

A leaf sequencing algorithm for dynamic multileaf collimator

PURPOSE:

To develop a leaf sequencing algorithm for IMRT field delivery. This algorithm allows visual verification and port filming of treatment setup before the treatment. And, the last segment remains open for another visual inspection of final positions of leaves after treatment.

METHODS AND MATERIALS:

A “stop and shoot” algorithm was developed using a “zero intensity” seeking method. Total monitor unit computation is accomplished by summing monitor units required for each leaf setting. Though this algorithm has not been optimized for the least number of beam segments, the number of beam segments are comparable to those algorithms which have been optimized for the least number of beam segments.

Outputs using this algorithm were validated with measurements using ionization chambers in water phantom and solid phantom. TLDs were placed inside of a human-like phantom and passed through the entire system as a patient would.

RESULTS:

Excellent agreements were found between computed values and measurements using DMLC. TLD measurements were also acceptable. This algorithm has been in clinical

use since July, 1998. More than 40 patients have been treated using this leaf sequencing algorithm.

CONCLUSION:

A new leaf sequencing algorithm has been developed for IMRT implementation. This algorithm starts with the largest treatment field and allows visual inspection of the treatment setups and port films before the treatment. The last segment remains open for another inspection of final positions of leaves. This algorithm has comparable number of beam segments with other leaf sequencing algorithms.