# BACKGROUND

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### INTRACORTICAL INHIBITION ALTERATION DURING THE REMISSION PHASE OF MULTIPLE SCLEROSIS: **RELATION TO WHITE AND GREY MATTER DAMAGE** Nantes JC\*, Zhong J, Whatley B, & Koski L Neurology and Neurosurgery, McGill University McGill University Health Centre

## RESULTS



FIGURE 1. Examples of cSP traces are shown from a control (A) and from a RRMS patient participating during a period of clinical remission (B). Compared to controls, RRMS participants had significantly longer cSP durations (C). From the sICI protocol, an example of a motor-evoked potential (MEP) induced by a single supra-threshold TMS-pulse (D) and an inhibited MEP (due to a sub-threshold TMS pulse preceding the upra-threshold TMS pulse) (E) are shown. Groups did not diffe in sla (F).



**FIGURE 2.** Compared to controls, RRMS participants had lower volumes of white matter (t(27) = -2.75, p < .01) and grey matter (t(27) = -2.07, p < .05) (A). Compared to white matter MTR of controls, RRMS participants had significantly lower MTR within both lesioned (t(24) = -5.48, p < .0001) and normal appearing white matter (t(24) = -1.96, p > .05). Cortical MTR within the primary motor cortex (M1) hand area was lower among RRMS participants compared to controls (t(24) = -1.99, p < .05), although total brain grey matter MTR did not differ (t(24) = 0.87, p > .05) **(B)**.



FIGURE 3. Lower white matter volume predicted longer cSP duration (A). The relationship between grey matter volume and cSP duration did not reach significance (B). Z-scores compare individual RRMS participants to the mean ± SD of the control group.

## INTRACORTICAL INHIBITION OUTCOMES **C** 120 t(27) = 2.35 p < .05 σ RRMS t(27) = 0.15 p > .05



			CLINICAL OUTCOME				
		MSFC	9HPT (dominant)	<b>9HPT</b> (non-dominant)	T25FW	PASAT	T N
	Controls	0.62 (0.27)	18.2 (1.9)	17.85 (1.6)	3.6 (0.6)	46.9 (8.9)	1)
	RRMS	0.27 (0.53)*	21.1 (3.8)**	20.5 (3.8)*	4.4 (1.1)*	42.8 (11.2)	S

- Low white matter volume is related to cSP prolongation during RRMS clinical remission phases.
- Preliminary evidence that damage within the primary motor cortex hand region lowers intracortical inhibition.



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Multiple Sclerosis Functional Composite MSFC) and raw scores on each MSFC subscale. \* *p* < .01 \*\**p* < .05

## DISCUSSION

### cSP DURATION IS RELATED TO BRAIN DAMAGE

RRMS participants (in clinical remission) have cSP prolongation, indicating that activity at intracortical  $GABA_{R}$  receptors may be abnormally high.

### Time

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