

EGBE 693 Research Seminar for Biomedical Engineering II

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Date: Jan 22, 2013 Time: 10 a.m. – 11 a.m.

Department of Biomedical Engineering (Room 6373)

Mahidol University

“MR Image Overlay Guidance : System Evaluation for Preclinical Use”



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Abstract : MA clinical augmented reality guidance system was developed for MRI-guided musculoskeletal interventions Magnetic Resonance Image Overlay System (MR-IOS). The purpose of this study was to assess MRI compatibility, system accuracy, technical efficacy, and operator performance of the MR-IOS.

The impact of the MR-IOS on the MR environment was assessed by measuring image quality with signal-to-noise ratio (SNR) and signal intensity uniformity with the system in various on/off states. The system accuracy was assessed with an in-room preclinical experiment by performing 62 needle insertions on a spine phantom by an expert operator measuring entry, depth, angle, and target errors. Technical efficacy and operator performance were tested in laboratory by running an experiment with 40 novice operators (20 using freehand technique versus 20 MR-IOS-guided) with each operator inserting 10 needles into a geometric phantom. Technical efficacy was measured by comparing the success rates of needle insertions between the two operator groups. Operator performance was assessed by comparing total procedure times, total needle path distance, presumed tissue damage, and speed of individual insertions between the two operator groups.

The MR-IOS is compatible within a clinical MR imaging environment, accurate for needle placement, technically efficacious, and improves operator performance over the unassisted insertion technique. The MR-IOS was found to be suitable for further testing in a clinical setting.

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