Continuous Theta Burst Stimulation Over Right Pars Triangularis Facilitates Naming Abilities in Chronic Post-stroke Aphasia by Enhancing Phonological Access.

Denise Harvey1,2, Joely Mass3, Priyanka Shah-Basak4, Rachel Wurzman1, Olufunsho Faseyitan1, Daniela Sacchetti1, Laura DeLoretta1, Roy Hamilton1

1Neurology, University of Pennsylvania, 2Research Department, Moss Rehabilitation Research Institute, 3Sidney Kimmel Medical College, Thomas Jefferson University, 4Baycrest Health Sciences Centre, Rotman Research Institute

Objective: To identify characteristics of post-stroke naming impairment associated with better outcomes following repetitive transcranial magnetic stimulation (rTMS) therapy.

Background: RTMS has been used experimentally to facilitate naming abilities in individuals with chronic post-stroke aphasia. However, little is known about which specific aspects of language difficulties rTMS confers clinical improvement, hampering its therapeutic value. The present study investigated the characteristics of naming failure that improve following administration of continuous theta burst stimulation (cTBS)—an inhibitory form of rTMS—to the right pars triangularis (rPTr) in persons with chronic aphasia.

Design/Methods: Eleven participants with chronic aphasia following left hemisphere stroke named pictures prior to and immediately following cTBS of the rPTr and a control site (vertex) in separate sessions. Prior to stimulation, we obtained two baseline measurements of picture naming ability to determine the extent and type (i.e., phonological vs. semantic) of naming impairment. Items presented for naming during stimulation were those that were named incorrectly in one or both of the baseline sessions (i.e., inconsistent vs. wrong items, respectively). Analyses assessed whether cTBS effects differed depending on the severity and/or type of naming impairment.

Results: Relative to vertex, cTBS of the rPTr improved naming of inconsistent, but not wrong, items for individuals with more severe baseline naming impairment ($p = .04$). Critically, improvements specifically manifested in decreased phonological, but not semantic errors, and correlated with the degree of phonological naming impairment at baseline ($p = .04$).

Conclusions: Inhibitory rTMS of the rPTr enhances naming by facilitating phonological access during word retrieval, indicating that individuals whose naming impairment is localized to this stage of processing may be most likely to benefit from this rTMS approach.