447 patients (573 breasts), stratified by duration of postoperative antibiotic prophylaxis (1 day, 14 days, or 21 days). Patient data were abstracted from medical records. Multivariable-adjusted logistic regression with robust variances was used to identify predictors of postoperative surgical site infections. All statistical analyses were completed using Stata v.15, and the two-tailed threshold for statistical significance was 0.05.

RESULTS: Patients across the three study cohorts (1, 14, and 21 days of postoperative antibiotic prophylaxis) were well-matched with regard to baseline demographic/clinical factors. Patients were separated into high risk (eg, smoker, diabetic) and standard risk groups with regard to their risk for postoperative infection (infection rates: 22.2% in high risk group versus 9.7% in low risk group, respectively, chi square: \( P = 0.02 \)). Amongst standard risk patients, infection rates significantly differed by antibiotic duration (1 day: 15.2%, 14 days: 7.9% and 21 days: 5.4%, respectively, chi square: \( P = 0.003 \)). Upon univariable and multivariable analyses, the 14-day cohort (adjusted odds ratio: 0.5, 95% confidence interval: 0.2–1.0, \( P = 0.05 \)) had significantly reduced odds of infection compared with the 24-hour cohort. Twenty-one days of antibiotics, however, did not provide any additional benefit over 14 days. In contrast, amongst “high-risk” patients, duration of postoperative antibiotics did not influence infection rates (chi square: \( P = 0.98 \)). In fact, upon univariable and multivariable analyses adjusting for baseline differences amongst patient cohorts, neither 14-day (adjusted odds ratio: 1.2, 95% confidence interval: 0.1–9.5, \( P = 0.89 \)) nor 21-day cohorts (adjusted odds ratio: 1.1, 95% confidence interval: 0.1–10.0, \( P = 0.90 \)) had significantly reduced odds of infection compared with the 24-hour cohort. Across all patients, incidence of postoperative complications other than infection and its sequelae was 20.7%. Overall complication rates did not significantly differ between study cohorts (chi square: \( P = 0.51 \)).

CONCLUSIONS: Two stage tissue expander/implant-based techniques remain the predominant form of postmastectomy breast reconstruction. Thus, it is important to determine ways to continue improving outcomes for patients undergoing this type of breast reconstruction, especially in the prepectoral plane. In standard risk patients, extending postoperative antibiotic prophylaxis beyond 1 day significantly reduced infection rates after prepectoral tissue expander placement, although continuing antibiotics prophylaxis beyond 14 days did not confer additional clinical benefits. Among high risk patients, however, alternative strategies for infection control need to be investigated.
Comparison of complications between individually reconstructed breasts in Group 1 versus Group 2 revealed significantly increased rates of skin necrosis (3.0% versus 10.6%, $P = 0.018$) among Group 2 breasts. Rates of infection were also increased among Group 2 (10.4% versus 18.1%, $P = 0.098$), which approached significance. There was no difference in reconstructive failure, conversion to autologous reconstruction, seroma, wound dehiscence, hematoma, or fat necrosis between the two groups. Logistic regression further revealed greater ADM thickness to be a significant predictor of skin necrosis (OR 3.869, 95% CI 1.175–12.738).

**CONCLUSIONS:** To date, this study represents the largest analysis of the effect of ADM thickness on complications after TEBR and the first to show a significant difference in complications with bivariate analysis. Thicker ADMs were significantly correlated with increased rates of skin necrosis, though there may not likely be a direct causality in this relationship. The increased infection rate, though not significant, may be caused by the potential for the ADM to act as a nidus for infection as well as prolonged time of thicker ADM incorporation and neovascularization. Our results, similar to previous studies conducted on smaller patient samples, show that ADM thickness does indeed play a role in complication rates, and selection of ADM should be conducted carefully.

**REFERENCE:**
1. Rose JF, Zafar SN, Ellsworth Iv WA. Does Acellular dermal matrix thickness affect complication rate in tissue expander based breast reconstruction?. *Plast Surg Int*. 2016;2016:2867097. doi:10.1155/2016/2867097

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**Long Term Maintenance of Nipple Projection Using 3D-printed Poly-4-Hydroxybutyrate Bioabsorbable Scaffolds Augmented with Autologous Processed Costal Cartilage**

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**PURPOSE:** Nipple reconstruction is a vital part of breast reconstruction after total mastectomy. However, nearly all local autologous tissue techniques suffer from scar contracture and loss of neo-nipple projection. Costal cartilage (CC) has been reported to maintain projection in nipple reconstruction, yet it has not been widely adopted due to the excessively firm resultant nipple. Herein we propose, using a 3D-printed bioabsorbable Poly-4-Hydroxybutyrate (3D-P4HB) scaffold loaded with processed CC, to promote ingrowth of tissue that mimics the biomechanical properties of native nipples and protect the regenerated tissue from contracture as it matures.

**METHODS:** 3D-P4HB scaffolds (diameter: 1.0 cm, height: 1.0 cm) were fabricated and sterilized. Patient-derived CC (discarded from DIEP procedures) was either minced (1 mm$^3$) or zested (<0.2 mm$^3$) in a sterile fashion to change its biomechanical qualities. Processed cartilage-filled 3D-P4HB scaffolds were subcutaneously implanted into nude rats using a CV flap technique. Additional groups consisted of empty 3D-P4HB scaffolds, and nonscaffolded (naked) processed cartilage. The constructs were explanted after 1, 3, and 6 months for gross, microstructural, histological, and biomechanical analysis. Four nipples per group/time point were analyzed.

**RESULTS:** All 3D-P4HB nipple reconstructions were well preserved in diameter and projection at 1, 3, and 6 months when compared with the non-scaffolded (naked) groups. A minor steady increase in tissue volume content was observed inside the scaffolds in both processed cartilage-filled 3D-P4HB groups overtime, due to cellular infiltration and tissue ingrowth through the pores and between cartilage pieces, although no significant differences were observed between groups ($P > 0.05$). However, the non-scaffolded (naked) group lost a significant amount of volume in the first 3 months (38% in minced and 26% in zested, $P < 0.05$), this smaller volume remained unchanged between 3 and 6 months. Biomechanical testing of elastic modulus indicated that the naked groups had minimal change in stiffness over 6 months within the range of 0.04–1 MPa due to the absence of scaffolds, but both processed cartilage-filled 3D-P4HB groups slightly increased in stiffness over 6 months within the range of 2–3 MPa. The newly formed spongy fibrovascular cartilaginous tissue (with viable chondrocytes within the lacunae) was noted in both processed cartilage-filled 3D-P4HB groups at 6 months. SEM images of 3D-P4HB scaffolds demonstrated degradation over time with widespread pitting on the outer surface of the scaffold walls. The inner wall of empty 3D-P4HB scaffolds had less surface erosion when compared with the cartilage-filled groups due to the presence of scaffolds.