

AbstractID: 1840 Title: A simple technique for MLC leaf position calibration

The accuracy of delivery of IMRT is critically dependent upon the leaf position and leaf gap accuracy and reproducibility. A gap error of 1 mm can produce a 5% dose error. The so-called "picket-fence" film technique is often used to verify the relative leaf position and gap width for each MLC leaf pair. This technique has an inherent limitation that the high density band on the film results from the combined effect of each individual leaf pair. For example, a positive 1mm leaf position error in the leaf of one bank and a negative 1 mm error in the corresponding leaf of the other bank will show up as no error. The only way to overcome this limitation is to use a two half-field exposure technique in which gantry is rotated exactly 180 degrees between two exposures. For example, Y1 leaf calibration is checked by setting all Y1 leaves=0 cm, Y2 leaves =5 cm and X=40 cm; Exposures are given at gantry angle=90⁰ and 270⁰ with film located at the center of these two fields, perpendicular to the beam and sandwiched between 40x40 cm² solid water slabs. An alternative technique described in recent literature in which a simple 180 degree collimator rotation between two exposures is suggested is not valid for leaf alignment calibration. A comprehensive analysis of the results from the proposed test for both Elekta and Varian machines show that absolute calibration of the leaf position can only be done using the technique described above.