AbstractID: 1252 Title: Patient Positioning Method Based On X-ray Image Correlation For Particle-Beam Radiation Therapy

High accuracy of patient positioning is of prime importance for particle-beam radiation therapy. A manual patient positioning is time-consuming and tedious. On the other hand, a simple template image matching method may lead to insufficient accuracy. We have proposed an automatic patient positioning method based on accurate edge detection and normalized image correlation. X-ray TV images (a front view and a side view) of a patient are acquired both at a planning time and at a treatment time. Subsequently, a bone edge contour is produced from each of the X-ray TV images using Canny edge method that can detect thin and consecutive edge contours. Then a template mask is defined on the bone edge image generated from the X-ray image at the planning time, and normalized image correlation indices are calculated between the two edge images at the planning time and at the treatment time, thereby providing patient repositioning data. Preliminary experiment has been performed using several sets of head, lung, and hip data. We have confirmed that the resulting displacement data have an accuracy of one pixel with an exception for hip side-view test data. We have also observed that the correlation index gives a very sharp global maximum, suggesting that automatic patient positioning is feasible by the proposed method.