AbstractID: 10558 Title: On face and angular surface dose measurements with OneDose MOSFET system

The purpose of the study was to evaluate the performance of the MOSFET based OneDose system in comparison with an established TLD system for clinical surface dose measurements for electron and photon irradiation. The impact of an oblique beam angle was investigated for electron beams.

Three electron (6, 12, 22MeV) and two photon (6, 20MV) energies have been investigated. For each energy OneDose and TLD detectors were irradiated at reference condition in a solid water phantom and on the surface of the phantom (100 cm SSD). For the electron beams additional surface measurements were performed with an incident beam angle of 30°. Four OneDose detectors and two TLDs were irradiated in each measurement. Three such measurements were performed for each data point. Comparisons were made between OneDose and TLD data as well as with established machine depth dose data.

The average standard deviation of the OneDose dose measurements over 13 sets of 12 measurements was 1.8% with higher standard deviations for the photon beam surface measurements (5.7%). Without correction for energy and beam type, which is generically offered by the system, the measured OneDose dose agreed within 2% with the TLD measured data for the photon beams and was 4-7% low for the electron beams. Applying these deviations as corrections for the surface measurements, the OneDose system was found to be in good agreement with the reference data (3%) and the TLD measurements (0-8%). OneDose underestimated the photon surface dose by 22%, TLD by 14%. Changing the beam angle to 30 degrees did not impact the OneDose electron beam surface measurements.

The OneDose is fit for use for electron surface patient measurements with applied beam correction factors. Surface measurements for photon beams are more challenging as with TLD.

Sicel Technologies provided the OneDose detectors used in this study.