

Purpose:Due to the weight of the accelerator head and the additional weight of the kV x-ray tube along with its flat panel detector, flex compensation is required to match the kV cone beam CT image center to the MV isocenter. However, the flex compensation has not been compared with and without an add-on micro multi-leaf collimator. The purpose of this study is to evaluate the impact of the add-on micro multi-leaf collimator on the flex compensation or flex map calculation.

Methods:Before attaching an add-on micro multi-leaf collimator to Elekta Synergy, MV radiation center was determined by a ball bearing and the flex map was obtained. Subsequently, a micro multi-leaf collimator was attached to the Synergy head and Winston-Lutz test was performed to locate the most reasonable MV isocenter. Then a ball bearing was positioned at the MV isocenter., and another flex map was obtained and compared to the previously obtained one acquired before attaching the micro multi-leaf collimator.

Results:MV isocenter discrepancy with and without the micro multi-leaf collimator was 0.5 mm in GT direction which is less than our tolerance limit. The flex map discrepancy with and without the micro multi-leaf collimator was not significant, either.

Conclusions:We could not detect significant flex map discrepancy with and without the micro multi-leaf collimator. However, flex map measurement needs to be repeated after fully unifying the method for determining the MV isocenter between the two configurations.