

Clinical Use of Ultrashort TE Pulse Sequences in MRI

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BACKGROUND

The essence of the invention is the use of ultrashort echo times (UTE) to enable the effective magnetic resonance imaging of difficult to image tissues and structures. Due to their material properties, MR signals from certain body tissues and structures decay very rapidly and thus produce very little detectable signal for image reconstruction. These tissues include cortical bone, tendons, ligaments, menisci and periosteum, certain matter of the brain, liver, and spine. Current commercial MR systems are limited in imaging these tissues using conventional pulse echo times (TE's).

TECHNOLOGY DESCRIPTION

The current invention incorporates the use of half radio frequency excitations with radial mapping from the center of K-space, yielding UTE pulse sequences with echo times 10 to 20 times shorter than commercially available clinical systems. These ultrashort echo times allow high imaging of the traditionally difficult tissues and structures mentioned above, as well as other difficult fast decay tissues. The technique is software driven and enables short echo times despite the traditional resonant "ring-down" of MR coils between transmit and receive modes; uses multi slice acquisitions; incorporates a subtraction algorithm (eliminates high imaging tissues that would otherwise overshadow the low signal tissues imaged); long inversion nulling pulses and multiple echoes.

The subject invention has raised a lot of interest from third parties following a review of clinical results from 120 patients. The method is seen as enabling high resolution imaging via MRI of tissues not previously suited for MR style scans. This should add a good deal of utility to current MR systems without significant hardware changes.

STATE OF DEVELOPMENT

This invention is patent pending with worldwide rights available.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	7,474,097	01/06/2009	2004-056

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OTHER INFORMATION

CATEGORIZED AS

- **Imaging**
- Medical
- **Research Tools**
- Other

RELATED CASES

2004-056-0