AbstractID: 9562 Title: Comparative analysis of leakage and transmission radiation measurements with different film detectors

Purpose:
To measure leakage and transmission factors using three different film detectors under the same conditions using a micro-multileaf collimator coupled to a dedicated 6MV linear accelerator for head and neck treatments.

Method and Materials:

Measurements were performed using three different films: GafChromic EBT film, Kodak©-XOMAT-V2 (XV), and Kodak EDR2. Radiographic and Radiochromic films were handled according to protocol TG-69 and TG-55, respectively. Each film was calibrated following the same protocol and each film calibration curve relating dose and film response was acquired. Readout of all films was performed using a commercial flatbed scanner Microtek 9600XL. Images analysis was performed with ImageJ. Leakage and transmission measurements were done under the same conditions at Dmax. Open reference fields were irradiated for each film according to its particular dynamic range.

Results:

The transmission average percent values found were: 0.93% +- 0.09, 0.99% +-0.07, 0.95%+-0.08 and leakage average percent values found were 1.09%+-0.08, 1.14%+-0.09, 1.11%+-0.09 for EBT, XV and EDR2 respectively. When analyzing leakage and transmission profiles an over response in XV measurements is evident. Measurements between EBT and EDR2 present more similar values. Differences between films are more pronounced for transmission than for leakage and also are more pronounced for the peripheral region of the collimator than for the central region.

Conclusion:
Leakage and transmission measurements with film may present variations according to each detector. Radiographic films present an over response for low energy scatter photons, this was particularly present for XV film. This over response is more notorious for transmission than for leakage zones. Variations also are associated with the zone of the collimator. According to previous Monte Carlo simulations this may be due the over response from low energy electrons generated in the collimator.

Conflict of Interest (only if applicable):