AbstractID: 5399 Title: Evaluation of the spatial and dose resolution of a new 3D polyurethane dosimeter

**Purpose:** To determine the dose resolution and spatial stability of PRESAGE™, a new three-dimensional (3D) polyurethane dosimeter.

**Methods and Materials:** PRESAGE™ dosimeters were irradiated to doses between 0.5 Gy and 10 Gy using stereotactic beams to develop a dose response curve and determine the dose resolution. A PRESAGE™ dosimeter was also placed in a water tank with the top surface coincident with the water surface and irradiated using a half-blocked field delivered by a linear accelerator to investigate the spatial integrity of the dose distribution. An additional PRESAGE™ was irradiated in a similar fashion; however the total dose was delivered in 3 fractions given over 3 days in order to investigate the affect of fractionation on spatial stability. All dosimeters were scanned using an OCT-OPUS™ laser CT scanner.

**Results:** The PRESAGE™ dosimeter showed a monotonic and easily characterized response with dose. The dose resolution, determined at the 95% confidence level, was found to be comparable to polymer gel formulations. The width of the measured penumbra was 3.98 mm when irradiated in a single fraction and 4.23 mm when irradiated in multiple fractions. Neither dosimeter demonstrated a dose overshoot near the steep dose gradient.

**Conclusions:** This work demonstrated the potential for PRESAGE™ to be used for 3D dosimetry. The dose distributions were found to be spatially stable in high-dose gradient regions. Also, the dosimeter did not exhibit the dose overshoot often observed with polymer gel dosimeters. Further work is required to optimize the dose resolution of the dosimeter.

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