

AbstractID: 6418 Title: Light-Radiation Field Coincidence for Small Stereotactic Fields

Purpose: To determine the degree of congruence between the light field and the X-ray field for a Varian 2100 SCX linear accelerator equipped with a Varian/Zmed tertiary collimator for stereotactic radiosurgery (SRS). If this congruence is sufficiently good then it is feasible to use the light field for alignment of the system instead of using a mechanical pointer or the room lasers.

Method and Materials: The SRS light field was projected onto a sheet of Kodak X-OMAT V film enclosed in a paper ready-pack at isocenter. A lead plug, slightly smaller in diameter than the collimated field, was placed concentric with the light field on the film pack. A 0.5 mm sheet of Cu was placed between the plug and the film pack to provide electron buildup to the film. The film was then exposed with 6 MV X rays from the linac. The developed film was scanned with a Vidar VXR-16 densitometer and the separation between the centers of the X-ray field and the shadow of the plug (representing the light field position) was measured. Similar films were taken of fields collimated by the accelerator jaws and by the MLC.

Results: The separation between the centers of the light and radiation fields was 0.1 mm for the SRS collimator, 0.2 mm for the MLC, and 0.7 mm for the jaws. These separations follow a linear relationship with the ratio $(SSD-SDD)/SDD$ where SDD is the source-to-collimator distance and SSD is the source-to-film distance.

Conclusion: If the light radiation congruence for the field defined by the jaws is within 1 mm then the light field with the tertiary collimator can be used in setting up the SRS system for this linear accelerator.