In this study a comparison was made between intensity modulated fields produced by Ellis type compensating filters and fields produced by a dynamic multi-leaf collimator (DMLC). We demonstrated that delivery of Intensity Modulated Radiation Therapy (IMRT) fields may be achieved using Ellis type compensating filters fabricated from cuboids of brass. A physical compensator is less expensive and technically simpler than a DMLC, making it a useful route to gaining experience with IMRT for small facilities with limited resources.

The required intensity maps were computed using a commercial inverse planning system for a clinical nine-field treatment. Eleven intensity levels were allowed for 1 cm by 1 cm beamlets at the plane of the isocentre. Extruded brass with a 0.63-cm (quarter-inch) square cross-section was cut into lengths and attached to shadow trays. The trays were positioned at the appropriate distance from the linac target to 1 cm by 1 cm at isocentre. The heights of the brass columns were computed from a transmission curve measured using the treatment geometry.

Compensating filters were designed and built for all nine treatment fields of an IMRT plan. Beam's-Eye-View measurements were performed using a fast Beam Imaging System. The transmitted fluence through the compensating filters and that due to the DMLC field compared favorably. Although their fabrication and clinical use would be labor intensive, these results demonstrated that Ellis compensating filters are an inexpensive and effective method by which the intensity modulation required by IMRT may be produced.