

## ***In vivo* verification of clinical intensity modulated radiotherapy delivered via dynamic multileaf collimation.**

The delivery of intensity modulated radiation therapy (IMRT) treatments using fully dynamic multileaf collimation (MLC) has recently commenced at our centre. In order to prove the reliability of this new technique in clinical use it has been necessary to institute a thorough program of verification for the initial clinical implementation. Here we describe the *in vivo* checks which ensure that every patient has been correctly treated.

At treatment, dynamic deliveries start with the MLC positioned as for a static irradiation. This allows comparison with a paper template placed on the couch to check that the correct prescription is loaded and allows a portal image to be acquired (to check for patient set-up errors) before the leaves move to their start positions for dynamic delivery. During delivery, real-time verification of MLC leaf positions is available via electronic portal imaging. A series of snapshot images are acquired during delivery and immediately displayed on-screen with the required leaf positions overlaid electronically. This allows the operator to monitor the progress of the delivery and to intervene should a gross error occur. Absolute *in vivo* dosimetry is performed using photon diodes placed on the patient surface. Diode correction factors for focus to surface distance and field size have been measured for dynamic MLC and are applied to the readings. This combination of verification techniques facilitates reliable treatment using the dynamic MLC technique.

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