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Effects of repetitive transcranial magnetic stimulation (rTMS) in patients with body dysmorphic disorder (BDD)

Dear editor,

Patients with Body Dysmorphic Disorder (BDD) experience significant distress and often have suicidal ideation and behavior[1]. BDD is an obsessive-compulsive related disorder and is characterized by a (delusional) preoccupation concerning presumed or minor flaws in appearance. Patients experience obsessions regarding their appearance which are often accompanied by compulsive behavior, like mirror-checking [2]. Major depressive disorder (MDD) is the most prevalent comorbidity in BDD, with a lifetime prevalence of 76% [3]. BDD is highly underdiagnosed, but when patients present themselves, there are different types of evidence-based treatments available. Current treatment options are antidepressants and cognitive behavioral therapy (CBT) with response rates between 40 and 73% [4–6]. Since many patients show insufficient response to these treatments, there is an urgent need for additional treatment options for BDD patients. Repetitive transcranial magnetic stimulation (rTMS), a non-invasive form of brain stimulation (NIBS), which has proven to be effective in both MDD and obsessive-compulsive disorder (OCD), but has never been investigated in patients with BDD [7]. This study describes a unique and first series of five treatment resistant adults with BDD.

Patients were indicated for treatment when meeting DSM-5 criteria for BDD and MDD. Refractoriness was defined as a history of non-response to at least two different treatments with medication and/or CBT. Three of the patients had already received CBT for BDD without effect. Patients were treated with rTMS, combined with weekly parallel CBT for BDD, focusing on psychoeducation, cognitive restructuring and exposure and response prevention. Concurrent antidepressants were continued on a stable dose during the rTMS trajectory. All patients signed informed consent.

rTMS was applied over the left dorsolateral prefrontal cortex (dlPFC) in a 10Hz protocol. Patients underwent treatment four to five times per week until plateau phase or remission was reached (in a period of five to seven weeks). Response in BDD was defined by a $\geq$30% decrease in Yale-Brown Obsessive Compulsive Scale for BDD (BDD-YBOCS) scores, remission was indicated as a post-treatment BDD-YBOCS score of $\leq$16 [8]. Decrease of $\geq$50% in Hamilton Depression Rating Scale - 17 items (HDRS-17) was defined as response in MDD, remission was stated as HDRS-17 score of $\leq$7. Secondary measures were the Inventory of Depressive Symptoms – Self Rated (IDS-SR), the Hamilton Anxiety Scale (HAS) and the Brown Assessment of Beliefs Scale (BABS). Psychometrics were performed every fifth rTMS session and at two-month follow-up. Patients demographics, prior treatments, baseline measurements, results and rTMS characteristics are summarized in table 1 (Supplementary Table 1.).

The treatment was well tolerated by all patients and no patients discontinued treatment due to side-effects. One serious adverse event occurred in one patient (patient 2), who attempted suicide while phasing out rTMS sessions. This patient was submitted to the inpatient clinic and rTMS was terminated. This patient was diagnosed with a personality disorder with borderline traits. See Supplementary Table 1 for all baseline, post-rTMS and two-month follow-up clinical assessments. See Fig. 1 for HDRS, BDD-YBOCS and HAS scores. The mean score of BDD-YBOCS was 32.0 at baseline, 16,6 at post-treatment and 22,5 at follow-up. Response and remission rates in BDD at post-treatment were 60.0% (3/5). Follow-up data was available for four patients. One patient was lost to follow-up due to being unreachable. At two-month follow-up, 50.0% (2/4) met response criteria and 1/2 responders also met remission criteria. The mean score of HDRS-17 was 22.0 at baseline, 6,8 at post-treatment and 10.8 at follow-up. Response rate in MDD at post-treatment was 100.0% (5/5) and remission rate was 60.0% (3/5). At two-month follow-up, 75% (3/4) met response and remission criteria. The mean score of the HAS was 22.8 at baseline, 6.4 at post-treatment and 9.5 at follow-up.

This is the first report to our knowledge to describe the effects of rTMS in patients with BDD. We found that BDD and depressive symptoms were significantly reduced after rTMS treatment in the majority of our sample.

Although this study shows promising results, it is important to note that there were two non-responders for the BDD. The first non-responder experienced a worsening of suicidality while phasing out of the treatment, and was shortly after rTMS completion diagnosed with a personality disorder with borderline traits. This worsening was not linked to the rTMS treatment. The second non-responder had an extreme BDD severity at the start of treatment which was reflected in a high BDD-YBOCS and BABS score. It is known that a higher BDD-YBOCS and BABS score predict non-response [9].

This report has limitations inherently to the open label design and small number of patients, hence a high placebo response cannot be ruled out. In addition, patients received CBT as part of their treatment procedure which may confound the high response rate.

In conclusion, this is the first report to our knowledge to describe rTMS in BDD patients. The results indicate that a rTMS protocol for depression can simultaneously reduce BDD symptoms.

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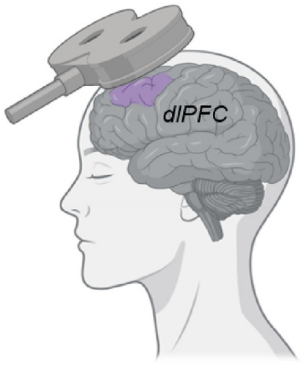
A

Psychometrics m (sd)	Baseline	End (T7)
HDRS	22.0 (7.2)	6.8 (4.3)
BDD-YBOCS	32.0 (8.5)	16.6 (11.2)
HAS	22.8 (8.5)	6.4 (2.6)

	Response	Remission
MDD	5/5	3/5
BDD	3/5	3/5

Parameters
10 Hz (n=5)
120% MT on dlPFC



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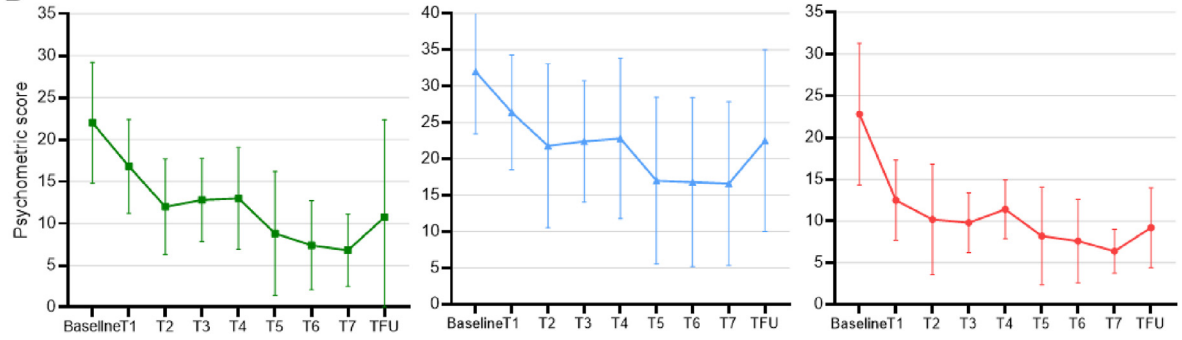

Fig. 1. Repetitive Transcranial Magnetic Stimulation of the dlPFC in five patients with BDD and MDD.
Fig. 1. Summarizing figure including (A) baseline measurements, treatment parameters and number of patients meeting remission and response criteria. (B) Mean psychometric scores showing the course of treatment, measured after every five treatment sessions (T1 to T7). MDD; Major Depressive Disorder, BDD; Body Dysmorphic Disorder, HDRS; Hamilton Depression Rating Scale, HAS; Hamilton Anxiety Scale, BDD-YBOCS; Yale-Brown Obsessive Compulsive Scale modified for BDD, m (SD); mean (standard deviation), MT; Motor Threshold, dlPFC; dorsolateral prefrontal cortex. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

Future studies should investigate the effect of rTMS in patients with BDD patients in a sham controlled- and randomized design.

Conflict of interest declaration

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.brs.2022.11.004.

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