

AbstractID: 11685 Title: A comparison of MLC demands between dosimetrically equivalent RapidArcTM and conventional IMRT deliveries

Purpose: To compare the MLC motion requirements of dosimetrically comparable RapidArcTM and conventional IMRT plans.

Method and Materials: A program was written to read the MLC control point positions from DICOM RT plan files and calculate for each leaf the total distance travelled, the velocity for each control point and the number of direction changes. Pairs of RapidArcTM and conventional IMRT plans were generated such that the resulting distributions were dosimetrically as close as possible. These plan pairs were analyzed for the requirements made on the MLC system and compared.

Results: It was observed that the average total distance travelled and the maximum velocity for each active MLC leaf was about equal for the two types of deliveries. However the average number of directional changes for each active leaf was 10 times greater for the RapidArcTM delivery.

Conclusions: Although the total distance and velocities of the MLC leaves are comparable, the ten fold increase in MLC directional changes throughout the RapidArcTM delivery could increase the amount of wear and service required for the MLC system. These additional directional changes could also increase interlocks due to the MLC decoder backlash errors requiring increased MLC initialization frequency.