

**AbstractID: 5205 Title: Start-up characteristics of Elekta SLi-linacs: minimum number of MU required for IMRT**

**Purpose:**

On Elekta SLi-linacs steering of flatness and symmetry starts after a user-definable delay of 0.5 to 1 s after beam-on, which equals 5 to 10 MU at 600 MU/min. The impact of start-up characteristics of Elekta SLi linacs on dose delivery with small segments during IMRT was investigated and the minimum number of monitor units needed per segment was quantified.

**Method and Materials:**

Linearity of the ionisation monitor was quantified by taking ionisation chamber readings for 10x10 cm<sup>2</sup> 6MV and 10 MV photon beams over the range 1-200 MU. By using the Wellhöfer Beam Imaging System (BIS) dosimetric images of 820x820 pixels of the beam were acquired during the first 10 monitor units for 5 gantry angles (-180°, -90°, 0°, 90°, 180°). Every 120ms images were taken of a 40x40 cm<sup>2</sup> field. All data are compared to the reference value after delivery of 10 MU, which is regarded to be the steady-state value.

**Results:**

Deviations in ionisation monitor readings were less than 0.5% for segments larger than 2 MU. For segments of 1MU readings were 1.5% less than expected. Values for symmetry and flatness of the beams were very large during the first MU but decreased within 2MU to twice the steady-state value at 10 MU. The integrated symmetry (defined as the symmetry of the integrated dose distribution) and integrated flatness decreased within 4MU to twice the steady-state value. Neither gantry angle nor energy had influence on these results.

**Conclusion:**

During IMRT segments of 4MU can be safely used for all gantry angles. Errors in dose are smaller than 1% and errors in symmetry and flatness are less than twice that of 10 MU segments.