Acellular Dermal Matrix Sparing Direct to Implant Prepectoral Breast Reconstruction â€” A Comparative Study Including Cost Analysis

**Presenter:** Alex Viezel-Mathieu, MD, CM

**Co-Authors:** Nayif M. Alnaif, MD; Albaraa A. Aljerian, MD; Jean-Francois Bolleau, MD, MSc, FRCSC; Tassos Dionisopoulos, MD, MSc, FRCSC

**Affiliation:** McGill University Health Center, Montreal, QC

**PURPOSE:** There has been a resurgence in popularity of prepectoral reconstruction, with the advent of new technologies and materials such as acellular dermal matrix (ADM), form stable silicone gel implants and intra-operative tissue perfusion analysis. Our centre has been utilizing a direct to implant prepectoral (DTI PP) reconstruction technique for over two years. This paper aims to revisit the notion of immediate DTI PP breast reconstruction and provide our university academic teaching centre single surgeon experience. A cost analysis is also presented and compared to traditional subpectoral two-stage reconstruction.

**METHODS:** Clinic log books were used to identified all patients who underwent DTI PP breast reconstruction with ADM over an 18-month period. A comparison group composed of patients having undergone traditional two-stage subpectoral reconstruction with ADM were also reviewed. A full electronic medical record review was performed. All countable variables were included in the cost analysis.

**RESULTS:** A total of 77 patients representing 116 reconstructed breasts were included. The prepectoral group was composed of 39 patients and 60 breasts and the subpectoral group of 38 patients and 56 breasts. Patient demographics including age, diabetic and smoking status and neo-adjuvant chemo were similar for both groups.

When compared to the traditional two-stage subpectoral reconstruction, patients having undergone DTI PP reconstruction benefited from fewer complications (24.7% vs. 35.6% respectively), fewer follow-up visits (3.8 vs. 5.4 respectively) and no animation deformity. DTI PP reconstruction proved to be 25% less expensive than two-stage subpectoral reconstruction when all associated costs were considered ($17 243 vs. $22 716 CAD respectively).

**CONCLUSION:** Using proper patient selection, form stable implants and ADM’s, reconstruction breast surgeons are now able to provide safe and consistent results using the prepectoral technique. Additionally, prepectoral reconstruction appears to be cost effective with a similar complication profile.

A Definitive Solution to Animation Deformity: Sub-Pectoral to Pre-Pectoral Conversion

**Presenter:** Glyn E. Jones, MD

**Co-Authors:** Victor A. King, MD; Aran Yoo, MD

**Affiliation:** University of Illinois College of Medicine in Peoria, Peoria, IL

**BACKGROUND:** A significant disadvantage of sub-pectoral breast reconstruction procedures is animation deformity during pectoralis major contraction. The prevalence of this post-operative complication may be as high as 75.6%. Many authors have explored solutions to animation deformity associated with breast reconstruction and augmentation including muscle splitting and botulinum toxin injection into the pectoralis major. These options, however, increase muscle morbidity or are temporary interventions. With the advent of intraoperative angiography and Alloderm, implant placement in the anatomic pre-pectoral position has become a safe alternative to sub-pectoral breast reconstruction. In this study, we discuss one surgeon’s experience with elective sub-pectoral to pre-pectoral implant site conversion as a definitive solution to animation deformity.

**METHODS:** Authors performed a retrospective review of patients with a history of a sub-pectoral breast reconstruction procedure who underwent implant site conversion to the pre-pectoral plane. Procedures were performed to alleviate chronic pain or animation deformity. All procedures were performed by a single surgeon. Implants placed in the pre-pectoral plane were supported with total anterior AlloDerm coverage.
RESULTS: 90 patients underwent 142 revision procedures to change implant sites from years 2014 to 2018. Average followup period for the study group was 1.5 years (maximum followup time, 3.6 years). Mean patient age was 54.8 years and average BMI was 27.7. History of smoking was present in 60.0% of patients, with 8.9% of patients being current smokers. 14.8% of patients had a history of preoperative radiation. Postoperative complications included minor superomedial contour deformity or implant edge visibility (28.9%), minor rippling (4.9%), infection requiring oral antibiotics (3.5%), minor seroma requiring needle aspiration in the clinic (1.4%), seroma requiring drain replacement (0.7%), hematoma (0.7%), dehiscence (0.7%), partial thickness necrosis requiring local wound care (0.7%), and one infection requiring IV antibiotics with eventual explantation (0.7%). 18.3% of patients received a secondary fat grafting procedure for rippling or implant edge visibility. There was no incidence of capsular contracture. Animation deformity was completely resolved.

CONCLUSION: Breast implant site conversion from the sub-pectoral to the pre-pectoral plane is a safe and definitive solution for animation deformity.

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Comparison of Sub-Pectoral and Pre-Pectoral Direct-to-Implant Breast Reconstruction Techniques

Presenter: Glyn E. Jones, MD

Co-Authors: Aran Yoo, MD; Victor A. King, MD; Charalambos K. Rammos, MD; Eric T. Elwood, MD

Affiliation: University of Illinois College of Medicine in Peoria, Peoria, IL

BACKGROUND: Staged sub-pectoral expander-implant has been the gold standard for breast reconstruction since the 1980s. The sub-pectoral plane is utilized to provide a robust barrier between the implant and overlying skin, and capsular contracture reduction. Tissue expansion ensures adequate mastectomy skin flap size and overlying tissue perfusion after implant placement. Advances in breast reconstruction have been possible with the advent of acellular dermal matrices, autologous fat grafting, cohesive prosthetic devices, and intraoperative angiography. We have previously demonstrated that single-stage direct-to-implant pre-pectoral reconstruction is a safe and effective option for breast reconstruction. This option avoids pectoralis major morbidity and post-operative animation deformity. In this study, we aim to explore the pre-pectoral plane as a viable alternative to the sub-pectoral plane. We compare post-operative outcomes of single-stage direct-to-implant sub-pectoral and pre-pectoral breast reconstruction techniques.

METHODS: Authors performed a retrospective review of pre-pectoral and sub-pectoral breast reconstructions performed by a single surgeon. Implants placed in the pre-pectoral plane were supported with total anterior AlloDerm coverage. Sub-pectoral implants had inferior pole coverage with an AlloDerm sling. Indocyanine green fluorescence was used for evaluation of mastectomy skin flap perfusion.

RESULTS: 140 women underwent 194 pre-pectoral breast reconstructions and 119 patients underwent 170 sub-pectoral breast reconstructions. Average follow-up periods for the study groups were 1.53 and 3.67 years, respectively. Analysis of patient data demonstrated sub-pectoral reconstruction patients had more post-operative radiation, longer follow-up (as they preceded the pre-pectoral technique), and more skin sparing (versus nipple sparing) mastectomy procedures.

Pre-pectoral breast reconstruction patients had higher incidences of minor seromas (managed with needle aspiration only) and no animation deformity. Sub-pectoral patients had more full-thickness necrosis, capsular contraction and animation deformity. Explantation rates were similar between the 2 groups.

CONCLUSION: This study demonstrates that the pre-pectoral plane is a robust alternative to the sub-pectoral plane for immediate breast reconstruction.