

AbstractID: 5586 Title: Evaluation of Radiation Therapy Treatment Plans through Conventional IMRT and Inversely Planned Intensity Modulated ARC Therapy (IMAT), A Clinical Comparison.

**Purpose:** The goals of this study were to evaluate the difference in target dose uniformity and dose distribution through mean DVH and OAR analysis for a given PTV. Dosimetric analysis were also extended to compare sparing of normal tissue and critical structures between two treatment planning techniques.

**Methods and Material:** The ADAC Pinnacle inverse planning system was used to generate conventional IMRT inverse plans for a few head & neck patients. These plans were then compared with treatment plans generated using the IMAT software package manufactured by 3D line USA Medical System Corp. Using axial CT for the same patients, targets, and numerous critical structures were delineated and “best” plans were developed in each environment. In IMAT planning, continuous and dynamically shaped arcs were planned through aperture optimization and leaf sequencing. The dose delivery was accomplished through a specially designed MICRO DMLC with 3 mm leaf width and double focus focalization.

**Results:** For IMRT plans, 5 or 7 co-planar arcs were used and treatment plans were generally optimized using a pre-defined set of dose objectives, penalties, min and max dose and percentage of volume required. The IMAT plans were designed with typically two co-planar arcs of 180 degrees around the patient with similar dosimetry objective parameters. The percentage coverage for V95 in targets 1&2 were  $94.9 \pm 2.8$  and  $95.1 \pm 2.1$  for IMRT and  $98.4 \pm 2.6$  &  $98.1 \pm 2.8$  for IMAT respectively. Sparing of critical structures was generally better in IMAT, a detail of which will be presented at the meeting.

**Conclusions:** In the IMAT technique with direct aperture optimization, dose distribution within the target was found to be better by 8%. Superior critical structure sparing was achieved as compared with similar plan using IMRT technique. The IMAT technique may be considered as an alternative to tomotherapy.