

Conformal therapy can be delivered using shaped bolus, which varies the penetration of the electrons across the incident beam so that the 90% isodose surface conforms to the distal surface of the PTV. Previous use of this modality has shown that the irregular proximal surface of the bolus causes the dose heterogeneity in the PTV to increase from 10%, typical of a flat-water surface, to approximately 20%. The present work evaluates the ability to restore dose homogeneity by varying the incident electron intensity. Nine patient examples were planned using electron conformal therapy with bolus. A subsequent plan was developed in which the electron intensity was varied across the beam such that the maximum dose along any ray originating from the virtual source was 100%. Subsequently, the shape of the bolus was readjusted to again conform the 90% isodose surface to the distal surface of the PTV. Software to accomplish this has been implemented into an in-house treatment planning system. The resulting dose distributions and DVH's were compared with non-intensity modulated bolus plans. In one patient example, the dose variation for a PTV in the region of the right buccal-mucosa was reduced from 90%-120% to 90%-106%. In all cases, the incident electron intensity varied approximately 80%-120%. Results showed that intensity modulated electron beams can significantly improve the dose homogeneity in the PTV for patients treated with electron conformal therapy using shaped bolus. The intensity modulation should be easily achieved using an electron MLC or possibly a x-ray MLC.