

Intensity Modulated Radiation Therapy (IMRT) delivered via an arc based, tomotherapy style of approach (e.g. Nomos Mimic) has recently begun to find clinical acceptance for delivering highly conformal, fractionated radiotherapy treatments. Previously, a few users have attempted to use the system on stereotactic radio-surgical targets employing only one couch angle. Intuition suggests that steeper 3 dimensional dose gradients, and increased sparing of normal brain tissue might be achievable when multiple, non-parallel plane IMRT arcs are utilized. As originally designed, the only currently available, commercial system for delivering such treatments has not fully supported the accurate delivery of such treatments due to couch indexation problems when multiple couch angles are utilized. We have developed a method to enable the accurate delivery of multiple, non-parallel plane IMRT/IMRS arcs. This methodology has been evaluated in conjunction with the commercial system's prototype post collimation device which was designed to further restrict the physical dimensions of the existing pencil beams.

The couch indexation system developed here has been shown to provide exceptionally accurate target alignment *at multiple couch angles*, and has yielded significant improvements in the volume of normal brain spared. Lastly, the combination of non-parallel plane arc delivery capability with the reduction in pencil beam dimension afforded by the commercial system's post collimation device resulted in significant improvements in 3 dimensional target conformality. Patient dose distributions, analysis, and hardware involved will be described. The couch indexation technology developed here has been licensed for distribution by Nomos.