

AbstractID: 11356 Title: Evaluation of Local Dose Reduction in the Fluence Map for Varian 2.5 mm HD120® MLC Using Portal Dose Image Prediction (PDIP).

**Purpose:** Dose (fluence) reduction in some regions was found when IMRT QA was performed on Trilogy Tx with 2.5mm HD120 MLC. The dose error in regions (strips) captured during IMRT dose verification on Trilogy Tx using PDIP and film dosimetry was evaluated. Measured dose fluence maps from Trilogy Tx and 2100EX (5mm MLC), created from the same IMRT plans, were compared.

**Materials and Methods:** 15 patients of various treatment sites - prostate, H&N, and brain were included in the study. To evaluate the presence or absence of local dose reduction for each machine, each patient's optimized fluence map was calculated for leaf motion sequence on Trilogy Tx and 2100EX, respectively. PDIP and film dosimetry were acquired on the Trilogy Tx to validate the accuracy of portal dosimetry. Thus, film dosimetry was used to compare the measured fluence maps obtained from each machine. PDIP dosimetry was analyzed using the Eclipse Planning System. Film dosimetry was analyzed using Vidar Scanner and RIT 113.

**Results:** For the fluence maps measured on the Trilogy Tx, PDIP and film dosimetry displayed "strips" of reduced fluence (dose) in high dose gradient areas, particular in Head & Neck and Brain treatment plans. Through the "strips" of reduced fluence, we measured differences of 10%-15% in the 2D profile comparison of predicted and measured profiles. For the 2100EX, the phenomenon was less pronounced with discrepancies < 3%. These strips occurred on the measured dose fluence map when a pair of leaves move at different speeds compared to adjacent leaves.

**Conclusion:** Regions (strips) of reduced fluence were present in PDIP and film dosimetry for both machines. The percent difference between the planed and measured profiles are more pronounced on Trilogy Tx (2.5 mm MLC) than that on 2100EX (5mm MLC). The overall dosimetry impact and its cause are being investigated.