

AbstractID: 10490 Title: Is Smaller MLC Width Really Better for Stereotactic Body Radiotherapy (SBRT) Treatment Planning?

**Purpose:** To investigate whether micro-MLCs can provide superior treatment plans for SBRT. Present a comprehensive treatment planning comparison between the most recent MLC systems available today. How do plans with micro-MLCs compare to those with standard 10 mm MLCs for the target volumes encountered in SBRT?

**Methods and Materials:** A number of patients (lung, spine, brain, liver) treated with SBRT in our clinic, were planned successively for NovalisTX (2.5mm), Synergy-BM(4mm), Artiste(5mm), Varian(5mm), Synergy(10mm) and Oncor(10mm) within the same planning system. Both 3DCRT and IMRT were utilized with same planning parameters for all MLC systems, respectively. Target sizes varied from 4.6-25.8cc planned with 6-11 non-coplanar fields. The target coverage was evaluated via a conformity index (CI) and the normal tissue sparing was evaluated from the dose to a "Ring" structure created around the target. In addition, comparisons based on dose distributions and DVHs for all plans were performed.

**Results:** Unexpectedly, we noticed no remarkable difference in tumor coverage ( $CI=1.18-2.22$  independent of tumor size) between the smallest MLC width and the standard 10mm width plans, for a variety of tumor volumes and planning techniques (3DCRT vs IMRT). In addition the dose drop-off in the "Ring", representing a sensitive volume next to the target, varied the same way for all MLC plans. Comparisons of dose distributions between MLC systems for either 3DCRT or IMRT lung cases show no distinct differences that will underline the benefit of small width MLCs on tumor coverage or sensitive structure sparing, at least for the tumor sizes planned.

**Conclusions:** Our study is the first to include the majority of today's MLC systems in a comprehensive way and has shown no apparent indication that smaller MLCs can lead to optimal plans, if multi-field techniques (IMRT or 3D) and, for the dimensions of the tumor volumes typically treated with SBRT.