Sequential tomotherapy employs rotational radiation delivery through a slit beam. During irradiation, the patient is stationary while the fan beam rotates. The patient is translated by an appropriate distance after each slice has been treated, and the process is repeated. The effect of various translation distances was investigated for uniform, non intensity modulated treatments. The translation distance should be a value such that the superimposition of adjacent dose distributions produces a uniform dose profile at the isocenter, i.e. there are minimal junctioning artifacts. It has been shown that sequential tomotherapy, such as that used by the NOMOS Peacock system, is quite susceptible to slight positioning errors of the patient between slices along the isocenter. Furthermore, a translation distance that minimizes artifacts along the isocenter may produce appreciable junctioning artifacts off-axis.

Helical tomotherapy also employs rotational radiation delivery through a slit beam. However, unlike sequential irradiation, the patient continuously translates across the slit beam during irradiation. Therefore, there should be no junctioning artifacts along the isocenter. The pitch is defined as the translation distance divided by the width of the slit beam. Therefore, a pitch of one results in the patient traveling exactly the width of the slit beam after a complete gantry rotation. The effect of various pitch values on dose homogeneity was investigated. It was determined that there are pitch values that produce excellent dose uniformity. The pitch selected does not affect the output to the isocenter, nor the treatment time.