

AbstractID: 8310 Title: Multiple Imaging Modality Isocentricity (MIMI) Test

Purpose: Develop a simple and fast means for cross-testing the isocentricity of four systems, cone-beam-CT (CBCT), on-board imaging (OBI), optical guidance, and in-room lasers. We have employed the Standard Imaging MIMI phantom for this test along with a Varian iX Linac with CBCT, OBI, and Varian's optical guidance system. **Method and Materials:** We placed a passive fiducial localizer with 4 infrared light reflecting markers on top of the MIMI phantom, which has 5 rods that run through it in various directions. A CT scan of the phantom was acquired and a simple treatment plan was created which was then sent to the optical guidance system. To enable localization of the phantom using optical guidance the phantom was registered in that system. The calibration of the optical guidance system with respect to in-room lasers was then verified and the phantom was aligned to isocenter adjusting 3 translational and 3 rotational degrees of freedom to within 0.3 mm root mean square error and less than 0.3 degrees rotational offset in each rotational degree of freedom. After aligning the phantom to the isocenter localization predicted by the optical guidance system orthogonal MV OBI images were acquired and a 2D/2D match was performed. Lastly, a CBCT of the phantom was acquired and a manual match was performed. **Results:** The 4 methods agreed with each other to within 1 mm or less in any one direction. **Conclusions:** This is a simple and effective means for QA of optical guidance, CBCT, and OBI which can be performed either weekly or monthly. This is not a complete test of the localization accuracy of any of these systems but could be part of the arsenal of quick and routine QA checks to ensure coincidence between the different isocenter locations predicted by each of these localization systems.