# AbstractID: 9643 Title: Quality assurance and an assessment of using Cone-Beam CT with extra-cranial frameless-stereotactic radiotherapy.

**Purpose:** Standard quality assurance of Varian's trilogy frameless-stereotactic radiotherapy(SRT) relies on the a match between the system's optical isocenter and room lasers. It does not match the static kV isocenter of the On-Board-Imaging(OBI) or the dynamic kV isocenter of the CBCT, nor does it QA the MV isocenter. Our purpose was to establish a quality assurance(QA) procedure for all isocenters including the MV isocenter for frameless-SRT. **Materials and Methods:**An acrylic phantom with dimensions of 15x15x15 $cm^3$ was constructed. The phantom included a removable slab that contains two machined holes designed to hold a stainless-steel ball-bearing(BB). One machined hole is at the center of the cube, and another is off to one side to established phantom orientation during scanning. The BB is removed during CBCT imaging to minimize artifacts and is replaced for kV and MV images. The Trilogy frameless-SRT array is mounted atop of the phantom and it is positioned at the LINAC isocenter. Repeated CB-3D, 2D-OBI datasets were acquired to determine the system's ability to detect and correct for known table shifts. All shifts observed and recovered by the SRT system were tabulated. Each recovered shift was verified by a Winston-Lutz(WL) test. The differences between known shift, OBI, CBCT, SRT and the WL test were recorded and tabulated. The couch's ability to recover to a known initial position was also tested and tracked by SRT camera system. **Results and Conclusions**:Initial results showed the couch had a precision of<1mm. The CBCT, SRT-array and OBI correctly predicted the movement within 0.13$\pm$0.35mm, 0.14$\pm$0.24 mm and 0.21$\pm$0.38mm, respectively. The mean agreement between the kV, MV and SRT-optical isocenters was 0.4 mm$\pm$0.6 mm via WL. Initial results show that this QA of four isocenters has the potential to allow the use of CBCT and OBI during extra-cranial frameless-SRT as an additional modality during treatment.