AbstractID: 1588 Title: Treatment planning quality and delivery efficiency for sMLC delivered IMRT treatments: Influence of the leaf width of MLC and the size of finite pencil beam

Time and MU required to deliver IMRT treatments can be significantly more than the conventional treatments. The first generation of MLCs has the leaf width of 1.0 cm at isocenter. The new generation of MLCs has the leaf width of 0.5 cm. It is generally accepted that MLC's with smaller leaf width produce more conform plans. In this work, we evaluate the impact of the leaf width and the size of finite pencil beam (FPB) on the quality and delivery efficiency of IMRT plans for clinical sites, including mesothelioma, spine, and prostate, planned with a CORVUS planning system for a Varian Millennium120-MLC. Three beam models were used. The first model forces two 0.5 cm MLC leaves moving in tandem to simulate 1.0 cm leaf width MLC and the size of FPB is 1.0x1.0 cm^2. The second model takes the advantage of the 0.5 cm leaves with FPB size of 0.5x1.0 cm^2 (1.0 cm in the direction of leaf movement). The third model also uses 0.5 cm leaves but the FPB size is 0.5x0.5 cm^2. When both quality and delivery efficiency are considered, the following conclusions can be made: no single beam model is better than others for all clinical sites; for mesothelioma, the 1.0 cm leaf width is the obvious choice due to the large field size; 0.5 cm leaves is necessary for spine due to the proximity of the spinal cord to the target; and the third model is not needed for the any of the cases studied here.