

AbstractID: 6858 Title: Verification of Treatment Planning Dose Calculations for Small Electron Fields and Small Anatomical Structures

The accuracy of treatment planning algorithms for small electron fields and small anatomical areas has not been thoroughly investigated. In this work, we aim to verify the accuracy of ADAC v5.2g's 3D pencil beam algorithm for a 9 MeV electron beam with a 2x3 cm field to treat small anatomical structures. We placed GAFChromic films (model HD810) at depths of 0.3, 0.5, 0.7 and 1.0 cm in both a full solid water phantom and a solid water phantom representation of a finger. The films were irradiated using a 2x3 cm oval cutout. All of the films were read with both a spot densitometer (Nuclear Associates model 37-443), and a Lumisys 150 scanning densitometer with RIT software. A calibration curve was established using a 6 MV photon beam. We used this curve to determine the dose distributions of the films irradiated in the phantoms. The central axis dose values, depth dose curves, and several isodose plots from the film measurements and ADAC's calculations were compared. The mean dose difference between the film data and ADAC's computations was less than 5%. Furthermore, we compared the dose distributions in both phantoms with each other. We conclude that ADAC's algorithm for calculating dose in small, electron fields and for small anatomical structures has a clinically acceptable accuracy at depths up to 1 cm. The dose comparison at deeper depths will also be discussed.