PRELIMINARY MAGNETOENCEPHALOGRAPHY (MEG) FINDINGS OF REDUCED SOMATOSENSORY GATING IN DYSTONIC CHILDREN WITH BASAL GANGLIA STROKE

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Introduction

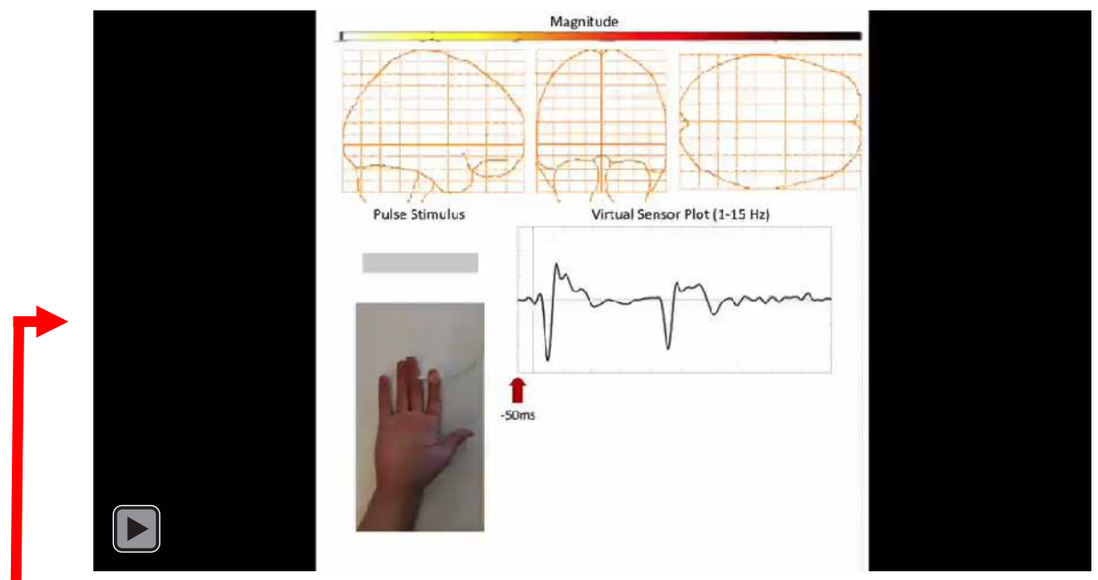
Magnetoencephalography (MEG) typical task-based study set-up. Participants can be in a seated or supine positions

Children recover from the damages of stroke three times better than adults, but are one hundred times more likely to have maladaptive recovery. Dystonia is the most common post-stroke disorder in children and can involve disabling and painful muscle activations and co-contractions, as well as diminished sensation. It has recently been found that post-stroke therapies involving repetitive sensory stimulation to the hand can improve sensation, suggesting that sensory processing is altered in post-stroke dystonia[1,2]. We examined evoked brain responses to a paired-pulse tactile stimulus in children with upper limb hemi-dystonia, with the hypothesis that attenuated responses to the second pulse (sensory "gating")[3], thought to reflect intracortical inhibition of sensory input, would be altered in their affected hand[4].

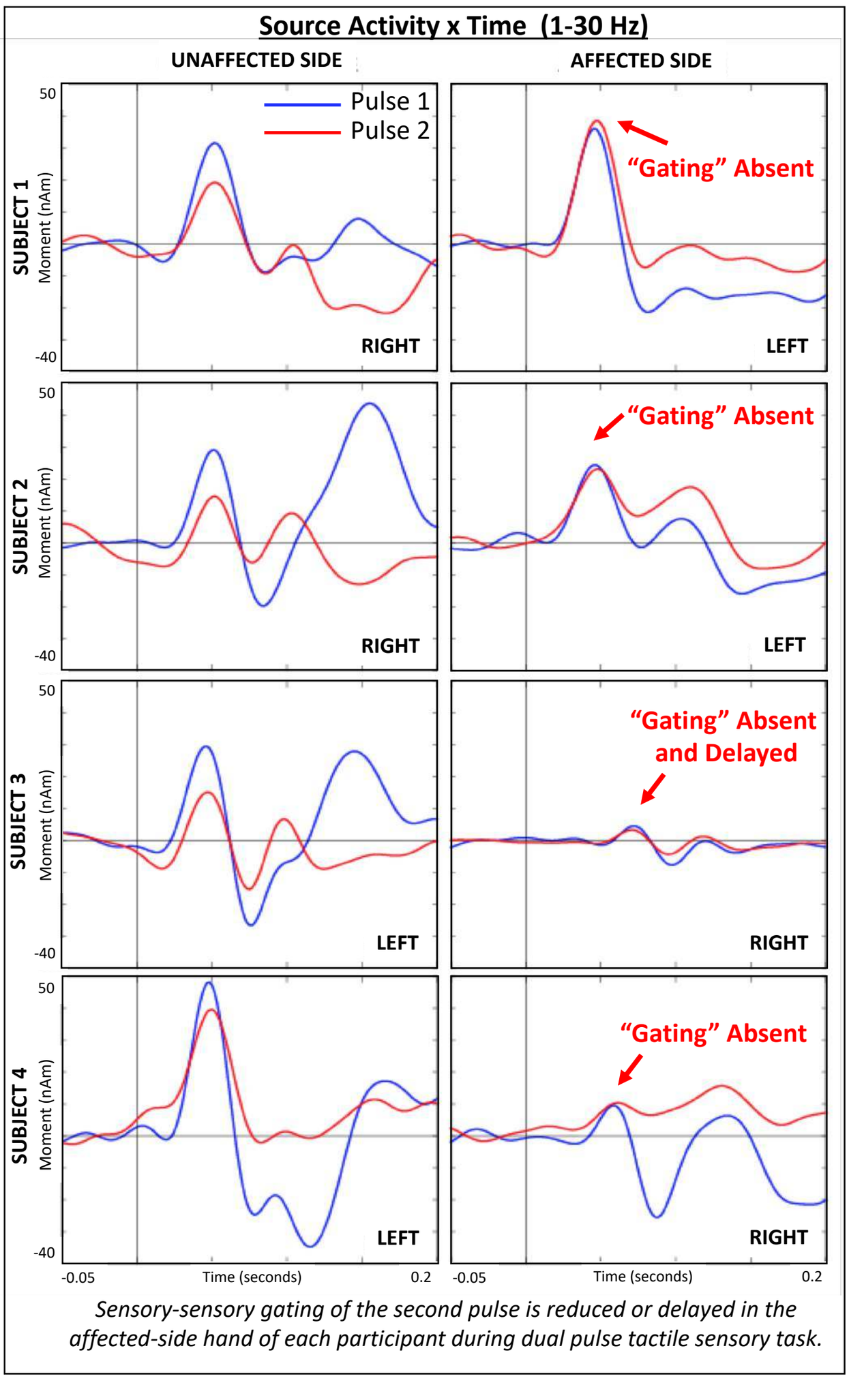
Methods

Magnetoencephalography (MEG) was collected at 600 samples/s in four children (2 females, mean age 15.25 ± 1.71 years old) with unilateral basal ganglia stroke and dystonic features (2 left-side affected). Children laid supine in the MEG with hands at their sides while they watched a movie. A 30 psi pneumatic-driven stimulus tapped the index finger of both hands in an interleaved manner (ISI 4s per hand, with 350ms between dual-pulses) for 8-10 minutes. Event-related sensory response peaks were localized for each averaged pulse within the sensorimotor cortex at around 40ms latency.

Example dual-pulse result in the left hand of a healthy adult.
Note second pulse is attenuated (i.e., "gating" present).



Results



Sensory-sensory gating of the second pulse is reduced or delayed in the affected-side hand of each participant during dual pulse tactile sensory task.

Conclusions

Preliminary results show reduced peak amplitudes (gating) to the second pulse in addition to delayed response latencies for the affected hand in all 4 children. This provides initial evidence for altered excitability in the somatosensory system in dystonic children.

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Supported by funding from the Canadian Institutes of Health Research (CIHR).