

TACTILE-ASSOCIATED RECRUITMENT OF CERVICAL CORD IS ALTERED IN MS PATIENTS WITH FATIGUE

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Introduction.

In multiple sclerosis (MS), fatigue is a rather common and troublesome symptom, which can notably compromise daily-life activities and be associated with impaired quality of life of these patients (1). Previous studies have shown that cervical cord functional MRI (fMRI) is able to detect tactile-associated functional changes occurring in patients with MS (2). Aim of this study was to investigate the pattern of tactile-associated cervical cord fMRI activity in relapsing-remitting (RR) MS patients with fatigue.

Methods.

Cervical cord fMRI was acquired from 20 healthy controls, 31 RRMS patients without fatigue (wf-RRMS), and 20 RRMS patients with fatigue (f-RRMS). Subjects were scanned when performing a sensory task, consisting of a tactile stimulation of the palm of the right (R) hand. Using a General Linear Model (3), statistical maps were generated for all subjects ($p=0.05$). The mean intensity signal change was computed for all activated voxels. The presence of activity in the R and left (L), anterior and posterior cervical cord at different levels was assessed. A random effect logistic regression model, with the frequency of fMRI activity as dependent variable and the subject as grouping factor, was used to assess the within-group difference in the occurrence of fMRI activity in R vs. L, and anterior vs. posterior cord. A Chi-square test was used to compare the occurrence of activity in all cord regions among the three groups.

Results.

Average cervical cord mean intensity change was 2.80% (standard deviation [SD]=0.8) in controls, 3.22% (SD=1.1) in wf-RRMS, and 2.93% (SD=0.6) in f-RRMS ($p=0.02$) (Figure). Wf-RRMS had higher cord activity than controls ($p=0.02$). Regional analysis showed that: a) controls had higher activity in the R than L cervical cord ($p=0.004$), and in the posterior than anterior cord ($p=0.022$), b) wf-RRMS had higher activity frequency in the posterior than anterior cord ($p=0.005$), but not in L vs. R, and c) in f-RRMS, no significant difference was found neither between R and L nor between anterior and posterior cord. Average activity frequencies in L and R, posterior and anterior cord in the three study groups are reported in the Table. The Chi-square test showed higher occurrence of activity in wf-RRMS in L anterior C6 ($p=0.004$) and R posterior C6/C7 ($p=0.01$) than controls, while f-RRMS had higher occurrence of cord activity in R anterior C7/C8 ($p=0.05$) and in L anterior C5/C6 ($p=0.014$) than wf-RRMS.

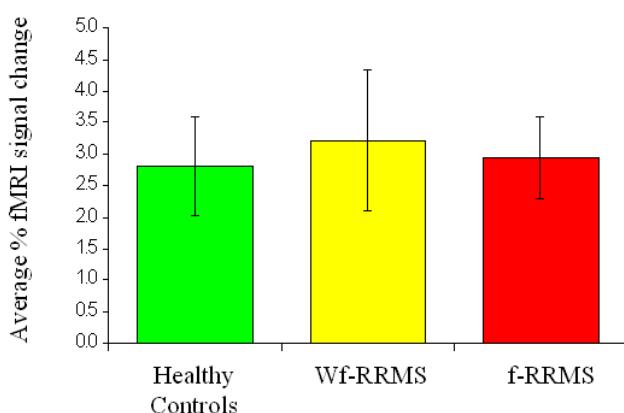


Figure Average cord intensity signal change during tactile stimulation in the three study groups

	L	R	p	A	P	p
Healthy Controls	23%	33%	0.004	24%	32%	0.022
RRMS with Fatigue	36%	40%	n.s.	35%	40%	n.s.
RRMS without fatigue	30%	33%	n.s.	27%	36%	0.005

Table Average fMRI activity frequencies in the left (L), right (R), anterior (A) and posterior (P) cervical cord, averaged over all cord levels, in the three study groups.

Conclusions.

An abnormal pattern of tactile-associated cervical cord activations occurs in RRMS patients. Fatigue is associated with reduction of cervical cord recruitment and loss of its lateralization.

References.

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3. Stroman P. MRM 2006;56:452-456.