Utility of Hand-on Scanning for Assimilating MRI concepts (www.learnmri.org)

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Purpose: To determine the effectiveness of hands-on MRI scanner exercises in teaching graduate students, medical students, residents, and fellows basic MRI concepts.

Methods: Hands on MRI scanner exercises were developed to guide an inexperienced operator through the tasks of 1) MRI safety and patient screening, 2) optimizing resolution, SNR and CNR on a phantom, 3) optimizing T1 and T2 weighting in the volunteer brain, 4) creating, identifying and eliminating various artifacts, 5) adapting scanning parameters to match varying anatomy in the volunteer knee and abdomen and 6) implementing various approaches to minimizing respiratory motion effects. Motivated MRI students, residents and fellows were surveyed before and after completing each workbook exercise to determine the impact on their level of MRI knowledge and ability. Survey questions were directed to the teaching points of each exercise. Wilcoxon signed rank test was used to determine the significance of changes in scores following exercises.

Results: For every subject the survey score increased following scanner exercises. No safety lapses occurred during the study. The mean survey score of 11 volunteers before hands-on MRI scanner exercises was 19.36 and this increased to 37.45 following the exercises (p= 0.002). Additional free form survey comments indicated workbook exercises were more enjoyable than just reading MRI books.

Discussion and Conclusion: Learning MRI is challenging. These data from 11 graduate students, medical students, residents, and fellows suggest that learning MRI by operating the MRI scanner instead of book reading can be an effective approach. This approach may be preferred when book reading has not been effective. Exercises are available at www.learnmri.org.

References: (1) McRobbie et al. (2003) MRI from Picture to Proton. Cambridge, UK: Cambridge University Press, chapters 3 & 6. (2) Schild (1999) MRI Made Easy (..well almost). Wayne, NJ: Berlex Laboratories, Inc. (3) Shellock (2006) Reference Manual for Magnetic Resonance Safety, Implants, and Devices: 2006 Edition. Los Angles, CA: Biomedical Research Publishing Group and Shellock R & D Services, Inc, section I (4) Signa Horizon LX Reference Manual: A Training in Partnership Program (2003) Milwaukee, Wisconsin: General Electric Co.

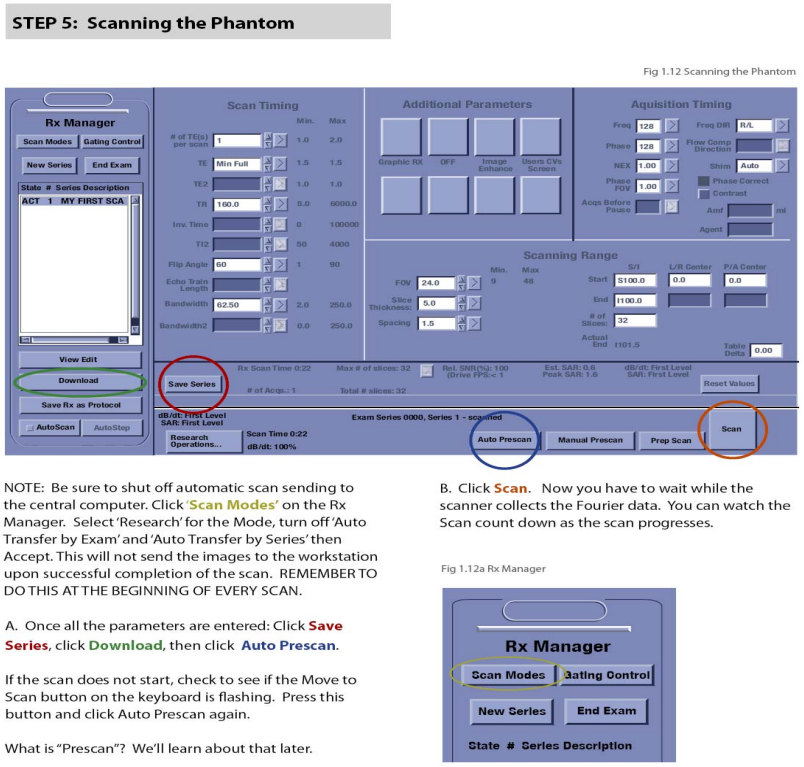

Fig 1 Sample screenshot of the MRI scanner exercise

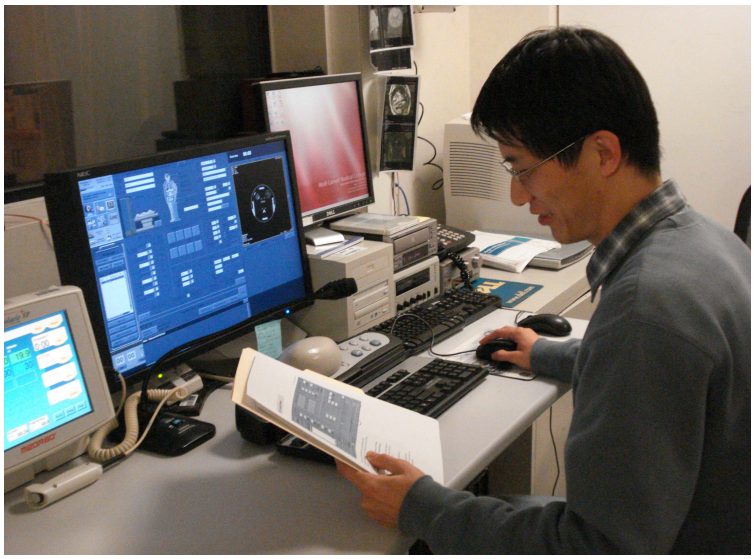

Fig 2 Volunteer trying out the exercise