

Purpose: The utility of immediate autologous breast reconstruction in patients likely to undergo radiation therapy remains controversial. The purpose of this study is to perform a quantitative outcomes assessment of patients undergoing bilateral immediate free flap breast reconstruction and subsequent radiation therapy.

Methods: A retrospective chart review was performed of all patients undergoing free flap breast reconstruction by the senior authors between 2005 and 2009.

Results: Two hundred and forty six women underwent immediate bilateral free flap breast reconstruction during the study period. Of these, 81 women (33%) received postoperative radiation therapy. This cohort was similar to the cohort not requiring irradiation in terms of demographics and medical comorbidities. No differences were noted in flap loss, contour deformities, fat necrosis, wound infections, hematomas, seromas or delayed wound healing. A higher incidence of volume loss was observed in the irradiation therapy cohort (20% vs. 2%, $p < 0.0001$). However, there were no significant differences in the rates of revision procedures. A multivariate linear regression examining volume loss found radiation therapy to be the only significant associated factor ($p < 0.0001$). The subgroup analysis revealed a significant increase only in the incidence of volume loss on the radiated side compared to the contralateral non-radiated breast (19% vs. 1%, $p = 0.0003$). A trend towards an increase in fat necrosis was observed in the radiated breast, but this only neared significance ($p = 0.065$). Local tissue rearrangements were more commonly performed on the contralateral breast ($p = 0.022$). A linear regression within the radiation therapy cohort found volume loss in this group to also be associated with perforator based flaps ($p = 0.003$). A post hoc analysis of this finding revealed a nearly 3 fold increase in the incidence of volume loss in radiated perforator flaps as opposed to msfTRAM flaps (36% vs 12%, $p = 0.012$).

Conclusions: Immediate reconstruction allows for optimal aesthetic and psychological outcomes for patients, yet there have been cogent arguments against this procedure when there is an uncertain need for radiation therapy. This study demonstrates that while post mastectomy radiation can result in volume loss, there are no increases in other complications or in revisional surgeries. Additionally, our results indicate that in this subset of patients, performing a msfTRAM in the diseased breast may help decrease the incidence of volume loss even if radiation is required.