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## **Non-invasive stimulation for improving lower limb motor function after spinal cord injury**

**Goal:** This study combines non-invasive brain stimulation and peripheral electrical stimulation in a protocol called Spinal Associative Stimulation (SAS), aiming to enhance lower extremity motor function. The SAS protocol combines the two techniques described below (PNS and TMS) during a 15-minute paired stimulation period. During this time, the magnetic and electrical volleys will collide at the spinal cord level, with the aim to increase the motor strength of the ankle muscles.

### **Techniques:**

1. **Transcranial Magnetic Stimulation (TMS)** is a well-established technique used to induce transient changes in brain and spinal excitability. TMS is a useful and safe tool that sends brief currents via an insulated coil to painlessly generate currents in the brain tissue beneath the coil. TMS will be placed over the subject's skull over the area of the brain that controls the leg movements.

2. **Peripheral Nerve Stimulation (PNS)** is a technique in which surface electrodes are placed on the back of the knee (over the posterior tibial nerve) to elicit an electrical pulse. This device evaluates nerve conduction in a safe, efficient and effective manner.

3. **Anklebot.** This lower extremity robotic device will be used to measure the movement characteristics and strength of the ankle muscles.

**Study Protocol:** The clinical research protocol includes 4 sessions that last a maximum of 2 hours, separated by at least 3 days. During the first session, participants will receive clinical, functional and neurophysiological (TMS) evaluations. The latter three visits will involve SAS intervention and an ankle robot evaluation. Before and after the stimulation protocol, neurophysiological and functional evaluations will be conducted.

**If you are interested please contact us for more information:**

**[SCIclinicaltrials@burke.org](mailto:SCIclinicaltrials@burke.org)**

**914 3683181 (Mar Cortes, MD)**

**<http://www.burke.org/research/faculty/29>**

## **Study Inclusion/Exclusion Criteria:**

### *Inclusion Criteria*

- Age range: 18 to 80 years old
- Chronic lesions (more than 6 months after the injury)
- Traumatic lesions
- Motor incomplete lesion (AIS B, C, D)
- Some degree of motor function in the ankle flexor and extensors
- Medically stable

### *Exclusion Criteria*

- Motor and sensory complete lesion (AIS A)
- Non-traumatic cause of lesion
- Medically unstable condition or presence of other concurrent neurological or psychiatric illness
- Presence of potential TMS risk factor
  - Presence of an electrically, magnetically or mechanically activated brain implant
  - Intracerebral vascular clip
  - Past history of seizures, epilepsy or unexplained spells of loss of consciousness

**Duration:** Subjects will need to attend the ‘Non-invasive Brain Stimulation and Human Motor Control Laboratory’ in four separate visits. Each visit will last 120 min (2 hours) approximately.

**Location:** The Burke campus address is: 785 Mamaroneck Avenue, 10605 White Plains, NY.

- *TMS Laboratory:* Burke Medical Research Institute (Building #1), TMS room (ground floor, room #H104).
- *Robotic Clinic:* Burke House (building #4).

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