

AbstractID: 4459 Title: Analyzing tertiary multileaf collimators position effect on the dose distribution in irradiated field edge

**Purpose:** To study the varying of dose distribution at the irradiated field edge (IFE) affected by the relative position between jaw and MLC setting.

**Method and Materials:** Varian 21EX linear accelerator with 80 MLC was used for this study. The dose distribution was measured with a 2D-array Seven29 (PTW) ion chamber with 6 and 18 MV photon beam and field sizes (FS) 5x6, 10x10, 15x16 and 20x20cm<sup>2</sup>. Ion chamber array was set perpendicular to the central axis beam and placed at 100 cm SAD at Dmax. Dmax was built with a solid water phantom. Measurements were taken at following four field setting: (1) MLC aligned up with jaw, (2) MLC 1cm larger than the jaw setting, and (3) MLC 2cm larger than the jaw setting, and (4) MLC fully retracted. Dose comparison was done between the field setting (1) and the others at x-axis and y-axis IFE separately. To minimize the measurement device inaccuracy, dose was measured at 0° and 90° collimator angles with FS 10x10cm<sup>2</sup> for the verification. To limit the setup error, each set data was measured at same setup.

**Results:** There was not significant dose different observed from x-axis direction. However, there were 2.8, 4.3, 6.3 and 7% lower dose observed from y-axis direction with four measured FS from 18 MV beam, respectively. A similar result was observed from 6 MV beam. The difference amount other three settings was less than 1%.

**Conclusions:** Relative jaw and MLC location affects a dose distribution significant at y-axis IFE and this effect increased with the off central axis distance. We recommended that for a linac commissioning with jaws alone, when a tertiary MLC is used to shape an irradiated field, a 1cm extra distance should be provide from MLC at y-axis direction to avoid the low dose at IFE.