

V. Rößner-Ruff¹, C.A. Penkov¹, J. Krieger¹, F. Friedrich¹, M. Ziegenbein¹

¹ Research & Development, Wahrendorff Clinic

✉ vanessa.roessner-ruff@wahrendorff.de

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Introduction

Neurostimulation procedures have also been in use for some time to treat neurological and neuropsychiatric disorders. In the field of non-invasive brain stimulation, a number of methods have been the subject of investigation, including transcranial magnetic stimulation (TMS), transcranial electrical stimulation (tES) and transcranial pulse stimulation (TPS) [1]. Although TMS and tES have been the subject of more extensive investigation, particularly in the context of Alzheimer's disease (AD) and depression, there remains a pressing need for research into TPS. TPS is a low-energy shock wave treatment, approved in mild to moderate AD. At TPS, sound pulses are introduced into certain brain areas to help improve blood flow and generation of new blood vessels in order to maintain or even increase cognitive performance for as long as possible [2]. Some studies indicate positive effects, which can be seen in significant improvement in neuropsychological test scores [3, 4, 5, 6] and depressive symptom burden [5, 6]. But the effectiveness of this treatment is not conclusively confirmed. Therefore more studies are needed. **Our study examined the cognitive performance and depressive symptom burden of patients with a mild or moderate AD over the course of treatment with TPS. The aim of the study is to investigate whether cognitive performance is significantly increased and depressive symptom severity is significantly reduced.**



Method & Selection

Cognitive performance (MoCA) and depressive symptom severity (GDS) were assessed in female and male patients with an early- or late-onset, mild or moderate AD at baseline (t1), three months (t2, 1st interval) and six months (t3, 2nd interval) following treatment with TPS. In context of this longitudinal study, which is designed with a single center, the participants were recruited from the outpatient setting Diagnostic|Neurostimulation of a specialized psychiatric-psychotherapeutic clinic in Lower Saxony (Wahrendorff Clinic), Germany. Data from the clinical sample were analyzed using repeated measures ANOVA .

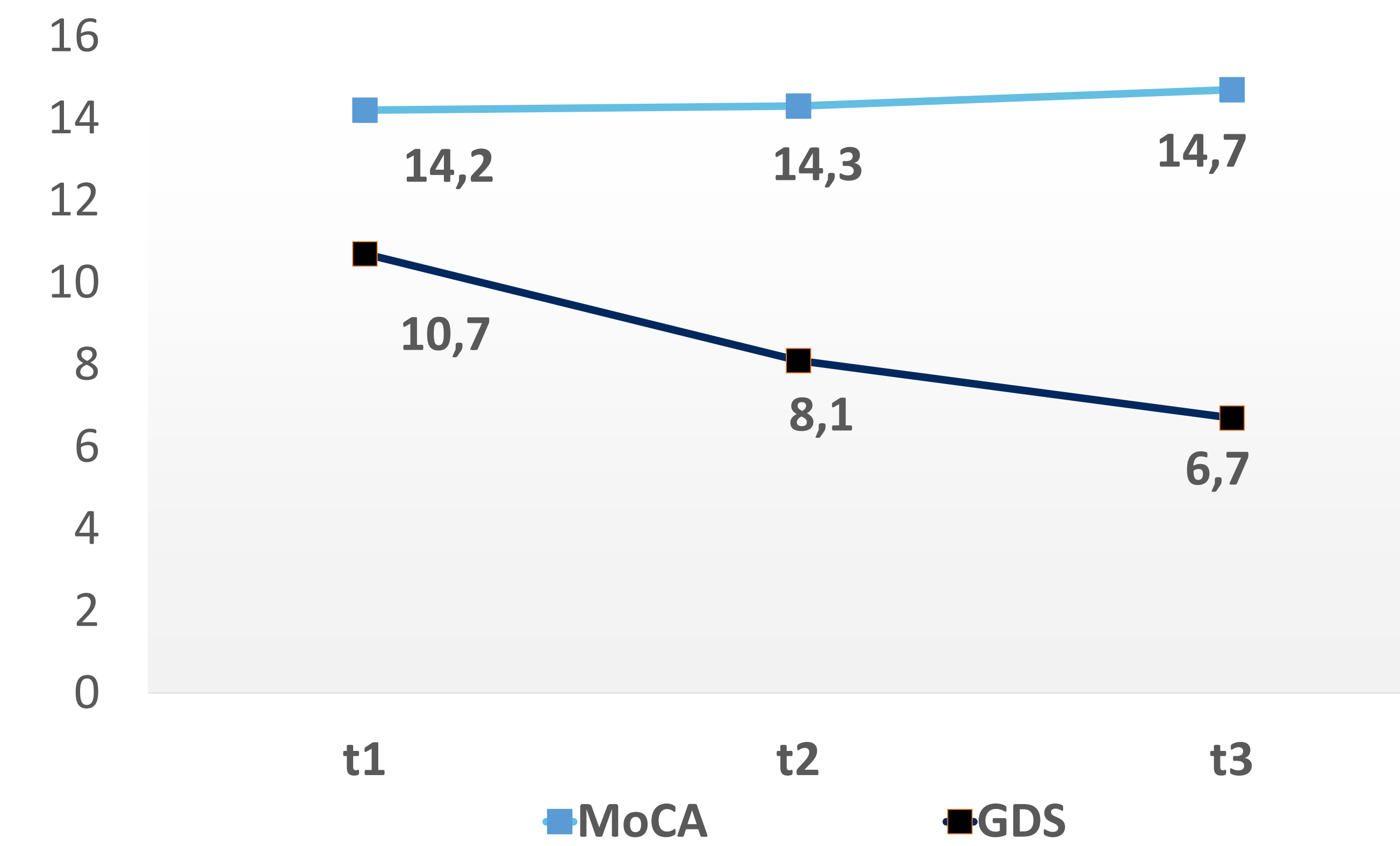
table 1: sample characteristic

feature	women & men n = 65 (100 %)	women n = 37 (57 %)	men n = 28 (43 %)	p
age M (SD) min = 48 max = 87	71 (9.9)	70 (10.4)	71 (9.4)	n.s. ^a
diagnosis (AD, ICD-10) F00.0: Typ 2 (early onset)	17 (26 %)	9 (24 %)	8 (29 %)	n.s. ^b
diagnosis (AD, ICD-10) F00.1: Typ 1 (late onset)	31 (48 %)	20 (54 %)	11 (39 %)	
diagnosis (AD, ICD-10) F00.2: atypical / mixed	15 (23 %)	7 (19 %)	8 (29 %)	
diagnosis (AD, ICD-10) F00.9: not specified	2 (3 %)	1 (3 %)	1 (3 %)	

notes:
M = mean value
SD = standard deviation
^a t-test
^b χ^2 -test
n.s. = not significant

Results

illustration 1: mean values of MoCA & GDS over course of treatment with TPS (t1, t2, t3), n = 36



repeated measures ANOVA:
Mauchly-Test of Sphericity for **MoCA** revealed **no statistically significant difference of mean values for the different time points**, $F(2, 34) = .549, p = .583$, partial $\eta^2 = .031$
Mauchly-Test of Sphericity for **GDS** revealed **statistically significant difference of mean values for the different time points**, $F(2, 17) = 4.5, p < .05$, partial $\eta^2 = .347$

Conclusion

As in other studies, remarkable effects were shown with the use of TPS in patients with a mild to moderate AD [3, 4, 5, 6]. The results may indicate that the cognitive performance can be stabilized and the depressive symptom severity can be reduced (ill. 1). It is important to note that the results are based on a relatively small sample size and lack control conditions, which may limit the generalizability of the findings. Furthermore, results should be seen under consideration that cognitive performance and depressive symptoms can also be influenced by other factors,. The study is being continued, so the results are preliminary data. Further research is required to evaluate the effectiveness of TPS-treatment in AD and to assess the potential suitability of this neurostimulation method as an add-on therapy, complementing previous drug and non-drug approaches. Further research is also required in the use of TPS in depression and other psychiatric disorders given the dearth of scientifically reliable findings on this topic.

Literature:
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