AbstractID: 11673 Title: Performance of a portable MOSFET Dosimetry system for in-vivo dose measurements in orthovoltage treatments and kilovoltage Cone beam CT

Purpose: The purpose of this work is to characterize the portable MOSFET dosimetry system for kilovoltage radiation beams, and investigate its use for in-vivo dose measurements in orthovoltage treatments and kilovoltage (kV) cone beam computed tomography (CBCT) imaging.

Materials and methods: A newly developed MOSFET portable dosimetry system (Best Medical Canada) was characterized and compared against the mobileMOSFET system (Best Medical Canada) for reproducibility, linearity, angular dependency for kilovoltage energies, ranging from 40kVp to 225kVp. Calibration factors were derived for 15 photon energies at 2cm depth of solid water with references to the doses measured according to TG-61 guidelines. Surface dose measurements were performed on solid water phantom, simulating treatment conditions of patients under treatment. The kV CBCT doses were measured on a Varian linear accelerator (Varian Onboard Advanced Imaging 1.4) for patients undergoing CBCT.

Results: The responses of the portable dosimetry system were found to be similar to those of the MobileMOSFET system in terms of sensitivity, reproducibility, linearity, and angular dependency. MOSFET sensitivity for standard sensitivity MOSFETs with standard bias was found to be from 4.63±0.1mV/cGy to 2.63±0.1mV/cGy in the energy range investigated. The average of the dose difference between the MOSFET measurements and the expected skin doses for orthovoltage treatment was (-0.1±2.25)%. The CBCT doses for patients undergoing prostate treatment, shows good agreement with the expected published values.

Conclusion: The results of the investigation suggest that the charcateristics of MOSFET portable dosimetry system is very similar to those of the mobileMOSFET system. The dosimetry system was found be suitable for surface dose measurements in orthovoltage treatment, as well as in kV CBCT imaging and therefore, can be used as an in-vivo dosimeter for routine clinical use.