

AbstractID: 1590 Title: Quantitative Tomotherapy QA Testing for Dynamic Interaction Parameters

Tomotherapy, a helical slice IMRT technique, presents unique challenges for machine quality assurance. One of these involves checking the dynamic interplay between couch movement, gantry rotation and MLC delivery. Not only should the couch speed be coordinated to the gantry speed but also the actual 'start' angle of the treatment must be precise and accurate.

A QA procedure to be done on a regular basis must be simple to perform yet accurate in its results. This is accomplished by positioning a film at isocenter sandwiched between two solid water 20 x 20 sheets 1.5 cm thick and marked with the laser coordinates. A computer control file has been developed that sets the jaw size at 1.0 cm and a couch speed of 4 cm/rotation. Further, only the central two MLC leafs are allowed to open for 20-degree arcs centered at 0 (accelerator at top), 70, and 290 degrees. All arc exposures are separated by 1 complete rotation of the gantry. This sequence is repeated so as the first and last 0 degree gantry exposure should be 36 cm apart.

The resulting film is analyzed in both axes. In the direction of couch travel the distance between the maximum of the first and last exposure should be within 1 mm of the expected value. The difference in relative width (in the rotation plane) of the exposure to the obtuse angles can be used to derive the expected start angle to a fraction of a degree.