AbstractID: 6714 Title: A phantom study to assess the feasibility of using ExacTrac for patient setup for fractionated Stereotactic Radiotherapy (SRT) technique

Purpose: To investigate the feasibility of using ExacTrac for setup error correction for patients treated with fractionated stereotactic (SRT) technique with the BrainLab relocatable mask system.

Method and Materials: A phantom study designed to evaluate setup accuracy of the ExacTrac system was performed. An actual treatment process, from making immobilization mask to treatment setup, was simulated. A 3.8 mm diameter lead bb was inserted in a Rando head phantom to represent a mid-brain target. The phantom was CT scanned with 1 mm slice thickness and 1 mm slice index. A treatment plan was created using BrainScan, with an isocenter placed at the center of the bb. The phantom was setup for treatment with the following two methods:

1. Phantom setup with the BrainLab localizer box.
2. Phantom setup with ExacTrac.

Electronic portal images of a treatment field defined by M3 MLC (12x12 mm^2) were taken at various gantry and couch angles. Setup accuracies for the above two methods were calculated from the positions of the bb relative to field center. A Lutz test was performed prior to portal image acquisitions to correct for gantry flex.

Results: Setup with ExacTrac showed consistently better accuracy compared with the Localizer box setup. Specifically, in Sup-Inf direction mean deviations of the center relative to the center of the field were 0.3mm (standard deviation 0.1mm) with ExacTrac setup and 0.4mm (0.5mm) for localizer box. For Left-Right direction deviations were -0.2 (0.3) and 0.4 (0.5); Ant-Post 0.2 (0.2) and 0.5 (0.2) mm, for ExacTrac and localizer box, respectively.

Conclusions: The BrainLab ExacTrac system has a great potential for setup verification and setup- error correction for the fractionated SRT technique with the BrainLab relocatable mask system.