AbstractID: 3889 Title: Feasibility of Dynamic Feathering for Field Junctions

Purpose: Patients are not perfectly immobilized and there is always some movement during treatments. Field junctions are typically shifted several times during the course of treatment to ensure that the effects of imperfect junctions and patient motion are minimized. We have evaluated a dynamic feathering scheme that reduces daily hot and cold spots at field junctions, and may eliminate the need for junction shifting in the future.

Method and Materials: Five craniospinal patients were planned using both conventional and dynamic feathering techniques. Using conventional feathering, the inferior border of the cranial fields were moved after each set of 5 fractions by increasing the inferior borders by 1 cm and closing the spine field by 1 cm. In the second plan we simulated an automated feathering technique in which the cranial fields opened dynamically and the spine field closed at the same rate, thus using one set of beams for the entire treatment. Patient motion of up to 5 mm was simulated and the dose distributions were analyzed. Film verification was performed to verify dose distributions.

Results: Comparison between the conventional and dynamic feathering plans show a slight advantage to automatic feathering. However, in conventional cases where 5 mm overlap is simulated, hotspots of 51%-63% were observed, but these were reduced to 33% using dynamic plans. Besides, only 44% of the prescribed dose covered the spinal cord at the junction for the conventional plan while 89% for the dynamic plan if 5 mm of gap was simulated.

Conclusion: Dynamic feathering yields better dose homogeneity and reduces the effects of overlapping or over-gapping field matches on a daily basis. This technique requires only a single plan, which reduces the workload on the physicists, dosimetrists, and therapists. In our continuation of this work we are investigating automated dynamic feathering on our linac.