

AbstractID: 4376 Title: Evaluation of Dosimetric Properties of 6 & 10 MV Photon Beams From a Liner Accelerator with no Flattening Filter

Purpose:

To study the dosimetric properties of an IMRT treatment beam after removing the flattening filter. Our goal is to show that more efficient IMRT treatments can be performed on a standard IMRT-capable linac after the flattening filter has been removed.

Method and Materials:

Measurements and Monte Carlo simulations were performed of 6 and 10 MV photon beams from an Elekta SL-25. Comparisons of the properties of these beams were made, with and without the flattening filter. %dd curves, beam profiles and photon fluence spectra were the primary method of comparing the beams. A study using the LATCH option in BEAMnc was also performed to determine the original of scattered photons that contribute to the dose outside of the treatment field.

Results:

Dose outside the treatment field was found to be reduced by up to 5.8%, depending on the field size. Photon fluence on the central axis of the 6 and 10 MV beams increased by a factor of 2.35 and 4.18.

Conclusion:

Our Monte Carlo study showed that by removing the flattening filter the amount of laterally scattered photons from the jaws and MLC's was reduced leading to lower photon fluencies outside of the treatment field. It is hypothesized that inverse treatments plans created using these filter-free beams would lead to a higher degree of conformation of the dose to the target. The increase in photon fluence that is induced by removal of the flattening filter is predicted to lead to shorter treatment times.

Conflict of Interest (only if applicable):