

AbstractID: 13023 Title: A dosimetric evaluation of cone beam CT imaging in an anthropomorphic phantom

Purpose: There is a trend of increasing use of Cone Beam CT (CBCT) in radiation therapy as a method of tumor localization. Various papers have published methods for estimating this dose. However, this imaging dose is currently not accounted for in a patient's treatment, but will soon be able to be optimized within the treatment plan itself through modeling of the CBCT. Through verification of a CBCT model on an anthropomorphic phantom, this dose can begin to be accounted for clinically. **Method and Materials:** TLDs were placed at different locations and depths in an anthropomorphic phantom to map the dose delivered in a full CBCT scan as well as a half CBCT scan. Multiple readings were performed for each set up to confirm the repeatability of the TLD measurements. Analysis of these dose distributions were performed and compared to various reports of CBCT dose as well as directly compared with a Treatment Planning System model of CBCT Dose. **Results:** The full CBCT scan TLD results show doses reaching a maximum of 5.92 +/- 0.21 cGy in soft tissue regions of a pelvis. Additionally, by reducing the scanning angle to half of the original scan, the highest doses were reduced by over 90% while providing adequate image information for the CBCT to localize the tumor volume. The results will be shown in comparison with the Treatment Planning Model of CBCT dose as well as compared with other published values. **Conclusion:** The TLD results show a need to better account for CBCT dose in a patient's treatment plan. Through further modeling of each CBCT parameter for each type of scan an accurate model can be put in place for each patient receiving radiation therapy. This will give the physicist and physician the ability to adjust treatment plans to account for imaging dose.