Who Should Receive Extension of TMS Depression Treatment? A Retrospective Analysis of Response Conversion

Brandon J. Lew, MD PhD, Eric Tirrell, Andrew M. Fukuda, MD PhD, Nim Murugan, Carissa Perez, Wenricka Griffith, Linda L. Carpenter, MD

Butler Hospital TMS Clinic and COBRE Center for Neuromodulation Research

Brown Department of Psychiatry and Human Behavior, 345 Blackstone Blvd, Providence, RI

INTRODUCTION

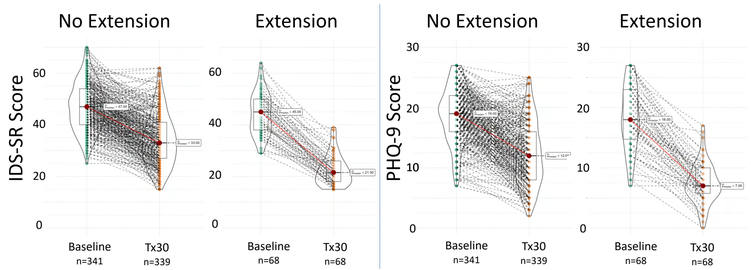
- Transcranial Magnetic Stimulation (TMS) is an FDA-approved treatment for Major Depressive Disorder.
- A full treatment course typically involves 30 treatments over 6 weeks, with an additional 6 tapering treatments.
- Previous studies have shown that some patients show additional antidepressant response beyond 36 treatments.
- Clinical judgement is used to determine whether a patient should receive an extension of their treatment course; however, data are limited in informing who will ultimately respond to a TMS extension.
- **In a retrospective analysis of naturalistic treatment data, we examined patients who were clinically determined to warrant extension of TMS treatment for depression and compared patients who converted to response versus patients who never ultimately respond.**

METHODS

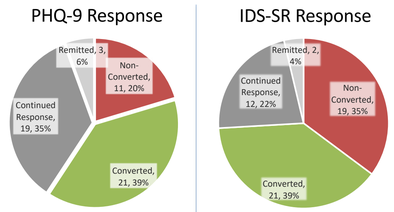
- De-identified data of 485 patients were reviewed, 54 patients were identified as having received an extension (>40 treatments)
- **Depression Scales:** Inventory of Depressive Symptomology- Self Report (IDS-SR) and Patient Health Questionnaire (PHQ-9)
- Response: ≥50% reduction from baseline score
- Conversion = Non-Response at treatment 30 → Response/ after extension
- Mixed model ANOVAs were used to compare the IDSSR/PHQ9 scores of non-responders versus patients who convert to response after TMS treatment extension.
- Classification analyses attempted to identify score cutoffs that could be used to predict conversion to response after extension.

RESULTS

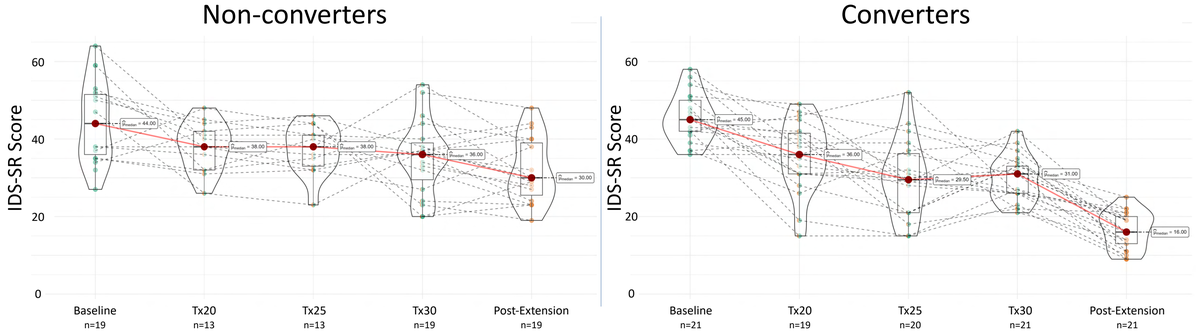
Who gets selected for extension?



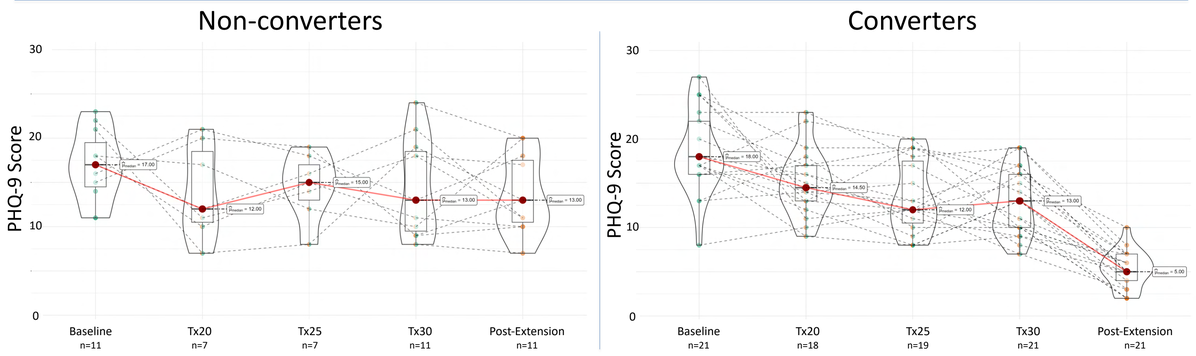
Response in Patients Receiving Extension



How do patients who convert compare to those that do not?



Mixed model ANOVAs of IDS-SR scores using baseline and tx30 showed a significant time by group interaction (p= .002) such that patients who convert to response after treatment extension had better improvement from baseline at treatment 30.



Mixed model ANOVAs of PHQ-9 scores using baseline and tx30 showed a significant time by group interaction (p= .006) such that patients who convert to response after treatment extension had better improvement from baseline at treatment 30.

DEMOGRAPHICS

IDSSR			
	Non-Converters (n=19)	**Converters (n=21)**	**Sig (p)**
Sex	3 M / 16 F	5 M / 16 F	.812
Age [mean (SD)]	**48.16 (13.5)**	**36.04 (18.7)**	**.004***
Had past Hospitalization(s)	8 no/11 yes	9 no/12 yes	.961
Had past ECT	16no /3 yes	21 no/0 yes	.098
Total number of treatments [(mean(SD)]	45.95 (3.73)	46.04 (1.82)	.913

PHQ-9			
	Non-Converters (n=11)	**Converters (n=21)**	**Sig (p)**
Sex	2 M / 9 F	2 M / 19 F	.888
Age [(mean (SD)]	**51.82 (11.75)**	**40.19 (11.87)**	**.013***
Had past Hospitalization(s)	5 no/6 yes	8 no/13 yes	.981
Had past ECT	9 no/2 yes	20 no/1 yes	.550
Total number of treatments [(mean (SD)]	46.64 (4.61)	45.43 (1.29)	.266

CONCLUSIONS

- TMS treatment extension can continue to build upon antidepressant response.
- Baseline scores in IDS-SR and PHQ-9 did not differ between converters and non-converters.
- Patients who respond after extension were more likely to be younger.
- Patients who respond after extension were more likely to have a greater improvement in IDS-SR and PHQ-9 score at treatment 30.
- Despite these associations, no reliable threshold could be determined to predict which patients will convert using data from treatment 30.
- Future directions include sub scores of the IDS-SR, analysis of remission, and controlled prospective studies.

ACKNOWLEDGMENTS

Work was supported by NIH grants: R25 MH101076 and P20 GM130452.