EFFECT OF DIFFERENT INTERPULSE INTERVALS OF PAIRED ASSOCIATIVE STIMULATION ON CORTICAL EXCITABILITY IN THE CONTRALESIONAL HEMISPHERE

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University of Minnesota Physical Therapy Program Funds

UMN IRB reviewed and approved this research study.

BACKGROUND AND PURPOSE: Paired associative stimulation (PAS) modulates neuroplasticity by pairing a median nerve stimulus and a cortical stimulus. Although an optimal interpulse interval (IPI) to induce inhibition has been demonstrated in healthy individuals, it has not been demonstrated for individuals with stroke. Due to the exaggerated interhemispheric inhibition from the contralesional hemisphere acting to suppress the ipsilesional hemisphere, finding the most effective method of inhibitory PAS applied to the contralesional hemisphere is desirable. The purpose of this study is to determine what IPI achieves the maximum inhibitory effect within the contralesional hemisphere.

SUBJECT: 64-year-old male with left sided hemiplegia, 14 years post-stroke.

METHODS AND MATERIALS: A single subject crossover design was used. Inhibitory PAS was applied at three different IPIs (N20-3, -5, or -7 ms) targeting the abductor pollicis brevis of the nonparetic hand in an individual with chronic stroke. A fourth condition (N20+100 ms) was used as a sham control. Change in corticospinal excitability was assessed by comparing the average of 30 motor evoked potentials elicited by single pulse transcranial magnetic stimulation (TMS) before PAS treatment and 0, 10, 20, 30, 40, 50 and 60 minutes following treatment.

ANALYSES: A mixed model repeated measures analysis of variance was used with a Tukey post-hoc test. Alpha was set at 0.05.

RESULTS: The analysis of variance showed a significant effect for condition (p <0.001) and interaction (p =0.0120), but no significant effect for time (p =0.3152). The condition that was significantly different was N20 -7 ms.

CONCLUSIONS: The N20-7ms IPI showed the most inhibition of the contralesional cortex compared to other latencies tested.

IMPLICATIONS: Finding the most effective method of inhibitory PAS treatment is important in order to most effectively improve paretic hand function.