

AbstractID: 1279 Title: A New Phantom Design for Image Guided Radiation Therapy Quality Assurance

A phantom was designed that allows the performance of image guided radiation therapy (IGRT) systems to be quickly and easily measured. The basic daily workflow in IGRT is to first image the patient, then to choose a location for the treatment plan isocenter based on the image data, and then to shift the patient into a treatment position based on the newly selected isocenter coordinate. Our phantom was therefore designed to test the ability of IGRT systems to align a radiopaque marker with the linear accelerator (linac) radiation isocenter. The phantom is unique in that it measures the radiation isocenter directly and does not rely on the accuracy of light fields or laser indicators, and it is capable of measuring the rotational as well as linear components of position.

The phantom holds three pieces of ready pack film in a triangular shape around a central radiopaque marker. It is placed on the treatment table and then positioned using the IGRT process such that its central marker is intended to be coincident with the linac isocenter. Exposures are made from three sides with "X" shaped fields such that the isocenter can be identified in the developed film and compared to the known location of the central marker. Wires embedded in the phantom cast shadows during exposure and allow for precise knowledge of the film location. Automated software facilitates quick analysis following exposure.