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Evaluation of Field Homogeneity of MR RF Coils by Combination of XFDTD and MATLAB Code Simulation

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Purpose : The purpose of this study is to investigate the magnetic field homogeneity of a MR RF coil using the XFDTD simulation program and to compare with the simple MATLAB code simulation result. Materials and Methods : XFDTD program is a three-dimensional full wave electromagnetic solver based on the Finite Difference Time Domain method. And MATLAB is a tool which is used around the various engineering fields. Hence, the magnetic fields of the two birdcage resonators (diameter -13 and 15cm, 12 legs, length - 22cm, copper material and 1cm width tape) were simulated by XFDTD and MATLAB. The final results were compared each other. Results : The images of our birdcage resonators' magnetic fields were obtained from the XFDTD and MATLAB program. It can be found that the final results of XFDTD and MATLAB program were similar. Discussions : The present results show that the magnetic field shape of XFDTD was similar to them of MATLAB simulation. While MATLAB simulation was able to be vexatious due to the complex RF coil geometry, XFDTD was independent on it as well as can measure the resonance frequency and SAR. Thus, we expect that the application of XFDTD could be increased in the MR RF coil simulation. Acknowledgment : This study was supported by a grant of the Seoul R&BD Program, the Korea Health 21 R&D Project, Ministry of Health & Welfare, Republic of Korea. (02-PJ3-PG6-EV07-0002) and a grant of the 2005 Nuclear R&D Plan Program, Ministry of Science & Technology, Korea.

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