

AbstractID: 8746 Title: Influence of Pitch and Jaw Width on Helical Tomotherapy Head and Neck Treatment Planning

Purpose: To investigate the influence of pitch and jaw width selection on helical tomotherapy treatment plans for head and neck. **Methods and Materials:** Helical tomotherapy plans using a combination of pitch and jaw width settings were developed for three patients previously treated for head and neck cancer. Three jaw widths (5, 2.5 and 1 cm) and six pitches (0.86, 0.7, 0.43, 0.34, 0.287 and 0.215) were used with a (maximum) modulation factor setting of 4. The 18 plans per patient were generated using an identical optimization procedure (e.g., number of iterations, objective weights and penalties, etc.), based on recommendations from TomoTherapy. The plans were compared using isodose plots, dose volume histograms, dose homogeneity indices, conformity indices, radiobiological models, and treatment times. **Results:** Smaller pitches and jaw widths showed better target dose homogeneity and sparing of normal tissue, as expected. The conformity index had a maximum for pitches between 0.287 and 0.43. The tumor control probabilities were greater than 99% for the 2.5- and 1-cm jaw widths for all pitches except 0.86. The treatment time increased inversely proportional to the jaw width. **Conclusions:** Our study indicates that the smaller jaw widths (2.5 and 1 cm) and pitches near the range of 0.3-0.4 produce better plans for helical tomotherapy head and neck treatment. However, because of the large increase in treatment time with only slight improvement in sparing of the critical structures for the 1-cm jaw width, the 2.5-cm jaw width, currently used in our clinic, remains our preference.

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