

AbstractID: 10185 Title: The effect of set-up errors on the final target dose distribution in step-and-shoot IMRT plans compared to helical tomotherapy plans.

**Purpose:** To compare the effect of small setup errors on the final target dose distribution when using step and shoot IMRT and helical tomotherapy.

**Method and Materials:** For three head and neck patients, two plans were created: one for delivery on a Tomotherapy system and the second one, using the Pinnacle treatment planning system, for delivery as step-and-shoot IMRT. After the patient was set up on the Tomotherapy couch, a megavoltage CT was acquired. This CT was imported to the adaptive planning module of Tomotherapy and the dose was recalculated assuming the patient was not repositioned prior to treatment. The shifts that would have been required to correctly position the patient were used to alter the treatment isocenter in the pinnacle plan and the dose was recalculated. This process was repeated for seven fractions in each patient and the doses from all fractions were summed up to create a PTV DVH for each case.

**Results:** For all three cases, the final delivered DVH showed deviations from the planned DVH. It was apparent that the discrepancy between the planned and delivered DVHs was much larger for the tomotherapy plans than the step-and-shoot plans.

**Conclusion:** The results show that extra care should be exhibited in properly positioning the patient when treating with tomotherapy.