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**Topic**: Kinematics; Strokes; Neurorehabilitation; Stroke Recovery

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**Title**: Using Paired Associative Stimulation to Evoke Plasticity as Effective Motor Recovery ​

**Abstract**

Strokes are a neurological condition in which blood flow is restricted to the brain. This can cause neuronal death or brain damage to the stroke patients. Often, this will leave the stroke patients with some form of physical damage. Examples include impaired speech, motor skills, numbness, etc. The purpose of this research was to investigate the efficacy of paired associative stimulation (PAS) in inducing neural excitability in stroke patients to increase motor recovery. PAS is a series of low-frequency stimulations over a median nerve, producing more action potentials in neurons, to cause neuroplasticity, or learning following an injury. With this research, stroke patients were administered PAS and transcranial magnetic stimulation (TMS) after walking on a treadmill, in order to better lower limb recovery of the stroke victims. Electromyography electrodes were placed over measured areas to understand electrical activity in muscles. Experimentation would be ideal around 1 week, 5 weeks, 35 weeks, and 52 weeks for complete data and more thorough analysis of patient motor recovery. The data was analyzed through 3-way ANOVA testing and student t-tests, indicating that stroke patients had increased MEP amplitudes following PAS/TMS, along with the control groups. Paretic stroke patients averaged about a 130% MEP amplitude increase, whereas, the MEP amplitudes for non-paretic patients averaged around a 91% decrease. Ultimately, the data indicates that stroke patients and control participants had an increase in excitability and would further indicate that motor recovery may be enhanced, as a result. Future research into the intensities of PAS and TMS must be further investigated going further.