AbstractID: 4786 Title: Treatment Planning to Achieve Skin Sparing with Tomotherapy

Purpose: To determine the extent to which skin dose can be reduced by defining the skin as a Region at Risk (RAR) structure to an IMRT treatment plan of a head and neck patient being delivered with a tomotherapy unit.

Method and Materials: The head and neck section of a RANDO phantom was imaged in a CT scanner and two treatment plans were created for it simulating the treatment of a head and neck cancer. Both plans were identical, with the exception that for one an attempt was made to spare the skin as much as possible without compromising the tumor coverage or increasing dose to other RARs. This was accomplished by defining the skin as a RAR, for the purpose of pan optimization. In order to confirm the doses predicted by the treatment planning system the RANDO phantom was treated as per the plans, with metal oxide-silicon semiconductor field effect transistors (MOSFETs) placed on its surface to determine the dose.

Results: The DVHs created by the treatment planning system showed a substantial reduction to skin dose as a result of introducing a skin RAR. The dose coverage of the PTV and other RARs were comparable. The change in skin dose was confirmed by the readings from the MOSFET detectors which indicated that the skin dose per treatment could be reduced from ~180 cGy to ~150 cGy with this process.

Conclusion: The dose to the skin for head and neck treatments delivered with IMRT is known to be greater than that of conventional radiation therapy. We propose a method of delivering IMRT on a tomotherapy unit with substantial skin sparing. In order to control the skin dose to the patient, treatment plans must be made treating it as an organ at risk.