

Short-term benefits seen with repetitive transcranial magnetic stimulation for focal hand dystonia

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Repetitive transcranial magnetic stimulation (rTMS) is being increasingly explored as a therapeutic tool for movement disorders associated with deficient inhibition throughout the central nervous system. This includes treatment of focal hand dystonia (FHD), characterized by involuntary movement of the fingers either curling into the palm or extending outward. A new study published in *Restorative Neurology and Neuroscience* reports short-term changes in behavioral, physiologic, and clinical measures that support further research into the therapeutic potential of rTMS.

In a study of 17 people with FHD, 68% reported that their symptoms improved after 5 daily sessions of low-frequency [repetitive transcranial magnetic stimulation](#) and 58% said their symptoms were better 10 days post-treatment. After completion of the study, three patients contacted the investigators for additional treatment, indicating that they felt their symptoms had improved for several months. While encouraging, the objective measure of handwriting pressure was not improved at the 10 day follow up. None of the five people who received sham stimulation reported any clinical benefits, which may suggest that some people are susceptible to benefit, but it is not universal.

rTMS did produce some other short-term changes. For instance, 3 days of rTMS significantly enhanced intracortical inhibition (as indicated by prolongation of the cortical silent period) but by 5 days, the changes

were no longer significant, suggesting there is not a cumulative effect of inhibition from the rTMS. Handwriting analysis showed that rTMS significantly reduced axial pen force at day 5, without reducing writing velocity.

"Focal hand dystonia is a movement disorder associated with deficient inhibition throughout the [central nervous system](#), including the [motor cortex](#)," says lead author Teresa Jacobson Kimberley, PT, PhD, of the Department of Physical Medicine and Rehabilitation at the University of Minnesota. "Several studies have shown that low-frequency rTMS can alter deficient intracortical [inhibition](#) in the primary motor cortex and produce transient changes in symptoms in focal hand dystonia, but for the change to be clinically meaningful, there must be a longer lasting benefit."

While other studies have found subtle beneficial effects from rTMS, this study was unique in that the stimulation was given while patients performed writing movements that did not trigger their dystonic symptoms and was delivered daily for 5 days. The authors speculated that in this state, dystonic neurons (i.e. those producing the FHD) would be less active than the normally functioning non-dystonic neurons, and thus would be more susceptible to the inhibitory effects of rTMS. The lack of clinically meaningful findings do not support this hypothesis, say the authors, but different parameters of stimulation may produce different results.

Noting that the patients included in the study manifested different types of hand dystonia (musician's and writer's cramp) and a wide range of symptom duration, the authors hope to be able to identify subpopulations that might benefit from rTMS intervention and assess the benefit as an adjunct to other interventions. They also intend to follow up on their finding that age was negatively correlated with responsiveness.

More information: "Multiple sessions of low-frequency repetitive transcranial magnetic stimulation in focal hand dystonia: clinical and physiological effects," by Teresa Jacobson Kimberley, Michael R. Borich, Sanjeev Arora, and Hartwig R. Siebner. *Restorative Neurology and Neuroscience*, 31:3 (May 2013), [DOI 10.3233/RNN-120259](https://doi.org/10.3233/RNN-120259)

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