AbstractID: 8659 Title: Dosimetry evaluation and correction of DMLC control points for sliding window IMRT

Purpose: The aim of this study is to investigate the sliding window-intensity modulated radiation therapy (SW-IMRT) dose profiles using the extreme dose rate and leaf velocity to reduce the irradiation time per beam and beam leakage for the field. Moreover, the accuracy of the dose profiles with multiple gradients generated by the SW-IMRT was evaluated. **Methods and Materials:** Radiographic films were used to measure the difference between the planned and delivered dynamic IMRT dose profiles, which were used to determine the point-by-point leaf correction function. Dose profiles of the flat, sinusoidal, exponential and steep linear functions were used with different prescribed doses up to 100 cGy per beam at the isocenter. Photon beams with different field sizes up to 12 × 12 cm^2 were used with dose rates varying between 100 and 600 MU min^{-1}, and leaf velocity was set from 1 to 5 cm s^{-1} in this study. **Results:** The correction methodology was examined for simple non-clinical beam profiles that mimic the extremes of more complex fluence maps, and dynamic IMRT beams planned for the prostate and head-and-neck radiation treatments. Using the point-by-point correction functions, close agreement between the planned and delivered dose profiles can be achieved. Reduced field leakage, beam-on time and deviation of dose profile in the range < 0.5% - 0.8% were found for all profiles with a high dose rate of 600 MU min^{-1} and leaf velocity of 5 cm s^{-1}. **Conclusions:** Although this study was based on our in-house developed software, the results are encouraging and the proposed model can be applied to a more complex optimization of clinical SW-IMRT plans.