

**Purpose:** To measure and to evaluate the surface and superficial doses for patients requiring postmastectomy radiotherapy (PMRT) with different treatment techniques.

**Methods:** An elliptic cylinder cork and super-flab boluses were used to simulate the lung and the chest wall, respectively. Sets of CT images with chest wall thicknesses of 5, 8, 10, 13, and 15 mm were acquired. Hypothetical clinical target volumes were outlined and modified to fit a margin of 1-3 mm away from the surface. The planning target volume was initially created by expanding an isotropic 3 mm margin from CTV and then a margin of 1-3 mm was shrunk from the phantom surface. Treatment techniques using a pair of tangential wedged fields (TWF) and 4-field IMRT were designed with a prescribed fraction dose ( $D_p$ ) of 180 cGy. Superficial dose profiles around the phantom circumference at depths of 0, 1, 2, 3, and 5 mm were obtained for each treatment technique using radiochromic external beam therapy (EBT) films.

**Results:** The TWF plans show a dose buildup about 3 mm at the median and lateral tangential incident regions with a surface dose of about 52% of  $D_p$ . Dose profiles were more uniform in the PTV region for the 4-F IMRT plans. Most of the PTV region had doses higher than 94% of  $D_p$  at depths larger than 1 mm. The mean surface dose was about 65% of  $D_p$  for the 4-F IMRT plans. The maximum dose for the 4-F IMRT plans was less than 118.4% of  $D_p$ .

**Conclusions:** The dose variations caused by the oblique incidence and a thin chest wall are modulated and reduced in the IMRT plans. More uniform dose distributions within the PTV are obtained with the 4-F IMRT plans.