

# MediTMS: A Multimodal Intervention of Breath-focused Mindfulness and Transcranial Magnetic Stimulation in Treatment-resistant Depression (TRD) Patients



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## Background

- Treatment-resistant Depression (TRD) is common in ~33% of all depressed individuals, who do not respond to conventional pharmacological treatments [1].
- Dorsolateral Prefrontal Cortex (DLPFC) targeted repetitive Transcranial Magnetic Stimulation (rTMS) is an FDA-approved neuromodulation treatment for TRD but also shows ~30% remission rates and with no cognitive benefits that are also impacted in depression [2].
- Several studies show that mindfulness training can alleviate depression, and also has cognitive benefits [3,4].
- Therefore, here we tested a multimodal intervention combining mindfulness and TMS (mediTMS) in TRD.

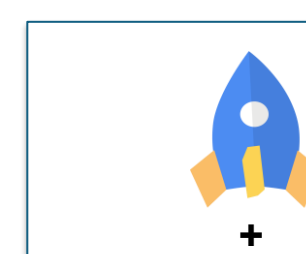
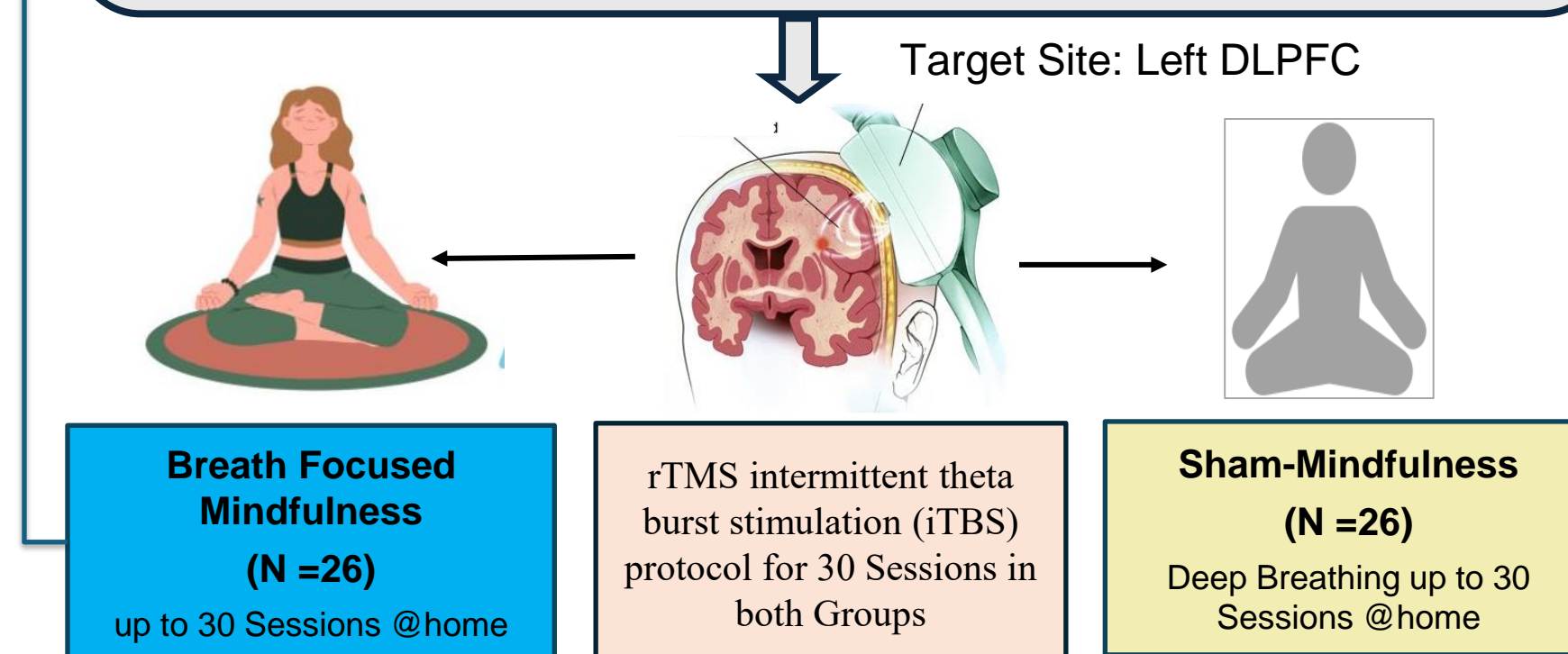
## Aims

- ❖ To conduct a randomized controlled trial of combined mindfulness practice (delivered digitally) with rTMS as a treatment for TRD
- ❖ To assess if mediTMS relative to a sham-mindfulness +rTMS group shows improvements in depression, related mental health behaviors, and cognitive performance.
- ❖ To investigate the neuroplasticity underlying the mediTMS intervention.

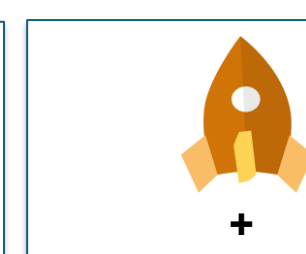
## Study Design

### Assessments (Baseline & Post)

- Mental Health Measures (+ Followup)
- Cognitive Measures + EEG Recording



A. Inhibitory Control (Go-Wait)



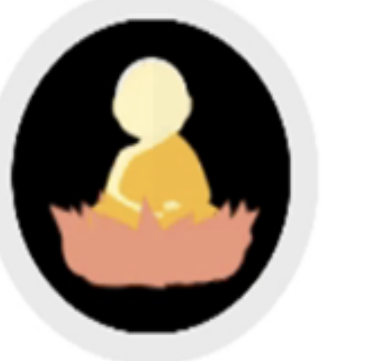
B. Breath focused Interceptive Attention (Two Tap) [5,6]

### Mental Health Measures

- 1°: Depression, Patient Health Questionnaire (PHQ-9)
- 2°: Anxiety, General Anxiety Disorder-7 (GAD-7)
- 2°: Sleep Disturbances (PROMIS)
- 2°: Inattention, Adult ADHD Rating Scale (ADHD-RS)
- 2°: State Mindfulness, Mindful Attention Awareness Scale (MAAS)

### Breath-focused Mindfulness

1. Settling the mind
2. Compassion for a loved one
3. Compassion for oneself
4. Loving-kindness for oneself
5. Embracing common humanity
6. Embracing common humanity continued
7. Cultivating compassion for oneself and others
8. Cultivating compassion for others continued
9. Active compassion
10. Integrated compassion practice

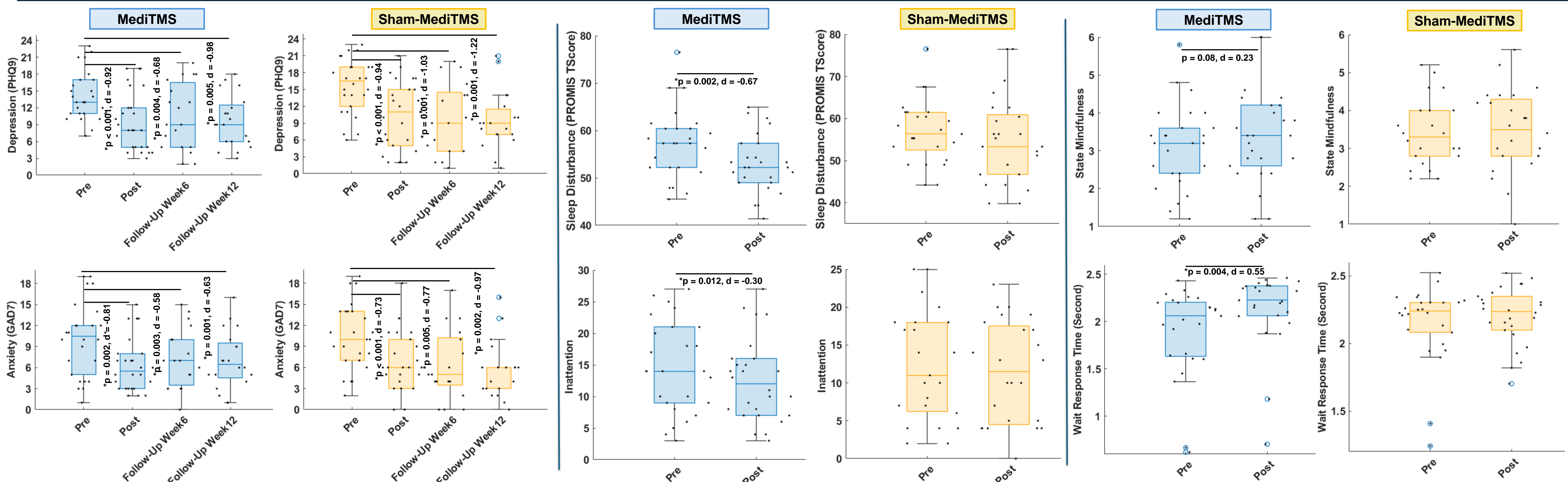


Level = Breath Counts & Number of minutes

### Instructions:

- Close your eyes and breathe naturally.
- Tap after every (level) breaths.
- Inhale and fill your belly with fresh air
- Exhale with belly in.

## Results



## Conclusions

- Both MediTMS and Sham-MediTMS groups showed significant alleviation of depressive symptoms (PHQ9), as well as co-morbid anxiety symptoms (GAD7), that were sustained at 6 weeks and 12 weeks follow up time points.
- Additionally, the MediTMS group exclusively showed significant improvement in Sleep Disturbances (PROMIS), Inattention (Adult ADHD) and State mindfulness measures, although between-group comparisons were not significant.
- Cognitive function improvement was exclusively observed in the MediTMS group, specifically reduced impulsivity on a response inhibition task that was also significant in between-group comparisons. Neuroplasticity analyses are ongoing.
- Overall, the mediTMS intervention may hold promise for holistic behavioral and neuro-cognitive benefits in TRD.

## Acknowledgments

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## References

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