Physical and dosimetric characteristics of a non-focused miniature multileaf collimator

The physical and dosimetric characteristics of a commercially available, axially non-focused miniature multileaf collimator (mMLC) are investigated. The mMLC is attached to a customized accessory mount of a Siemens MXE-2 linear accelerator and has a source to aperture distance of 67 cm. The maximum field size is 10x12 cm and the leaf width projected at isocenter is 4mm. Our investigation consisted of measuring TMRs, relative output factors, beam profiles, leaf leakage and leaf positioning precision. Measured TMRs increased with increasing field size at all depths. Output factors increased rapidly for small field sizes (< 4 cm) and less rapidly for larger field sizes. The distance between the 80% and 20% dose levels of the beam profile measured at a depth of 5 cm was 3.5 mm which is comparable to that of the photon jaws and blocks. Interleaf leakage was observed to be on average 1.3% of the primary beam intensity with a maximum of 1.6%. Leaf positioning precision was verified by examining the matchlines of abutting rectangular fields and was found to be better than 1mm for all leaves. Our data indicate that the characteristics of this mMLC are consistent with previously reported studies on MLCs.