**Effects of radiation therapy on silicone prostheses with different gel cohesivity**


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**Statement of Purpose:** In spite of widespread use of breast-conserving therapy for early breast cancer, a large number of patients still undergoes mastectomy. Post-mastectomy radiation (PMRT) is indicated in selected breast cancer patients. Currently, number of patients receiving PMRT is increasing, as many women would pursue breast reconstruction with benefit for self-image [1]. Even if breast reconstruction does not contraindicate radiotherapy, irradiation treatment to implant-based reconstruction remains highly controversial. Criticism of the technique has focused on possible compromised radiation design and potential for increased complication rates with inferior cosmetic outcomes [2-3]. When RT is given to patients with permanent implants, the irradiation technique does not vary from that for intact breast, using $^{60}$Co, to administer 45-50 Gy to the chest wall with daily fractions of 1.8-2 Gy. Many published data indicate that prostheses do not affect the quality of radiation treatment: in fact the linear absorption coefficient for silicone gel and water are comparable and, behaving like tissue, silicone prostheses or water filled expanders do not affect the photon or electron beam distribution with no significant alterations of depth doses [4]. Vice versa, data on alteration of shape and consistence of the implants due to radiation are occasionally reported.

The aim of this work is the study of morphological and mechanical modification of three types of prostheses (namely FM, MM and MX), occurred after an irradiation dose similar to the radiotherapy on patient affect of breast cancer.

**Methods:** The investigated models of breast prosthesis, kindly provided by Allergan Co., are ST410 FM 360g (FM0), 410 MM 360 g (MM0), 510 MX 360 g (MX0). The main difference among the three models is the silicone gel cohesivity, 510 MX model has a double gel with different cohesivity, while the ST410 FM is a soft gel cohesivity, 510 MX model has a double gel with different cohesivity. Further investigations depending on the gel cohesivity. Further investigations are still in progress to better understand the effects of the radiotherapy commonly used for the treatment of breast cancer on the implant materials, especially on the silicone gel used as filler.