

AbstractID: 13837 Title: Dosimetric Analysis of Matching Photon and Electron Fields for the Treatment of Head and Neck Cancers

**Purpose:** To evaluate the current method of treating cancers of the head and neck at our institution. The method consists of using anterior off-cord photon fields to treat the site of the primary tumor, matched with an overlapping posterior electron field.

**Methods and Materials:** Nine patient specific treatment plans, along with their electron cone cutouts, were applied to a 15cm solid water phantom and recalculated to deliver the prescription dose. Each plan consisted of laterally opposed 6MV photon field's incident on the anterior portion of the neck, treating 180 or 200cGy prescribed to the isocenter, and a matching field of 9MeV electrons treating 180 or 200cGy to the 90% isodose line. EDR2 film was placed at depths of 2.0cm, 2.2cm, and 2.5cm from the phantom's left surface. A 6MV photon calibration curve was generated and applied to the films. The plan is delivered with a 3mm overlap of the photon and electron fields. The dose was evaluated using three profiles evenly distributed through the junction. Each profile was normalized to the uniform portion of the photon field, and the maximum dose and the length of tissue receiving 125% of the prescription dose were measured.

**Results:** The average maximum dose was found to be  $148 \pm 6\%$  of the prescribed dose at 2.0cm depth and slightly less at other depths. Tissue irradiated to 125% dose ranged from 0mm to 31mm, with an average of  $11 \pm 6$ mm. Three plans had profiles exceeding 150%, with an average of  $3 \pm 1$  mm receiving this high dose.

**Conclusion:** At our institution we intentionally overlap photon and electron fields by 3mm at the match-line to ensure there are no cold regions. The maximum dose can exceed 150% of the prescribed dose, with nearly the length of the match-line experiencing dose exceeding the prescription.