

In Intensity Modulated Radiation Therapy (IMRT), each modulated field must line up exactly with the other modulated fields in order for the planned doses to be delivered. If organ motion occurs during treatment, the composite dose to the target can be altered. This study was undertaken to determine the dosimetric effects of intrafraction motion for prostate patients treated with five-field fixed gantry intensity modulation. Patient specific intrafraction motion was assessed by acquiring CT scans of 10 prostate patients in the supine position immediately before and after the first three fractions. Each pair of CT images were fused by matching bony anatomy. The prostate, rectum, and bladder were contoured on each data set by the same investigator. Isocenters were automatically placed in the geometric center of the prostate. Intrafraction motion was then characterized by changes in organ volumes and isocenter displacements. The dosimetric effects of intrafraction motion were then evaluated using composite film dosimetry. Kodak EDR-2 film was placed in a homogenous 30 x 30 x 20 cm water equivalent phantom. Transverse composite dose distributions were obtained for 1.) the treatment delivery without intrafraction motion and 2.) with interaction motion simulated by moving the treatment couch between fields. The EDR-2 film was then scanned and analyzed for dosimetric differences using a commercially available film dosimetry system. Results for a group of patients will be presented as well as information on how to minimize intrafraction dosimetric error.