AbstractID: 1991 Title: Patient Breathing Coaching Using The Real Position Management System

In this study we investigate patient respiratory coaching using the Real Time Position Management System (RPM) as respiration coaching tool. Recently, at Massachusetts General Hospital (MGH) we proposed a tumor motion synchronization technique called Synchronized Moving Aperture Radiation Therapy (SMART) to account for tumor motion during radiotherapy. The two key requirements for being able to successfully use SMART in clinical practice are the precise and fast detection of tumor position during the simulation/treatment and the good regularity of the tumor motion pattern. To fulfill the first requirement, an Integrated Radiotherapy Imaging System (IRIS) is currently being developed at MGH. This study deals with the second requirement of maintaining a regular breathing pattern by using RPM system as a respiratory coaching tool. The patients were given simultaneous audio and visual prompting, with free breathing as a control. The audio prompting coached patients to "breathe in" or "breathe out" at periodic intervals based on the patient specific breathing parameters. At the same time, for visual prompting, patients were shown a real-time trace of their abdominal wall motion due to respiration and were asked to maintain constant amplitude of motion. Free breathing generated breathing traces with variable amplitude and frequency. RPM audio-video coaching resulted in a breathing pattern with reproducible frequency and amplitude. In conclusion the respiratory coaching with RPM improves the regularity of the patient's breathing pattern, essential for the implementation of the SMART technique.