

AbstractID: 7410 Title: Quality Assurance (QA) procedure for kV-kV setup correction verification using autodetection of radiopaque markers

**Purpose:** Developed QA procedure for checking 1) the accuracy of the automatic detection of implemented markers 2) the accuracy of the detected shifts using the radiomarker application software provided on the On-Board Imaging System (OBI). This QA procedure will assure that marker match software is reliable and that the positional difference detected by the software can be reliably transferred to couch motion.

**Method and materials:** Anthropomorphic phantom was used for this procedure. Three bbs were placed into the phantom defining 3D spatial locations. An axial CT scan of the phantom was acquired with slice thickness of 2 mm. A plan with AP and lat KV fields with attached DRRs was created in Eclipse treatment planning where only the radiopaque markers are visible. The procedure starts with setting up the phantom as marked in the CT and acquires KV-KV AP and lat images. The automated marker matching process of the OBI identifies the location of the markers on the reference sim-CT image and their locations on the KV radiographs. Once detected, the 3D sim-CT reference markers will be projected onto the orthogonal 2D images. The system will provide automatic marker positioning where the reference markers position themselves over the markers in the KV radiographs and necessary couch positions will be displayed. The shifts obtained will be applied to remotely move the couch. To test the accuracy of the detected shifts, a 1-cm shift was applied to the phantom in all 3 translational directions. Same above procedure was followed to detect the shifts. All data were saved

**Result:** This procedure is simple and easy to implement. The accuracy the procedure can detect is better than 1 mm.

**Conclusion:**

The suggested QA procedure is clinically robust and reliable. We implemented this procedure before starting using the system for patient set up verification.