

DETECTION OF MULTIPLE SCLEROSIS LESIONS WITH HIGH FIELD MRI EXPERIMENTAL SYSTEM PHILIPS 7T

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Multiple sclerosis (MS) is an autoimmune condition in which the immune system attacks the central nervous system, leading to demyelization. The aim of this work was the optimization of MR imaging techniques and analysis tools for a new longitudinal studies of patients with Multiple Sclerosis. The research was carried out the 7T Philips human scanner located at the Sir Peter Mansfield Magnetic Resonance Centre in Nottingham (SPMMRC, United Kingdom).

Due to relative changes in relaxivity of both contrast agents, blood, and surrounding tissue at 7T compared to lower field strengths, initial attempts to obtain pre- and post- Gd-DTPA contrast scans have not been ideal. For improving required images, T1 weighted MR sequences was optimized to maximize contrast enhancement of relevant MS lesions following injections of standard gadolinium based agent.

The MRI techniques, especially T₂*-weighted sequence, are useful tools for visualisation of both MS lesions and blood vessels together on the same image. The pilot study at ultra high field (7T Philips) in the SPMMRC showed that most but not all white matter MS lesions in the brain appear to be centred on a small vein which confirms neuropathology studies. Knowledge about lesion-vessel relationships could be clinically relevant because it could be helpful for better understanding MS disease in particular if the central vessel plays a role in lesion formation or whether lesion-vessel relationships have arisen by chance. Due to both the high spatial resolution and enhancement of veins at 7T, image analysis techniques are required to define the distance between the centre of a lesion and an intersecting vein, as already defined by a neurologist.

References:

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