studies would be of benefit to validate the use of TMS when MDD is co-morbid with chronic pain.

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INCREASED ABSOLUTE POWER IN THE LEFT PREFRONTAL AND ANTERIOR CINGULATE CORTICES WITH TMS FOR COMPLEX DEPRESSION

Laura Viner PhD, Stefanie Molicki MA, Elliot Birn BS, Jesse Viner MD. *Yellowbrick Center for Clinical Neuroscience, Department of Psychiatry and Behavioral Sciences, Northwestern University Feinberg School of Medicine*

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.

OUTCOMES AND FEASIBILITY FROM THE FIRST TMS SPECIFIC WEB-BASED INTERVENTION

Kayla Evans [1], Lauren Valencia LCSW [1], C. Dean Cochran [2], Michelle Cochran [3]. [1] *NeuroScience & TMS Treatment Center, Nashville, TN, USA;* [2] *Centre College, Danville, KY, USA;* [3] *Vanderbilt University Medical Center, Nashville, TN, USA*

Background: The authors sought to review the feasibility of an intervention combined with transcranial magnetic stimulation (TMS) for patients with Major Depressive Disorder (MDD) and assess outcomes on a self-rated measure of mood.

Methods: A post hoc analysis was performed with de-identified data from patient users of the workbook. A subset of data was identified, n=20, and analyzed. This subset of patients had verified daily workbook use and a complete data set (diagnosis, demographics, medication history, TMS treatment protocols, number of delivered TMS sessions, weeks of workbook participation, etc.).

Results: Overall patient PHQ-9 outcomes for the group were: Remission = 60%, Response = 85%, Nonresponse = 15%. The analysis showed that use of the workbook is feasible by a TMS operator and patients with electronic tablets and smartphones. Demographics of the patients were 50% (10/20) female, and 50% (10/20) male, with an average age of 33 years old, (range: 18-58). All patients had a primary diagnosis of Major Depressive Disorder, recurrent, severe and were quite treatment-resistant with an average number of antidepressants used prior to TMS initiation of 6.2 antidepressants (range of 4-18), and the average number of augmenting agents (antipsychotics, stimulants, anti-anxiety, folate supplements, e.g.) of 7.3 (range 1-20). The patients had an average of 41 (range 26-59) treatments and an average workbook use of 10.25 weeks (range 8-14 weeks of use). Of the patients treated throughout their TMS course with the standard protocol (10/20), PHQ-9 outcomes were: Remission = 80%, Response = 90%, Nonresponse = 10%.

Conclusion: This study showed that the HIPAA compliant, web-based workbook can feasibly be used by TMS operators in combination with TMS Treatment for depressed patients. The interpretation of the reported outcome results is limited by the small number, the post hoc nature of the data analysis, and the lack of a randomized comparator group. A randomized clinical trial to test this workbook against nonconcurrent TMS and online CBT or other interventions, with specific education to improve operator and patient utilization, might answer if this combined intervention can improve outcomes for patients compared to standard TMS treatment.

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Disclosures:

- Dr. Cochran is the owner and author of Train Your Brain: Your record of Care with TMS, www.TMSworkbook.com.
- Dr. Cochran is on the speaker's bureau for NeuroStar/Neuronetics and has done market research for MagStim and NeuroStar/Neuronetics.
- Dr. Cochran owns a practice, NeuroScience and TMS Treatment Centers which purchased both a MagVenture device and two NeuroStar devices which are used with patients.
- Lauren Valencia, LCSW is one of the authors of Train Your Brain, TMSworkbook.com and works with Dr. Cochran
- Kayla Evans is a TMS operator in Dr. Cochran's practice.
- C. Dean Cochran is Dr. Cochran's son and a Data Science Analytics major at Centre College, Danville, KY.

THE CASE FOR INCORPORATING EEG IN CLINICAL TMS PRACTICE

Menolascino Shelly [1], Perry Lincer David [1], Honeck Ryan [1], Belgin Mitchell [1], Gunkelman Jay [1]. [1] *Washington Square Psychiatry & TMS, New York, NY*

TMS psychiatrists are seeking methods to identify subtypes of clinically complex treatment-resistant depression (TRD), requiring rigorous, in-depth assessment. Advances in affordable neurotechnology and software have made it possible to record, process, and analyze EEGs within the clinic. Psychiatrists can learn to decipher the electroencephalograph (EEG) according to the EEG phenotype model developed by Johnston, Gunkelman, & Lunt (2005).

We reviewed and processed raw EEG recordings, using WinEEG software, from 50 recent TRD TMS patients. Their primary diagnoses included: MDD recurrent (54%), MDD recurrent with mixed features (22%), bipolar 1 depression (4%), and bipolar 2 depression (20%). Secondary diagnoses included chronic PTSD (72%), dysthymia (32%), comorbid anxiety disorder (48%), OCD (6%), substance use disorder in full remission (18%), alcohol use disorder (6%), cannabis use disorder (4%), personality disorders (10%), and ADHD (12%). Baseline EEGs showed the following features, in ranking order: dysfunctional insular involvement seen in independent component analysis (80%), a marker of severity of depression; hypercoherent frontal alpha, reflecting diminished cognitive and emotional control (80%); excess