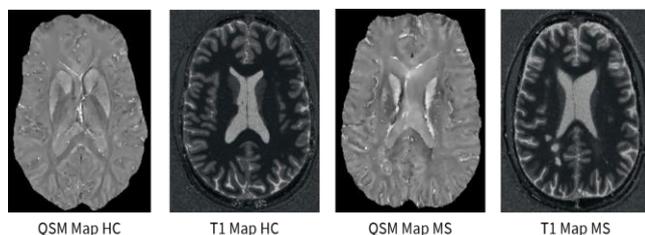
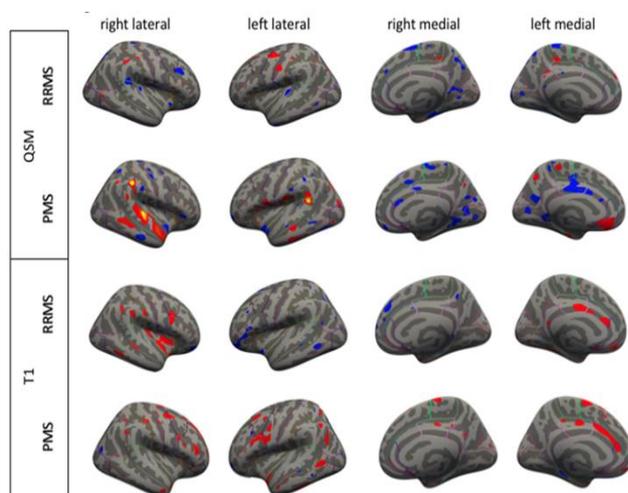


# 3T Surface-Based Quantitative Susceptibility Mapping and T1 Relaxometry in Relapse-Remitting and Progressive Multiple Sclerosis Patients



**Figure 1:** Exemplary QSM and T1 maps for one HC and one MS patient. (Picture: N. Eichner/ThInk)



**Figure 2:** T1 and QSM Significance Maps of PMS and RRMS (Picture: N. Eichner/ThInk).

**Master Thesis by Nicholas Eichner at Translational Imaging in Neurology.**

Multiple sclerosis (MS) is an incurable inflammatory disease of the central nervous system (CNS) characterized by multifocal and diffuse inflammation and degeneration in both cortical grey and white matter, affecting roughly 2.3 million people worldwide [1-3]. The experienced symptoms are due to the area(s) of inflammation and scarring (sclerosis) in the different parts of the CNS. There is currently limited knowledge about the extent and distribution of diffuse cortical damage across different MS subtypes.

This study was performed to investigate whether patients with relapsing remitting MS and progressive MS show different QSM/T1 relaxometry characteristics of the cortical surface than a group of healthy controls and to help assess and understand the cortical pathology in MS patients.

Quantitative susceptibility mapping (QSM) provides maps sensitive to iron deposition and demyelination, two major standard pathologic features in MS.

T1 relaxometry provides an assessment of tissue microstructural integrity and has shown to be highly sensitive to diffuse white matter pathology in MS patients.

The results showed that QSM and T1 maps acquired at 3T MRI are sensitive to cortical damage in MS patients. Additionally, both methods revealed more extensive areas of alterations in progressive than in relapsing-remitting MS.

Overall, this study using QSM and T1 relaxometry surface mapping by 3T MRI shows patterns compatible with cortical demyelination and possibly iron accumulation, which predominate in progressive MS to relapsing remitting MS patients.

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