

A comparison of the accuracy of automated versus manual patient setup adjustment in radiotherapy

A study was performed to compare the accuracy of automated versus manual treatment couch adjustment in radiotherapy. Following initial patient setup, a portal image was obtained and aligned to a reference image (DRR or simulation film). The alignment transformation was used to correct patient position. Under the automated repositioning protocol, the transformation was sent electronically into the room through an in-house computer controlled radiotherapy system and the table was automatically adjusted. Under the manual protocol, the transformation was relayed to the therapists in predetermined increments of 3, 5, 8, 10 mm, etc. A second portal image was obtained after the adjustment. The image of the adjusted patient was aligned to the reference image. The residual error vector for the automated procedure was defined by comparison of the image in the adjusted position to the reference image. The residual error for the manual procedure was calculated by the difference between the vector error of the patient in the adjusted position and the difference between the corrective action given to the therapists and the transformation given from the original alignment. Automated adjustment was more reproducible ($\sigma = 0.73$ mm) than manual setup ($\sigma = 1.59$ mm). The maximum residual setup error using the automated adjustment was 2.91 mm smaller than that from manual adjustment. The largest adjustment made was 31.6 mm.

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