for capsular bands. Photo documentation of contracture bands and Alloderm - capsule interface were obtained. Two groups of biopsy specimens were obtained for histologic analysis. Group 1 – biopsy of contracture bands ; Group 2 biopsy of the Alloderm – capsule interface. Histologic analysis was performed using H & E staining, Verhoff staining, immunohistochemistry and electron microscopy.

Results: Alloderm is well integrated into implant capsule as observed clinically and histologically. Clinically, capsular bands were observed most commonly in superior and medial poles. Histologic analysis revealed population of Alloderm with various inflammatory cells and endothelial cells. The concentration of myofibroblasts was less in Alloderm specimen of capsule as compared to capsular band specimen.

Conclusion: Alloderm is resistant to the foreign body fibroblastic response as evidenced by decreased concentrations of myofibroblasts in Alloderm versus capsular bands.

Significance: Alloderm is a versatile dermal matrix that has many applications. Its resistance to fibroplasia and capsule formation has significant potential. Alloderm is an excellent soft tissue filler and may have decreased risk of capsular contracture as compared to firm implants. Breast implants completely covered with Alloderm may have decreased risk of capsular contracture. Alloderm may also be used as an interposition graft after capsulotomy to prevent further capsular contracture.