

AbstractID: 13120 Title: Rotational IMRT Delivery Using a Siemens Artiste in Flattening-Filter-Free, High Dose-Rate Mode

Purpose: To demonstrate the ability to deliver *unflattened* (high dose rate), *modulated arc plans* using the Siemens Artiste linear accelerator using prototype linac firmware developed by Siemens and prototype TPS software developed by Prowess.

Method and Materials: Prototype Prowess treatment planning software was used to develop a set of high dose rate (1,000 mu/min) modulated arc plans for four treatment sites - head/neck, lung, prostate and breast. A step-and-shoot plan (SS) was also created for delivery efficiency comparison to arc-based plans. The same planning criteria were used for all plans to ensure their 'equivalence'. With the linear accelerator converted to the experimental state, all plans were delivered to a solid water phantom. Dose was measured using an ion chamber for point dose measurements and film for evaluation of relative dose distribution with a gamma criteria of 3%/3mm. Delivery times were collected to assess delivery efficiency.

Results: Plans developed using all arc modalities were successfully delivered for all cases. The maximum difference between measured and calculated doses was 3.08% for ion chamber measurements and the minimum 3%/3mm gamma agreement was 87% of pixels. All arc treatments were delivered in less time than the corresponding SS plans, with the lung SBRT plans being delivered in 5 minutes for a 20 Gy prescription.

Conclusion: Unflattened, modulated arc delivery is possible using prototype firmware on a Siemens Artiste machine and the Prowess treatment planning system accurately predicted doses for such deliveries. Modulated arc delivery in combination with unflat (high dose rate i.e. 1,000+ mu/min) mode may allow for very efficient delivery of highly conformal isodose distributions.

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