AbstractID: 9679 Title: MapCHECK Patient Specific QA cannot suffice for MLC QA

Purpose: To demonstrate that MLC QA is an important aspect of an IMRT program, and cannot be substituted with patient specific QA using MapCHECK.

Method and Materials: Two Elekta linacs in our clinic are currently being commissioned for IMRT from 3D conformal. Traditionally MLC QA involved testing the range of leaf position by forming diamond-shaped and X-shaped fields. Films were exposed to these fields and analyzed to have a 1mm correspondence between the light field and the planned position **[Radiotherapy and Oncology, 38(1), 51-60 (1995)]**. With the linacs being commissioned for IMRT, the QA for MLC requires to be more stringent as the leaf positional accuracy is of much greater importance. The validation process involved creating IMRT plans on head and neck and breast patients using the Pinnacle^3 TPS. Planar doses on these plans for each field were computed and exported to the MapCHECK. All fields were irradiated and analyzed for passing criteria of 3%/3mm for absolute dose under gamma analysis specific to our clinic's passing guidelines as well as 4%/4mm specific to some other clinics. The leaf positions were analyzed by the MLC picket fence test.

Results: The visual analysis of the picket fence film indicated significant errors with the MLC calibration. Nevertheless, the MapCHECK analysis of all the patient plans at 4%/4mm had a pass percentage greater than 90%. Even at 3%/3mm, majority of the fields had a pass percentage greater than 85%.

Conclusion: Although the picket fence test displayed remarkable inaccuracies with MLC calibration, relying only on daily patient specific MapCHECK QA to conclude the MLC is properly calibrated can be misleading. Frequent MLC QA using a picket fence or similar techniques should be conducted to check the MLC calibration accuracy.