

AbstractID: 13260 Title: Anisotropy function verification of I-125 Brachytherapy source with film dosimetry

**Purpose:** For eye plaque implant with fixed source locations and orientations on the plaque, the variation of anisotropy function may significantly affect the brachy dose distribution following the TG43-U1 algorithm. TLD-based dosimetry for the brachy source anisotropy functions generally involves significant measurement time. In this study, we explore a convenient film-based dosimetry verification of the anisotropy function for eye plaque I-125 source, on a timely manner prior to the brachytherapy treatment planning.

**Method and Materials:** EDR2 films (Kodak) were used to measure the dose distribution of I-125 seeds (Amersham, model 6711). The center and alignment of the cylindrical I-125 seed on the film dose plane were determined based on the anisotropic and symmetrical dose distribution fact. Then along the circles with radius  $R = 1\text{cm}$ ,  $2\text{cm}$ ,  $3\text{cm}$  from the seed center, point dose reading were taken to calculate the anisotropy function table and compared to published data (TG43-U1).

**Results:** For the comparisons between our film measurement data and the published data, the relative differences between the two data were small at radius  $R = 1\text{cm}$  i.e. mean  $\pm$  STD as  $0.9\% \pm 1.2\%$ , while increasing with larger  $R$  – mean  $\pm$ STD as  $7.3\% \pm 6.5\%$  at  $R = 2\text{cm}$ , and  $11.3\% \pm 9.7\%$  at  $R = 3\text{cm}$ . This increasing deviation trend with larger radius was anticipated considering the fact that more angle range will fall below the film lower dose response threshold at larger radius.

**Conclusion:** The preliminary results showed that film dosimetry can give fairly precise estimation of the seed Anisotropy Function Table, as compared to the published data. For dose measurement at different radius from the seed, the film exposure time needs to be adjusted, avoiding the measured dose region exceeding the film dose responsive range.

**Conflict of Interest (only if applicable):** N/A.