

AbstractID: 6704 Title: Prediction of patient treatment (couch) coordinate based on Treatment Planning CT image

Purpose: To reduce the probability of treating the wrong site by predicting patient treatment coordinates.

Method and Materials: Palliative radiotherapy often involves multiple body sites and the time to treatment from simulation is often limited due to its emergent nature. In the era of CT simulation, marking on the patient's skin is often limited to reference points rather than the corresponding isocenter of the treatment sites. In our experience, this has led to a high probability of wrong treatment site misadministrations due to human errors. Since the advent of indexed immobilization, it should be possible to predict the treatment couch coordinates based on the CT image acquired during simulation. By calculating the relative positions of the same indexing location both on CT and treatment couch, we have established a simple translational relationship between the two.

Results: We were able to predict the couch coordinates for treatment within 0.4cm(\pm 6) using simple calculations. Lateral and AP coordinates were relatively easy to calculate but longitudinal coordinates were difficult since many CT simulators use relative indexing in this direction. Longitudinal coordinates can be calculated by two means; either by establishing a reference location between the indexing bars and the CT-coordinates, or by using embedded V shaped marker wires in the ct couch. The predicted results were tested using a simple Styrofoam phantom with markers and also a retrospective analysis of patient data. By automating this calculation through software we hope to make it efficient and minimize the chance of introducing human error.

Conclusions: The patient treatment coordinate could be calculated and this could potentially improve patient safety. We recommend that CT simulators use absolute rather than relative couch coordinates to facilitate calculation of the longitudinal coordinate.