

AbstractID: 11415 Title: Feasibility of a frame-less mask-less bite-block-less stereotactic radiosurgery treatment with real-time surface imaging

Purpose: Due to the high doses and dose conformity, Stereotactic Radiosurgery (SRS) requires high precision delivery, currently achieved by high-precision localization and by immobilization of the patient. However, immobilization can lead to patient fatigue and discomfort due to the long duration of treatments. In addition, bite-block localization has limited use in multiple isocenter treatments and provides decreased accuracy on edentulous patients. We explore the feasibility of SRS treatments with minimal immobilization and by continuous monitoring of patient motion. **Methods and Materials:** A foam head cast has been created for 4 volunteers. The expanding foam conforms to the patient's head as it expands, leaving the face of the patient uncovered. Motion monitoring is performed with a real-time surface imaging system that tracks a region of interest and displays and records real-time deltas. The selected region of interest covers the forehead, eyes and nose. Motion during a 20 minute interval is recorded and the maximum motion is calculated. Afterward, the treatment couch is moved to simulate couch kicks during SRS procedures and brought back to the original position. The position of the patient before and after the kick has been analyzed to calculate subject's motion relative to the mold. **Results:** The maximum motion during the 20 minute interval with respect to the initial position was 0.6mm, 0.8mm, 0.5mm, and 1.3mm for each of the 4 patients respectively. Motion due to couch kicks was less than 0.2mm in all four volunteers. **Conclusion:** The technique under investigation, a combination of a head cast and surface imaging monitoring, shows great potential for clinical use in SRS treatments. Motion inside the head mold is minimal and can be tracked by real-time surface imaging. Accuracy of the surface imaging motion tracking during SRS is currently under investigation.

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