BQ-MINDED: Introducing Quantitative MRI in routine clinical practice

Magnetic resonance imaging (MRI) is a medical imaging technique that generates excellent soft-tissue contrast and allows for investigating both anatomy and function of tissues noninvasively. Unfortunately, signal intensities in conventional MRI images are expressed in relative units that are dependent on hardware and software.[1] While that does not hinder visual inspection of anatomy, it severely complicates quantitative comparisons of intensities within a scan, between successive scans, and between subjects.

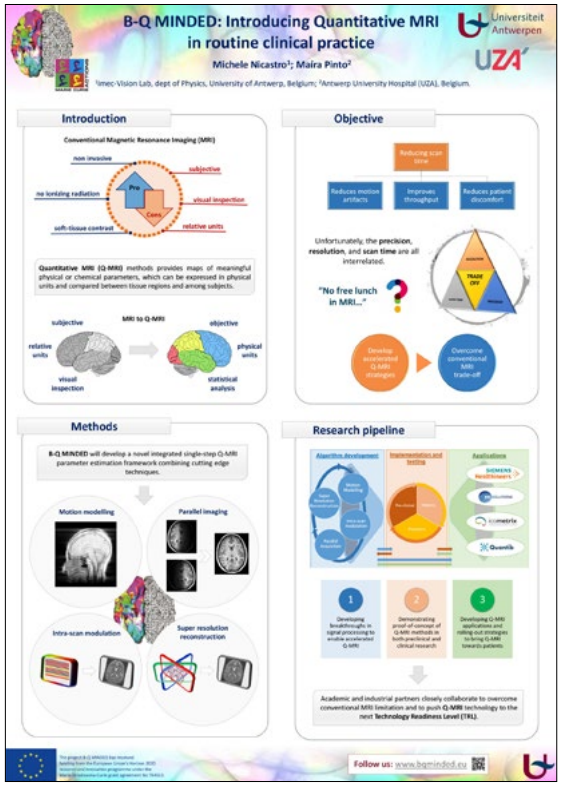
In contrast, quantitative MRI (Q-MRI) methods exist[2, 3] that provide maps of meaningful physical (relaxometry, diffusion…) or chemical parameters, which can be expressed in physical units and compared between tissue regions and among subjects. Q-MRI has shown great promise in a broad spectrum of neurodegenerative diseases such as Multiple Sclerosis, Alzheimer's disease or Traumatic Brain Injuries. However, current Q-MRI methods are unsuitable for use in routine clinical practice, primarily due to the associated long scan time needed to achieve high resolution scans.

The BQ-MINDED project addresses this problem by developing accelerated Q-MRI strategies able to overcome the traditional MRI trade-off between imaging time, spatial resolution and accuracy of quantitative parameter maps. To achieve this goal, academic and industrial partners closely collaborate to build a novel integrated single-step Q-MRI parameter estimation framework combining cutting edge techniques from the fields of motion modelling, intra-scan modulation, parallel acquisition and super resolution reconstruction.

1 *Deoni, Magn Reson Imaging. 2010;21:101-113.*

2 *Cheng et al., J Magn Reson Imaging. 2012;36:805–824.*

3 *Cercignani et al., Quantitative MRI of the Brain: Principles of Physical Measurement, Second edition. 2018; CRC Press.*



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