Increased Absolute Power in the Left Prefrontal and Anterior Cingulate Cortices with TMS for Complex Depression

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Purpose: This study compared pre-post TMS treatment of Depression on Quantitative EEG (QEEG) indices of absolute power in the Left Prefrontal Cortex and Anterior Cingulate Cortex, among complex depressed patients in intensive neuropsychiatric treatment.

Method: Eighteen young adults, aged 19-29, with comorbid depression, received either TMS using the Brainsway H1 coil and protocol (n=9), or no TMS (n=9). All subjects participated in intensive treatment, which consisted of 5-day a week Intensive Outpatient Program (IOP), 3 x weekly individual psychotherapy, and antidepressant medication. Subjects had QEEGs, using the 10-20 electrode system, at admission and discharge. Measures included Absolute Power z scores, pre- and post-treatment, for the Left Prefrontal and Anterior Cingulate Cortices, and the BDI.

Results: Complex depressed patients who received TMS, as a component of their neuropsychiatric treatment, increased significantly on measures of absolute power recorded in their left prefrontal cortex (t=2.57, p<.05), and in their anterior cingulate cortex (t=2.40, p<.05); whereas, without TMS, co-morbid depressed patients did not. Similarly, complex depressed patients who had TMS improved significantly on the BDI (t=4.20, p<.005) but the non-TMS patients did not.

Conclusions: These findings suggest that TMS may be not only a beneficial treatment for depression but an essential component of neuropsychiatric care for severe, complex depressed young adults. If the findings are replicated in a clinical trial, they could suggest that the mechanism for improved interconnectivity may be, in part, the greater availability of raw power to the prefrontal cortex and, potentially, its connections into the anterior cingulate cortex.

The authors declare that there are no conflicts of interest in this research.