

AbstractID: 8603 Title: Static and dynamic tracking accuracy of a novel radioactive tracking technology for target localization and real time tracking in radiation therapy

**Purpose:** In radiation therapy there is a need to accurately know the location of the target in real time. A novel radioactive tracking technology is being developed to answer this need. The technology consists of a radioactive non-migrating implanted fiducial marker and a linac mounted tracking device. This study measured the static and dynamic accuracy of the new tracking technology in a clinical radiation therapy environment. **Method and Materials:** The tracking device was installed on an Elekta Synergy® linac gantry. The radioactive marker was located in a tissue equivalent phantom. Actual marker location was measured using a Microscribe G2 coordinate measuring machine (CMM) arm (certified spatial accuracy of 0.38 mm). The marker was attached to the tip of the CMM arm and its location was measured simultaneously by the CMM and the tracking system. Static accuracy was measured at multiple locations covering a 12cm cube centered at the linac iso-center. The measurements were repeated at multiple gantry angles. Dynamic accuracy was measured with the marker located inside a breathing phantom. **Results:** The mean localization error for the static source was less than 0.7mm throughout the tested region at all measured gantry angles. The mean real time tracking error for the dynamic source within the breathing phantom was less than 1mm. **Conclusion:** The novel radioactive tracking technology has the potential to be useful in accurate target localization and real time monitoring for radiation therapy. **Conflict of Interest:** Research sponsored by Navotek Medical Ltd.