forms of treatment are based on electrical stimulation and not necessarily direct to the brain but implying peripheral nerves, which effect can combine input to the brain and output-reafferentation from target organs. There is a tendency to use simplified methods. While repetitive transcranial magnetic stimulation (rTMS) requires complex machines, a clinical setting and physician supervision, new proposals are limited to set portable stimulation devices. Effectiveness is mostly measured using behavioral or performance tasks and subjective-rating scores.

**Conclusion**: A kind of prediction for the future use of BSBT can be made from the interpretation of the present tendencies: BSBT may set the right level of excitability in brain circuits to enhance sensory experiences or improve performance. While rTMS may have its place in a hospital setting and research, other treatments are well suited to take home and be self-administered by the patient at the desired time and frequency as an add-on therapy. The combination of BSBT with illusions derived from visual, auditory, haptic and olfactory inputs in a virtual reality environment may be the next step.

Keywords: Brain Stimulation, Peripheral nerve stimulation, Neurological Disorders

## [0530]
## IMPACT OF GALVANIC VESTIBULAR STIMULATION ON MOOD

F. Pasquier [1,2], C. Guillot [1,2], P. Denise [1,2], G. Quarck*[1,2]. [1] *University of Caen Normandy, France;* [2] *Lab INSERM Comete U1075, France*

From a technical point Galvanic Vestibular Stimulation (GVS) is a variant of transcranial direct current stimulation (tDCS). In most vestibular studies on human subjects GVS is applied through large surface electrodes placed over the mastoid. The usual maximum current is about 5 mA since higher currents or smaller electrodes cause unpleasant skin sensations and risk burning the subject's skin. The evidence from neurophysiology shows that GVS activates primary otolithic and semi- circular canal neurons (irregular neurons) (Kim and Curthoys, 2004). GVS applied to the mastoids of human subjects produces oculomotor (nystagmus), perceptual (rotating or tilting sensation), and postural responses. Several studies have explored the effect of tDCS on mood and particularly on depression. tDCS is commonly used to treat depression (Utz & al., 2010). Emerging evidence suggests that the vestibular network (the vestibular cortex ie the temporoparietal junction) expands into dimensions of emotion processing, mental health, and social cognition (Lopez, 2016). Our hypothesis is that GVS and tDCS, by sharing a common process, could have certain common impacts. The aim of our project is to study the impact of GVS (1 mA, 20 min, 10 days) on depression. The presented results are preliminary and take part in a larger study set up to explore the impact of GVS on sleep/wake cycle, biological rhythms and mood in a healthy group in comparison with a sham control group. We have already conducted an experiment on six healthy participants. The stimulation protocol was the following: a current of 1 mA was delivered on 10 days, each session lasting for 20 minutes. The Beck depression inventory (BDI) was administrated before and after the stimulation protocol. The results show that the BDI was lower after the stimulation protocol (before: 2.5± 1.33; after 1.33 ± 1.11, $p<0.05$ *using the Wilcoxon signed-rank test*).

Keywords: Galvanic vestibular stimulation (GVS), Depression

## [0531]
## SAFETY, FEASIBILITY, AND EFFICACY OF RTMS FOR MAJOR DEPRESSION IN BORDERLINE PERSONALITY DISORDER: A 2-CASE REPORT

K. Feffer*[1,2], P. Giacobbe [2,3], P. Fettes [4], J. Downer [2,3]. [1] *Shalvata Mental Health Center, Israel;* [2] *University of Toronto, Canada;* [3] *University Health Network, Canada;* [4] *University of Toronto, Canada*

**Introduction**: Borderline personality disorder (BPD) is a serious mental illness, characterized by mood dysregulation, impulsivity, and difficulties in interpersonal relationships, and often self-harm behaviour. Lifetime prevalence of major depression in BPD is 83%. Antidepressant medications are of limited utility for MDD in patients with BPD, so alternative approaches are needed. The dorsomedial prefrontal cortex (DMPFC) plays important roles in cognitive control, emotion regulation, and impulse control, suggesting that DMPFC-rTMS could be of potential use for MDD in BPD patients.

**Methods**: Here we report two cases of women who received 20 sessions of DMPFC rTMS treatments for MDD in the setting of BPD. rTMS was delivered once daily on weekdays, bilaterally to DMPFC, using 600 pulses per hemisphere of iTBS (case 1) or 1500 pulses per hemisphere of 20 Hz stimulation (case 2).

**Results**: In both cases, treatment was well-tolerated and significant improvement in depression symptoms was demonstrated based on the HDRS-17 and BDI scores.

Case 1: 39 year-old woman with BPD features of parasuicidal and impulsive behaviours and presented with an episode of MDD. She received 20 sessions of DMPFC using the iTBS protocol. At baseline, BDI score was 52. Following the course, BDI score improved to 16 and HDRS-17 score improved to 6.

Case 2: 32 year-old woman with BPD manifested by severe functional and interpersonal difficulties and a long history of eating disorders. She presented with a 10-month history of major depressive episodes with baseline scores of HDRS-17 of 24 and BDI score of 29. Scores improved by session 20 with HDRS-17 of 7 and BDI score of 4.

**Conclusion**: These preliminary case reports suggest rTMS might have a role in the treatment of depression among BPD patients. A pilot sham-controlled study may be warranted to assess the efficacy of rTMS in BPD specifically.

Keywords: depression, borderline personality disorder, dorsomedial prefrontal cortex

## [0532]
## THE EFFICACY OF REPETITIVE TRANSCRANIAL MAGNETIC STIMULATION OF LEFT DLPFC WITH PERSONALIZED TARGETING IN MAJOR DEPRESSION: PRELIMINARY RESULTS OF PSEUDO-RANDOMISED STUDY

A. Poydasheva*[1], E. Zmeykina [1], A. Chernyavskiy [2], A. Chervyakov [1], J. Lykova [3], N. Suponeva [1], M. Piradov [1]. [1] *Recearch Center of Neurology, Russia;* [2] *Russian Academy of Sciences, Russia;* [3] *I. M. Sechenov First Moscow State Medical Univercity, Russia*

**Introduction**: Despite the quasi high effectiveness of the repetitive transcranial magnetic stimulation (rTMS) of left dorsolateral prefrontal cortex (lDLPFC) in treatment of major depression, the high effect size variability is noticed (Herbsman et al, 2009). One of the reasons for this variability is the imperfect targeting of stimulation point.

**Objective**: The aim of our study is to compare the efficacy of rTMS of lDLPFC with personalized targeting using intrinsic functional connectivity measurement against standard targeting.

**Materials and methods**: Eight patients suffering major depression were enrolled in this study and were divided into 2 groups (4 persons per group). They were clinically evaluated with Beck Depression Inventory (BDI) and SF-36 questionnaire before rTMS, after 10 and 20 sessions of rTMS. The groups were matched by age and depression severity. Resting-state fMRI data was acquired on 3T MR-scanner. nTMS with Abductor pollicis brevis muscle mapping was also performed with NBS eXimia Nexstim device. Maps of functional connectivity were built using CONN toolbox for MATLAB. Subgenual cingulated cortex area (10 mm radius sphere at MNI coordinates (6,16,-10) was taken as a seed region. Then points in lDLPFC with maximum value of negative correlation were found individually in seed maps. In control group the stimulation point was determined as 5 cm anterior to individual APB muscle hotspot. All patients received 20 sessions of high frequency rTMS of lDLPFC (20 Hz, 100% RMT, 3200 stimuli/session).

**Results**: We observed decrease of BDI score and an increase of SF-36 mental health score in all patients in both groups (Fig. 1). Further statistical analysis was not performed due to small sample size.

**Conclusion**: rTMS using personalized targeting at least is as effective as in standard targeting method. We plan to enroll more patients to perform formal statistical analysis.

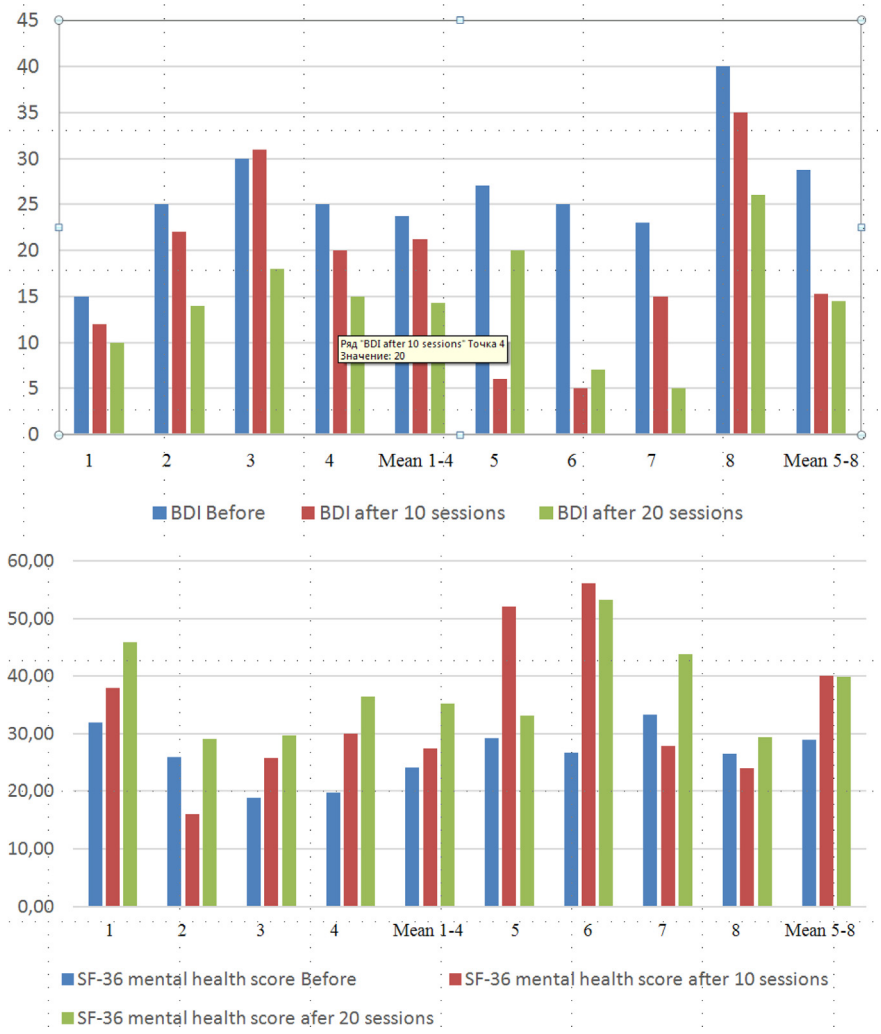


**Fig. 1.** BDI score and SF-36 mental health score dynamics in patients before and after rTMS (subjects1-4 subjects were treated with personalized targeting rTMS; 5-8 - with standard targeting rTMS).

Keywords: personalized targeting, functional connectivity, rTMS, major depression

**[0533]**

## TRANSCRANIAL MAGNETIC STIMULATION OF THE DORSOLATERAL PREFRONTAL CORTEX DURING REST AND WORKING MEMORY ACTIVATION

H. Althen*[1], H. Moessinger [1], C. Luckhardt [1], C.M. Freitag [1], S. Bender [1,2], T.A. Jarczok [1]. [1] *University Hospital Goethe University Frankfurt, Germany;* [2] *University Hospital Cologne, Germany*

**Introduction**: With simultaneous transcranial magnetic stimulation and recording of the electroencephalogram (TMS-EEG), the excitability and inhibition of cortical areas can be examined. It has been shown that the TMS-evoked N100 potential, reflecting neural inhibition, is reduced during motor cortex activation. In this study we aimed at establishing a stimulation design for examining neural inhibition in the activated DLPFC using TMS-EEG. We hypothesized that the N100 amplitude would be reduced during a working memory task compared to a rest condition in healthy adolescents.
**Methods**: The left dorsolateral prefrontal cortex of healthy adolescents was stimulated with 35 TMS-single pulses using a figure-of-8-coil at 80 % intensity of resting motor threshold during rest and a visual N-back task. Neuronavigation was used to determine the location of the DLPFC. Simultaneously, the 64-channel DC-EEG was recorded. EEG-data preprocessing included removal of the TMS-artifact and data interpolation, as well as removal of eye-blinks and other artifacts using independent component analysis. Mean N100 amplitudes were retrieved from the EEG electrodes showing the largest amplitudes and tested for differences between rest and task condition with a t-test.
**Results**: Preliminary results of 11 participants indicate that the N100 amplitude decreased during the N-Back task, compared with the rest condition, $t(10) = -2.28$, $p = .046$, $r = 0.58$.
**Discussion**: The N100 is suggested to represent GABAergic inhibitory neural activity. Thus, our results give evidence that the technique and task used in this study work well to image a decreased neural inhibition during DLPFC activation with a working memory task. This paradigm could be applicable to investigate cognitive impairments in populations with neuropsychiatric disorders.
Keywords: TMS-EEG, DLPFC, working memory, N100

**[0536]**

## DECISIONAL IMPULSIVITY AND THE ASSOCIATIVE-LIMBIC SUBTHALAMIC NUCLEUS IN OBSESSIVE-COMPULSIVE DISORDER: SUBTHALAMIC STIMULATION AND INTRINSIC FUNCTIONAL CONNECTIVITY

V. Voon*[1], F. Droux [2], L. Morris [1], S. Chabardes [2], T. Bougerol [2], O. David [2], P. Krack [2], M. Polosan [2]. [1] *University of Cambridge, UK;* [2] *University of Grenoble Alpes, France*

**Purpose**: Why do we make hasty decisions for short term gain? The subthalamic nucleus (STN) is implicated in inhibitory function but its role in decisional impulsivity is less well-understood. Here we assess decisional