

AbstractID: 13857 Title: Investigation of Different Carbon Fiber Tabletops Used in Radiation Therapy

Purpose: The dose changes in the buildup region and beam attenuation by several carbon fiber tabletops were investigated for 6 and 10 MV photon beams.

Method and Materials: Measurements were performed for 3×3 , 10×10 , and 25×25 cm² field sizes. The surface dose and percentage depth doses (PDD) were measured using a Markus parallel plate ionization chamber. A Farmer type ionization chamber with appropriate buildup caps have been used for attenuation measurement at several gantry angles (from 0° to 180°). Oncor's couch (Siemens schematic G5499), Primus' couch (MED-TEC model IL3005), and CT's couch (MED-TEC model IL3302) have been studied.

Results: For a 6 MV beam Oncor couch increases the surface dose from 16.8% to 77.6% for small fields. Attenuation varies from 1% to 4.7% for 180° and 120° gantry angles. At 6 and 10 MV beams respectively, Siemen's couch increases the dose from 17.8% to 43.2% and from 10.0% to 28.5%, the beam attenuation varies from 0.1% to 8.6% and 0.2% to 3.1% for 180° and 120° gantry angles. The increase of the surface dose for the CT couch is from 17.5% to 77.8% and 9.6% to 58.9% for 6 and 10 MV beams respectively, and beam attenuation varies from 1% to 4.7% and 1% to 2.4% for 180° and 120° gantry angles.

Conclusion: The carbon fiber tabletops significantly decrease the skin sparing effect. Our data show that the surface dose increase in the buildup region is about the same for the three couches. The dosimetric effect of the tabletop may be higher, especially for intensity-modulated radiation therapy depending on the beam orientation. Attenuation should be considered and corrected such as any material under the patient at the treatment planning stage.

Keywords: Carbon fibre tabletops, Oncor, Primus, CT, PDD