

AbstractID: 6528 Title: A CT Daily Quality Assurance On-Couch Procedure and Phantom in Radiation Oncology

Purpose: To design a simple yet comprehensive daily quality assurance (QA) program and phantom for CT Simulators in Radiation Oncology so that positioning laser and imaging QA can be performed on the flat couch using only one tool. This has been done to avoid removing the flat couch to perform CT QA and to simplify the daily QA procedure.

Method and Materials: A new daily QA phantom was constructed by attaching to a commercially available CT QA phantom 3 adjustable legs and two metric scales in both vertical and horizontal directions. The two metric scales are used for laser QA, while the phantom body is used for CT imaging QA. Since the couch is scanned with the phantom, its effect on image quality was evaluated. The phantom is positioned on the couch such that couch effects are minimized. Four different GE CT scanners and 3 different Philips scanners were used to evaluate this phantom. Daily testing includes high and low contrast resolution, scale accuracy, CT number accuracy and uniformity.

Results: The proposed program has been piloted in our institution. Inclusion of the couch produces different yet reproducible effects on image quality. The effects appear to be couch and scanner specific and are incorporated in the acceptability criteria for each CT scanner. Based on our data thus far, the presence of the couch does not change image resolution visually. It appears, however, that the couch causes changes in the uniformity of water's CT number. The effects are greatest in the section of the phantom closest to the couch. We thus limit our image quality evaluation to the central and 12 O'clock positions of the phantom.

Conclusions: The proposed program and phantom has allowed us to implement a more comprehensive QA program while decreasing the level of effort by the simulation therapists.