

**Purpose:** The purpose of this study was to investigate the influence of different Mammosite applicators (Spherical vs. Ellipsoidal) on integral dose to the skin.

**Introduction:** In early 2005, Mammosite introduced a new balloon in ellipsoidal shape. Ellipsoidal balloon has typical five dwell positions with 10 mm dwell spacing, and different weightings to each dwell position compared to the single dwell position for spherical balloon. The dose prescription for both balloons is identical. However, the influence of different dwell positions & dwell time on integral dose to the skin is not well documented. Dose distributions were reviewed retroactively in 12 mammosite cases to establish the relationship for integral dose to skin vs. balloon type.

**Methods and Materials:** Dosimetry plans (\*Nucletron, V14.26) for twelve mammosite patients were reviewed. Nine patients were treated with spherical balloon and remaining three patients received treatment with ellipsoidal balloon. The dose prescription, for all the patients was 34 Gy in 10 fractions at 10 mm from balloon surface. In order to eliminate the influence of skin distance from the balloon center on integral dose, each plan was re-run using both types of dwell configurations. Entire skin surface (thickness 5 mm) above the balloon was contoured. Dose volume histograms (DVH) were generated for the skin.

**Results:** The DVH analysis indicated consistently higher skin dose with Ellipsoidal balloon compared to the spherical balloon technique. The difference was more pronounced for shorter skin distance (7-10 mm) from the balloon surface. On average the integral skin dose was higher by 11% with ellipsoidal balloon for skin distance of  $\geq 7$  mm. While for skin distance of  $\geq 13$ mm, the integral dose was higher by 6.5% for ellipsoidal balloon.

**Conclusions:** Ellipsoidal balloon technique of mammosite delivers higher integral skin dose. It is too early to indicate any clinical significance of these findings.