

**Title:** Measuring breast volume changes in reconstruction surgery using three- dimensional optical surface scanning

**Purpose:** Over 30% of patients who choose breast-conserving treatment (BCT), consisting of lumpectomy and adjuvant radiation, will experience deformity that requires reconstruction. Monitoring the difference in breast volume during reconstruction using fat grafting could allow accuracy in planning and assessing the efficacy of this surgical procedure to ensure optimal aesthetic outcome.

**Method:** A workflow was designed to efficiently capture a three-dimensional surface scan of a patient during a clinical visit. Software was developed to compute the inter- and intra-breast volume differences, and visualize shape differences, using the surface scans and a fiducial list defining the breast footprint. We conducted a validation study of fourteen patients. Each patient was scanned five times and the breast volume and shape differences were computed for each.

**Results:** All metrics and visualizations were successfully computed. The average coefficient of variance for all intra-breast volume measurements was 1.54%. The average normalized standard deviation for the inter-breast volume measurements was 1.17%. The workflow and software created can compute and visualize both the inter- and intra-breast volume and shape differences of post-BCT patients.

**Conclusions:** The reproducibility of our results suggests this method could be used in the clinical setting. Two potential applications include: (i) measurement of the volume difference between breasts at presentation to aid with surgical planning of the number of fat grafting sessions, and (ii) monitoring of the volume changes within one breast post fat grafting.

### **Objectives:**

After this presentation one should be able to...

1. Appreciate the necessity of a validated measurement tool for evaluation of breast shape/volume in the context of breast reconstruction post BCT.
2. Recognize the clinical importance of having access to a breast volume measuring tool to assist in surgical planning and monitoring of fat grafting to achieve optimal aesthetic outcome.