

Automated Repositioning for Body Stereotactic Radiosurgery

A new system utilizing reflective markers placed on the patient and visible by IR and video cameras mounted in the treatment room has been developed by BrainLab, Inc. for automated repositioning for extracranial stereotactic radiosurgery (Body-SRS). The reflective markers are strategically placed during CT simulation on the patient immobilized on a carbon fiber table insert with vacuum-lock styrofoam. The markers are localized by the planning system to identify the treatment isocenter. The system is relatively easy to install and may utilize up to 7 markers for improved accuracy agreement. Calibration procedures have been developed to insure that the cameras accurately identify the treatment isocenter ($<1\text{mm}$) using jigs designed for spatial and isocenter measurements. Patient repositioning in the treatment room is performed using an automated computer controlled pendant, which moves the couch into position with input from the infra-red cameras in the room. A live image may be captured from the video camera which can confirm the correct treatment position, and perform comparisons and image subtractions with subsequent treatments. Modifications of the system in development include a custom belt for shallow breathing, and techniques to insure accurate relocalization of the markers. An IRB approved protocol has been established for fractionated Body-SRS at our institution which utilizes the system clinically. The study tests delivery of three fractions of Body-SRS using the micro-MLC for conformal treatments. This presentation will discuss the problems and approaches to immobilization, repositioning, and dosimetry that will be undertaken in order to provide accurate and safe treatments.