

Accelerated Cartesian MR Fingerprinting using multi-shot EPI

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Introduction/Purpose: The main purpose of this study is to develop an accelerated Cartesian MR Fingerprinting (MRF) scheme using multi-shot EPI for rapid, simultaneous quantification of T1 and T2 parameters. The proposed Cartesian MRF scheme is compared with an interleaved Spiral-MRF acquisition using the same sequence for the first time while also maintaining the same acquisition parameters like flip angle (FA), repetition time (TR) and number of repetitions.

Methods: The scanning was performed on a 3T GE MR750w scanner with a 12 channel receive only head RF coil (GE Medical Systems, Milwaukee, WI). The study was approved by the local ethics committee. 16-shot EPI-MRF and Spiral-MRF datasets were acquired from a healthy volunteer using a linear ramp FA variation from 1° to 70° for 500 repetitions [1]. The TR was 16 ms and the scan time was 8 s for both acquisitions.

Results and Conclusion: The T1 and T2 maps generated by EPI-MRF and Spiral-MRF were visually comparable and agree with each other for the range of T1 and T2 values present in a healthy volunteer human brain (see Fig. 1). The estimated T1 and T2 values of white matter (WM) and gray matter (GM) were also in agreement when compared to an established Spiral-MRF technique [2] and previously reported literature values [3]. The proposed Cartesian EPI-MRF technique could serve as an alternative to conventional Spiral-MRF.

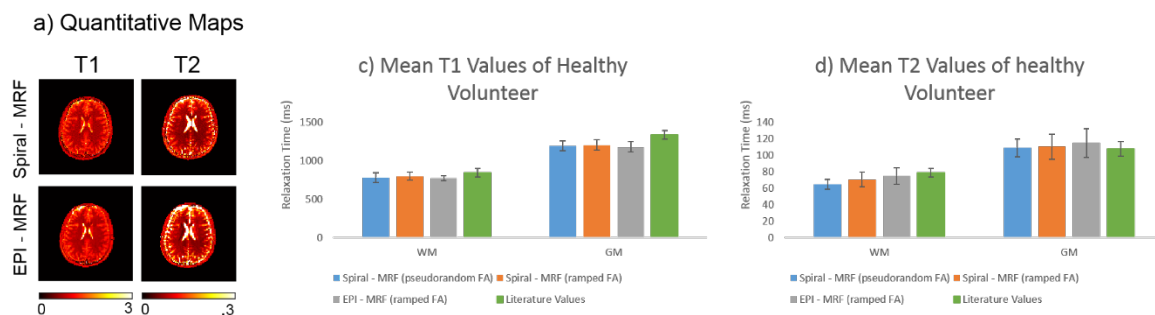


Figure 1: (a) Comparison of T1 and T2 maps generated by Spiral-MRF and EPI-MRF. (b), (c) Mean T1 and T2 values of GM and WM respectively for EPI-MRF, Spiral-MRF and previously reported literature values.

References: [1] Gomez et al., Proc. ISMRM, #1167 (2017). [2] Jiang et al., MRM 71, p1621 (2015). [3] Wansapura et al., JMRI 9, p531 (1999).