# AbstractID: 9626 Title: Quality assurance evaluation of delivery of respiratory gated treatments

A commercially available device to effect respiratory-gated delivery of radiation (RPM, Varian Medical Systems, Palo Alto CA) uses a signal from external fiducials to trigger the delivery of radiation from a linear accelerator. The purpose of the present work is to describe a method for evaluating the quality of the respiratory-gated radiation delivery using this device. Gating traces for each patient were acquired during irradiation for one field for each treatment, and transferred to a spreadsheet. Software was designed to evaluate the following parameters: duty cycle, amplitude of fiducial motion, fraction of amplitude during gated delivery, and respiratory cycle time. Gating traces and gating parameters can be displayed in a quality assurance report. Criteria were established for acceptability of gating traces. In a sample of 11 patients, over 70% of traces indicated acceptability. An example of results for one patient extracted from analyzed gating traces is as follows: mean duty cycle – 49% (range 27% – 76%), average amplitude of motion – 0.59 cm (range 0.40 cm – 0.72 cm), average fraction of motion during gated delivery – 0.37 (range 0.17 – 0.68), mean respiratory cycle time – 2.9 sec (range 2.0 sec – 3.6 sec). This technique can be used to analyze delivery of respiratory gated radiation therapy for quality assurance purposes and to evaluate various techniques for improving delivery of gated therapy.

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