

AbstractID: 12876 Title: The Impact of Linac Static Jaw Setting on Dose Output from small SRS/SRT fields using an add-on Micro-Multileaf Collimator

Purpose: In small field SRS/SRT using an add-on MMLC, the default jaw setting from the BrainLAB treatment planning is larger than the furthest end of MMLC-defined segment. The purpose of this study is to evaluate how the dose output changes with varying static jaw setting. **Methods and Material:** The BrainLAB micro-multileaf collimator (BrainLAB M3) was mounted on a Varian 2100EX linear Accelerator. Output factors were measured for six different MMLC and jaw field sizes ($12 \times 12 \text{mm}^2 \sim 100 \times 100 \text{mm}^2$) and compared with different MMLC and fixed jaw setting ($100 \times 100 \text{mm}^2$). A PTW 31016 PinPoint ionization chamber (0.016cc) was employed to measure the field sizes less than $42 \times 42 \text{mm}$ and a PTW 30013 farmer chamber (0.6cc) was used to measure field sizes larger than $42 \times 42 \text{mm}$. The measurement depth was 5 cm using solid water (Gammex). Source to surface distance was 100cm and 300 monitor units were used for each measurement. The measurements were repeated twice for each condition. **Results:** For 6 MV photon beams, compared to the output from the same static jaw settings as MMLC defined field size ($12 \times 12 \text{mm}^2 \sim 100 \times 100 \text{mm}^2$), the dose percentage difference varies from 10.2% down to the 1.2 % for MMLC defined field size from $12 \times 12 \text{mm}^2$ to $80 \times 80 \text{mm}^2$ with the fixed static jaw setting ($100 \times 100 \text{mm}^2$). For 18 MV photon beams, the dose percentage difference varies from 9.1% to 1.4%. **Conclusion:** The static jaw setting should be manually adjusted as close to the furthest end of MMLC segment to reduce summated leakages through the MMLC and reduce unintentional over-irradiation to target and organs at risk. **Future work:** More retrospective studies will be conducted to include various tumor sites in order to quantitize dose deviations from beam limiting jaw settings.