

The use of linear accelerators for the stereotactic radiosurgery of small intracranial lesions has been well documented using a circular collimated beam while rotating about the target. This process is repeated for a number of treatment couch angles. Recently, several investigations have focused on using multileaf collimation devices for stereotactic radiosurgery and radiotherapy treatments. Clinical investigations have been performed using both conventional multileaf collimators (MLCs) as well as miniature (or micro) multileaf collimators (MMLCs) with a fine resolution of leaf width.

While the requirements for acceptance, commissioning and routine quality assurance and use are well described for conventional radiosurgical systems, these concepts may require some modification when considering the use of MLCs for field shaping. The purpose of this talk is to elucidate these areas of concern, and to describe the techniques and results found to date with MLC systems currently in use for stereotactic treatment. Specific examples will be described of treatments using a conventional, double-focussed MLC with 1.25 cm wide leaves, as well as using MMLCs with leaf widths of 0.3-0.4 cm. The course objectives are to review:

1. acceptance data (isocentricity, calibration, reproducibility, leakage)
2. commissioning (beam model, treatment planning description of MLC, output characterization)
3. quality assurance (periodic calibration, isocenter verification, monitor unit calculation, documentation)
4. treatment planning (number of segments, field shaping guidelines, use of upper jaws)
5. treatment delivery (verification of field shapes, treatment throughput)
6. current results

This work is supported in part by NCI grant number PO1-CA59827