

AbstractID: 13631 Title: Effect of Film Orientation on Proton Beam Dosimetry

Purpose: To evaluate the dosimetric effect of film irradiations in a pelvis phantom treated with protons. **Method and Materials:** A CT simulation of an anthropomorphic pelvis phantom was performed and the Hounsfield Units were converted to the measured relative stopping power for each material. A proton treatment plan with lateral fields was devised. TLD and Gafchromic® EBT film were inserted in the phantom with the film orientation at 0° and 90° relative to the beam axes and the plan was delivered. The process was repeated twice more. The phantom was re-loaded with the film rotated 10° from the beam axes. The treatment plan was delivered three more times. Dose calculations from the planning system were compared to the measured dose from the TLD and film. Profiles along the film planes were compared to calculations from the planning system. An acceptable displacement was defined as < 3 mm. **Results:** The film aligned along the axes of the beams showed a displacement between the measured and calculated dose profiles of -7 mm on the left side and 5 mm on the right side. After rotating the film 10°, the new displacements were -4 mm on the left side and 3 mm on the right side. **Conclusion:** Rotating the film from the axis of the beam reduced the displacements between the measured and calculated dose profiles in the right-left direction by as much as 3 mm. The difference in density between the film and phantom material is believed responsible for the differences in the dose profiles. The planning system did not account for the density of film and underestimated the range of the protons. This work was supported by PHS CA010953 and CA081647, awarded by NCI, DHHS, and funds from the RTOG.