

AbstractID: 6524 Title: Inter and Intra-Fractional PTV Margins for Non-Sedated Intracranial Pediatric Patients

Purpose: To investigate the proper PTV margin for non-sedated intracranial pediatric patients based on inter and intra-fractional motion using a reflector array radiocamera system.

Method and Materials: The patients were immobilized and simulated with a custom thermoplastic facemask and bite block. Attached to the bite block was a frame containing an array of fiducial reflectors. The treatment planning CT was registered with the fiducial frame software. During the first day of treatment, films were taken to ensure proper setup and to record the baseline position of the array. The position of the array was continuously tracked by infrared cameras and their deviations from baseline recorded at a frequency of 10 Hz. Based on the method described by van Herk *et al*, an inter-fractional, intra-fractional, and combined margin were calculated.

Results: Twenty one patients were treated in 2006 with an average of 25.7 +/- 6.9 treatment fractions for which motion data was acquired. The average age was 15.7 +/- 4.3 years. There was an average of 4.2 +/- 1.4 couch positions. With half of the inter-fractional data analyzed, the preliminary inter-fractional margins are 2.16 mm PA, 2.29 mm LR, and 2.28 SI. Based on one quarter of the intra-fractional data, the preliminary intra-fractional margins are 0.58 mm PA, 0.37 mm LR, and 0.62 SI. The preliminary combined margins are 2.24 mm PA, 2.32 mm LR, and 2.37 mm SI.

Conclusions: Based on the preliminary data, a PTV margin of 2.5 mm is feasible for intracranial pediatric patients treated with radiocamera monitoring. If the patient is re-positioned after each couch movement, a 0.75 mm PTV margin for intra-fractional motion is potentially achievable. The ability to re-position to the sub millimeter level requires further investigation.