

AbstractID: 5452 Title: Interference of I-125 dose distributions by neighboring seeds in dense packing configurations: a radiochromic film study

#### Purpose

To study the interference effect on the I-125 seed dose distributions by neighboring seeds in dense packing configuration using radiochromic EBT film dosimetry.

#### Method and Materials

Radiochromic EBT films (lot #35076) were used to measure the dose distributions around I-125 seed (Implant Sciences model 3500) with neighboring dummy seeds in dense packing configurations in solid water phantom. The types of dummy seeds studied included model 6714 (dummy of 6711), xenated dummies with and without silver marker. Four dummy seeds of the same type were positioned parallel to the active seed, two on the left and two on the right, with center-to-center spacing of 1mm (B), 2mm (C) or 3mm (D). The single seed (A) configuration was also done for comparison. EBT films were located at contact geometry, 2mm or 5 mm distance from the plane of seed/s. After exposure, all the experimental and calibration films were scanned using PeC CCD100 densitometer with 0.2mm spatial resolution. Conversion from optical density to dose was achieved based on the established calibration curve. The dose distributions for configurations B, C and D were compared with those of A. The ratios of B/A, C/A and D/A were also plotted against the radial distance from the active seed center.

#### Results

Compared with configuration A, we found major dose reduction up to 80% in the contact film for configuration B. The extent of dose reduction was progressively less; but remains significant, for configurations C and D, and for 2mm and 5 mm distances.

#### Conclusion

We have observed major dose reduction (up to 80%) around an I-125 seed with neighboring seeds in dense packing configurations. Such interference may be clinically significant for prostate implants and eye plaque treatment when the interseed distances are small.

#### Acknowledgement

Implant Sciences Corporation, model 3500 I-125 seeds.