

Dual Contrast EPI by Use of a Key Hole Technique

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목적 : In the gradient echo EPI the conventional $T2^*$ -weighted image is poor in signal as well as distorted by the field inhomogeneity. By acquiring a proton density image in addition to the $T2^*$ -weighted image at the same scan, the fMRI processing can be improved.

대상 및 방법 : The central region of the k space is acquired twice at different time points after the RF pulse while acquiring the other regions once as described in Fig. 1. In Fig. 1 the segment numbers are chronological. Then, we can get two images of different contrast by interleaving the central region in the k space as done in the dual contrast FSE.

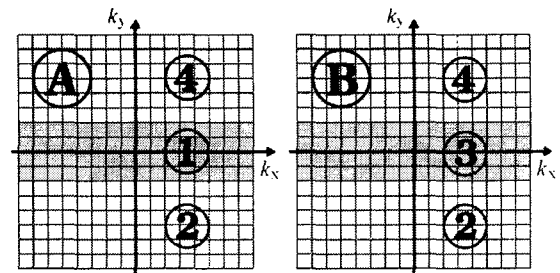
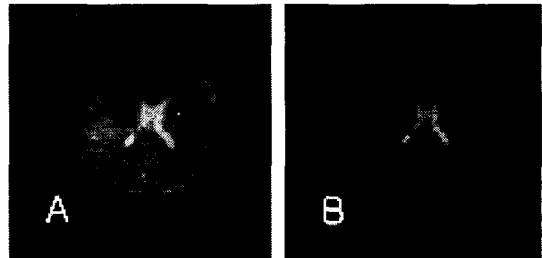


Fig.1. Combinations of phase-encoding segments for two different contrasts: (A) the proton density and (B) the $T2^*$ -weighted.

결과 : This concept was experimentally proven for human brain on a KAIST 3.0T equipped with Varian spectrometer as seen in Fig. 2: (A) proton density and (B) $T2^*$ -weighted images.



결론 : Both the proton and $T2^*$ -weighted images can be acquired at the same time in the gradient echo EPI sequence. The proton density image suffers less from the low SNR and the susceptibility artifacts than the $T2^*$ -weighted image. Therefore, the proton density image will find applications for the motion correction and co-registration in fMRI processing.

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