AbstractID: 7127 Title: Electron Arc Treatment Using a Multi-Leaf Collimator: Initial Determinations

ABSTRACT:

Electron Arc Treatment Using a Multileaf Collimator: Initial Determinations.

Currently, electron arc therapy at our institution requires cast inserts for field shaping and manual corrections for off-axis planes. Our goal is to use dynamic control of the multi-leaf collimator and a 3-D electron pencil-beam algorithm for dose calculation in all planes. Electron arc therapy must be commissioned separately from fixed electron therapy. Previous experience with beam measurements for electron arc has shown that using the x-ray MLC for electron arc will present significant hurdles in the measurement of data for the treatment planning system. Beam profile shapes change with field width and distance from isocenter *and the virtual SSD is different for different field sizes and beam energies*. The virtual SSD for the inverse square of the central axis peak is not the same as the point of divergence of the field width. Initial measurements were made using a diode scanning system. The medium was a 6-cm mini-phantom with the sensitive element at maximum buildup. The use of the mini-phantom permitted the rapid determination of dose variation over a 75 to 100 cm SSD range. Rectangular fields of 1 to 8 cm widths and 10 to 39 cm lengths were scanned. Trapezoidal fields of varying shape were also evaluated. Integrated dose measurements were made for varying distances and field sizes. Profiles at selected distances, depths, and field widths were measured in water. The parameters for the 3-D electron pencil-beam algorithm were then adjusted to permit reasonable dose prediction with the treatment planning system.