

AbstractID: 5120 Title: A Comparison of MatriXX, MapCHECK and Film for IMRT QA: Limitations of 2D Electronic Systems.

Purpose:

Evaluation and comparison of 2D electronic systems versus film/ion chamber based dosimetry for IMRT QA using MapCHECK and MatriXX.

Method and Materials:

All IMRT plans were generated with Eclipse/Helios 7.3.10 treatment planning software (Varian). Treatments were delivered on a Varian 21EX linear accelerator (6MV) with 120 leaf Millenium MLC for delivery of sliding window IMRT. The film measurements were first compared to the Eclipse dose plane. Secondly, the electronic measurements were compared to the Eclipse dose plane. Thirdly, the film measurements were compared to the electronic measurements. The film, Eclipse dose plane and MatriXX (Scanditronix) were analyzed using the OmniPro IMRT software (Scanditronix). The film, Eclipse dose plane and MapCHECK (SunNuclear) were analyzed using the MapCHECK software. Analysis was based on distance to agreement (DTA), Gamma, profile comparisons, measured dose (relative/absolute) and visual comparison.

Results:

Film and ion chamber comparisons were in good agreement as well as comparisons between electronic and ion chamber measurements. However, in some instances, electronic system measurements did not agree with film due to MLC leaf failure. Advantages and disadvantages of MatriXX and MapCheck for IMRT QA as well as specific MLC leaf failure instances will be discussed further.

Conclusion:

With many clinics implementing electronic IMRT QA devices, a careful understanding of the limitations of the MLC system and the electronic IMRT QA device is needed. We are investigating the resolution capabilities of each QA system. The MLC failure was caught before treatment began. A major disadvantage in implementing 2D electronic systems for IMRT QA is the limited resolution, resulting in limited sensitivity to MLC failures. Primary advantages of 2D electronic systems include: 1) time, 2) efficiency, 3) ease of use, and 4) overall simplification of IMRT QA.