

AbstractID: 5684 Title: Intensity Map Verification for IMRT QA using an a-Si EPID

Purpose: To use a flat panel electronic portal imaging device (EPID) for intensity map verification as part of an intensity modulated radiation therapy (IMRT) QA program.

Method and Materials: An a-Si EPID was used to image each field shape segment of a head and neck IMRT treatment. The DICOM images produced from each gantry angle were summed together and weighted according to the number of MU measured. Open field portal images were acquired at the end of the treatment, for each gantry angle, and subtracted from each composite image. A GUI was created in the MATLAB environment to read and sort each image according to gantry angle and MU measured, perform the image summations/subtractions, produce and display a final composite image.

Results: Subtraction of the open field portal image from the field shape composite image removed the anatomy from the treatment area and produced a true intensity map. Outside of the treatment area the anatomy was visible, thus providing verification of correct radiation delivery location. The composite images were compared to other composite images produced using the same treatment plan delivered with and without a phantom and were found to be in excellent agreement. The images were also compared to the intensity map images created in the treatment planning system. Imaging of each segment of an IMRT treatment required no additional radiation be delivered to the patient. The open field portal images require additional radiation, however each image needs only to be acquired once during a course of treatment.

Conclusion: This work indicates that flat panel EPIDs may be used to image an IMRT treatment and accurately and efficiently verify the intensity and location of the delivered radiation. Future investigations will use the 2D images to produce a 3D intensity "cloud" image.

Conflict of Interest (only if applicable):