

A Recovery Method of Signal Loss Due to Susceptibility in Echo Planar Imaging of Magnetic Resonance Imaging

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Technology description

Background The echo planar imaging (EPI) is most popular pulse sequence for the functional magnetic resonance imaging (fMRI) because it can acquire the multi-slice images fast. In particular, a gradient echo EPI is mostly used in fMRI due to its sensitivity to the blood oxygenation level. However, this sequence is sensitive to other susceptibility such as sinus in the head. The susceptibility effect from the sinus causes two major imaging artifacts: (i) geometric distortion and (ii) signal void at the surrounding tissues. **Technology** This technique reduces the signal void by modifying the conventional gradient EPI pulse sequence. This is accomplished by extending the phase-encoding range outside the range required for the given spatial resolution matrix so that the shifted phase encoded signal can be included in the acquired range of the phase encoding.

Advantages

- 1) 100% of signal loss in the tissue near susceptibility regions can be recovered.
 - 2) increased signal-to-noise ratio.
 - 3) new pulse sequence can be easily implemented into the exiting EPI pulse.
 - 4) image reconstruction can be done in a real-time mode.
 - 5) applies generally without limitation.
 - 6) may be combined with known z-shimming technique (SLOW and degrades signal-to-noise ratio).
- Stage of Development** The new pulse sequence has been confirmed by experimental demonstration. Commencing work on a synergistic slice selection methodology for total elimination of susceptibility effect.

Institution

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