

**Publication****Analysis of impairment related functional architecture in MS patients during performance of different attention tasks****JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)****ID** 57059**Author(s)** Penner, Iris-Katharina; Rausch, Martin; Kappos, Ludwig; Opwis, Klaus; Radü, Ernst Wilhelm**Author(s) at UniBasel** [Penner, Iris-Katharina](#) ; [Kappos, Ludwig](#) ; [Opwis, Klaus](#) ; [Radü, Ernst-Wilhelm](#) ;**Year** 2003**Title** Analysis of impairment related functional architecture in MS patients during performance of different attention tasks**Journal** Journal of neurology**Volume** 250**Number** 4**Pages / Article-Number** 461-72**Keywords** functional magnetic resonance imaging multiple, sclerosis attention, cognition, functional reorganisation, MRI

More than 50 % of patients with multiple sclerosis (MS) suffer from cognitive deficits. Attention is one of the most frequently affected cognitive functions. It has been shown that MS patients suffer from a specific but not necessarily from a generalized decrease in performance and that different severity grades of impaired attentional processing can be distinguished. Little is known about patterns of brain activation in MS patients with different grades of attentional deficits. The objective was to examine if different severity grades in attentional impairment are reflected by altered patterns of brain activation in specific attention tasks. In the present study cerebral activation induced by three attention tasks of different complexity was assessed in 14 MS patients and seven healthy controls by functional MRI (fMRI). Based on their performance on the tests recorded off-line with a computerized test battery and during the fMRI investigation, patients were classified as mildly and severely impaired. MS patients with mild impairment showed increased and additional activation of brain areas which were in part not activated in normal subjects. Those were located mainly in the frontal cortex and posterior parietal cortex. This effect decreased with increasing task complexity and was strongest for the alertness task. In MS patients with severe impairment no additional activation was found in prefrontal structures and activation in the pre-motor cortex was not significantly different from controls. These findings suggest that compensation in MS patients is in part achieved by functional integration of frontal and parietal association areas. The extent of compensation seems to depend on the brain's capacity to access additional brain structures. Exhaustion of this capacity may finally lead to severe cognitive impairment.

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