

AbstractID: 10439 Title: Dosimetric evaluation of the OneDose MOSFET for measuring kilovoltage imaging dose from image-guided radiotherapy

**Purpose:**

There is a growing interest to determine and to manage the additional image dose to radiotherapy patients. An easy-to-use in vivo dosimeter would be very useful for kilovoltage (kV) x-rays used in IGRT. This study aims to provide the dosimetric characteristics of the commercially available OneDose™ for measuring dose from kV x-rays with energy ranging from 60 to 125 kVp used in IGRT procedures with respect to reproducibility and energy correction factors.

**Method and Materials:**

The OneDose™ system consists of a small MOSFET dosimeter with overall physical dimensions of 6 mm wide, 33 mm long, and < 1 mm thick and a portable handheld battery-powered reader. The dosimeter is wireless with adhesive backing to stick to patient's skin. This single-use dosimeter was pre-calibrated by the manufacturer using Co-60 beams. The energy response for kV x-rays produced by a Varian OBI system was determined by using an ionization chamber in which the air-kerma calibration factors were obtained from an Accredited Dosimetry Calibration Laboratory (ADCL).

**Results:**

The dosimeters have reproducible readings with a deviation of 1-4% for imaging dose of only a few cGy. The energy correction factors were found to be 0.27 - 0.32 for kV x-rays from the OBI system ranging from 60 to 125 kVp including beams from cone-beam CT.

**Conclusion:**

OneDose™ dosimeter has a similar reproducibility when used for measuring dose from kV photon beams as that when used for measuring dose from MV photon beams. A correction factor that is energy dependent must be applied because of the over-responds to x-rays in the diagnostic energy range. The ease-to-use allows the OneDose™ dosimeter to be suitable for in vivo dosimetry of measuring doses resulting from imaging guidance.

**Conflict of Interest (only if applicable):**

Research sponsored by Sixel Technologies, Inc. Morrisville NC.