Neurofeedback for Depression

No registrations found.

Ethical review	Positive opinion
Status	Pending
Health condition type	-
Study type	Interventional

Summary

ID

NL-OMON24001

Source
Nationaal Trial Register

Health condition

Depression, major depression

Sponsors and support

Primary sponsor: Prof. Dr. F.P.M.L. Peeters
Afdeling Psychiatrie
Academisch Ziekenhuis Maastricht
Postbus 5800
6202 AZ Maastricht

Tel : 043-3874130
Fax : 043-3875444
E-mail: f.peeters@maastrichtuniversity.nl
Source(s) of monetary or material Support: Prof. Dr. F.P.M.L. Peeters
Afdeling Psychiatrie
Academisch Ziekenhuis Maastricht
Postbus 5800
6202 AZ Maastricht

Tel : 043-3874130
Fax : 043-3875444
E-mail: f.peeters@maastrichtuniversity.nl

Intervention

Outcome measures

Primary outcome

Depression severity as assessed with the Quick Inventory of Depressive Symptoms (QIDS-SR; [18], and the Hamilton Depression Rating Scale (HDRS; [19].

• The QIDS-SR is a 16-item self-rating scale to assess symptom severity of MDD and will be administered prior to each NF session (3 times a week).

• The HDRS is a 17-item clinician-rated scale for estimating severity of depression during the past week. It will be administered once a week by a trained research assistant during the 6-week study period.

Secondary outcome

Remission from Depression Questionnaire (RDQ; [20] and change in AA between frontal cortical regions.

• The RDQ is a 41-item self-rating scale that measures symptomatic and functional remission from depression. It will be administrated once a week during the 6-week study period.

• AA in frontal regions (F3-F4) will be calculated as described in the intervention paragraph above.

Other study parameters

• Demographical data-sheet (date of birth, gender, educational level, marital status).

• The State-Trait Anxiety Inventory (STAI). This instrument measures state and trait anxiety based on 40 items [21].

• General health before and after the treatment will be measured with the RAND-36. Based on 36 items, various dimensions of general health are being measured [22].

• After their last NF-session, participants will be asked to indicate whether, in their opinion, they have received active or sham-treatment.

• Questionnaire “Classificatie van links- en rechtshandige proefpersonen” [23].

Study description

Background summary

Rationale: Neurofeedback (NF), non-invasive operant conditioning of neurophysiological brain activity within a brain-machine interface, has been claimed to represent a new and effective therapy for major depressive disorder (MDD). Although fundamental research data provide support for the potential validity of this approach, no sound scientific data substantiate therapeutic claims. Recently, we obtained pilot data that do support the presumed effectiveness of NF for MDD.

Objective: The objective of this proposal is to examine the efficacy of NF for MDD in a RCT.

Study design: Double-blind placebo controlled intervention study

Study population: 50 Depressed participants between 18-65 years

Intervention: Participants will be randomized (double blind) to active NF aimed to decrease alpha-asymmetry between left and right frontal areas or sham NF. The intervention will be carried out 3 times weekly over 6 weeks (total of maximum 18 NF sessions).

Main study parameters/endpoints: Primary outcome measures are clinical response and remission as assessed with severity measures. Secondary outcome measures are neurophysiological changes throughout the intervention.

Study objective

To examine if neurofeedback (NF), by influencing prefrontal alfa-asymmetry, is an efficacious treatment for major depressive disorder.

Study design

Schematic overview of the study

Week 1 Week 2 Week 3 Week 4 Week 5 Week 6 FU
Baseline 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
SCID-1 interview x
QIDS x x x x x x x x x x x x x x x x x x
HDRS x x x x x x
RDQ x x x x x x x
STAI x x x
RAND36 x x x

All participants will be asked to fill out the QIDS, RDQ, and RAND-36, 3 months after termination of the intervention to assess stability of therapeutic effects. The HDRS and the

QIDS-SR are conventional depression severity rating scales that are widely used in treatment studies for depression. The RDQ is a new instrument designed to assess clinical response and remission as well as improvement of functioning in daily life. In case participants start with a conventional treatment for depression before this 3 months follow-up period, they will be asked to fill out these questionnaires a few days prior to start of treatment. Additionally, a 5-minute baseline EEG will be measured to assess AA. These measurements will take place in our laboratory. Primary endpoints are scores on the QIDS-SR and HDRS as outlined in paragraph 8.1.1. Response and remission criteria for the QIDS-SR is defined as at least 50% reduction from the baseline score, and <6 respectively (see www.ids-qids.org). Response on the HDRS is defined as at least 50% reduction from the baseline score, remission is defined as a score <8 [24].

Intervention

After signing informed consent, participants will be invited to the neurofeedback laboratory of the school for Mental Health and Neuroscience (MheNS). This laboratory is a facility that meets the requirements as outlined in NEN 60601 by the Nederlands Normalisatie-instituut. The intervention will take place while participants sit behind a table and look at a monitor on top of this table. The monitor displays a visual feedback signal (thermometer) based on real-time analysis of their electrophysiologidal data. The participants are instructed to raise the bar of the thermometer (which is indicative of a decrease in AA). During the NF sessions, while being in the laboratory, participants are in constant contact with the research assistant through an audio-channel, additionally there is constant video-surveillance. Prior to the NF session, depression-severity will be assessed as outlined above (see outcome measurements).

EEG-electrodes will be attached following the international 10-20 system at F3, F4, C3, C4, P3 en P4. EEG will be referenced by 2 electrodes attached to the earlobes. Under and above the left eye an electrode will be placed to measure EOG. The electrode will be applied after cleaning the skin with scrubgel. The impedance on all locations will be kept lower than 5 KΩ.

At the start of each NF session, the baseline EEG is being measures without NF to assess baseline AA which serves as a starting point for feedback. Measuring baseline prior to each session is necessary as can be expected that, at least in the active arm, AA decreases over time. Data collection will be channeled through an acquisition PC with a BrainAmp DC EEG amplifier (Brain Products) using a 1000 Hz sample frequency. Online calculations are done by a filter written for BrainVision RecView. The data will be epoched online into 2.048-s epochs that overlap by 75% and then transformed by a fast Fourier transform (FFT) to the frequency domain (frequency resolution 0.488 Hz). Every 0.512 second, the power within the alpha frequency band (7.8 Hz – 13.1 Hz) of both F3 and F4 will be calculated. AA is computed as the difference of the natural log-transformed F3 and F4-alpha power: Ln(F3-alpha) – Ln(F4-Alpha). Current asymmetry is subsequently compared to the personal mean baseline asymmetry. The result of the calculation will be sent to a stimulus PC running Presentation stimulus delivery software (Neurobehavioral Systems) with an 8-bit parallel port (LPT-port) to control a paradigm showing a visual representation of the asymmetry. In the Presentation paradigm, the last 20 values of the asymmetry are used in a moving average to prevent ‘jitter’ in the feedback. Participants receive feedback with visual feedback; they are instructed to increase

the level of a thermometer that is shown on a flatscreen. Additionally, a numerical score below the thermometer indicates their actual total performance. This score is adjusted (i.e. increased) continuously by a number ranging from 0 and 128, depending on the level of the thermometer. In this way a good actual performance (a shift in asymmetry in the desired direction) results in an increasing total score. A big shift in the desired direction results in a rapidly increasing total score, whereas a small shift in the desired direction results in a slow increasing total score. A shift in the undesired direction produced no change in total score. The purpose of this total performance score is to give participants feedback on the differential effect of the sessions.

The sham-NF will be delivered with the same data acquisition protocol, but the AA will be randomly multiplied by +1 or -1, which reduces the correlation between measured brain activity and the visual feedback signal to almost zero. Pilot-data showed that healthy subjects were not able to distinguish between real and sham-NF.

A maximum of 18 NF sessions will be given during 6 weeks. The intervention will be stopped if participants meet criteria for remission (both QIDS-SR and HDRS) before they have received this maximum of 18 sessions. If no clinical response occurs, participants will be offered an evidence-based treatment at the unit for treatment of mood disorders at the RIAGG Maastricht as planned.

Contacts

Public
Department of Psychiatry
University Hospital Maastricht
P.O. Box 5800
F.P.M.L. Peeters
Maastricht 6202 AZ
The Netherlands
043-3874130
Scientific
Department of Psychiatry
University Hospital Maastricht
P.O. Box 5800
F.P.M.L. Peeters
Maastricht 6202 AZ
The Netherlands
043-3874130

Eligibility criteria

Inclusion criteria

In order to be eligible to participate in this study, a subject must meet all of the following criteria:

• Primary axis-1 disorder of Major Depressive Disorder fulfilling DSM-IV criteria [14]. The diagnosis will be based on resuls from the Structured Interview for DSM-IV [15], that is an element of the diagnostic work-up at the RIAGG Maastricht.

• Written informed consent.

Exclusion criteria

A potential subject who meets any of the following criteria will be excluded from participation in this study:

• History of brain trauma (commotio or constusio cerebri) or CVA.

• Current use of antipsychotics, moodstabilizers or benzodiazepines. Current use of antidepressants is permitted if this medication is not changed within a period of 6 weeks prior to participation in the study. Additionally, no changes in antidepressant medication are allowed during active participation in the study.

• Chronic depression (> two years duration).

• Dysthymia as a primary axis-1 diagnosis

• Bipolar disorder or schizophrenia as a primary axis-1 diagnosis

• Severe suicidality (HDRS item # 3 with a score >2) or severe depression symptomatology (HDRS score > 25).

• Pregnancy.

• Age < 18 or > 65 years.

• Daily alcoholintake of >7 units.

Study design

Design

Study type:	Interventional
Intervention model:	Parallel
Allocation:	Randomized controlled trial
Masking:	Double blinded (masking used)
Control:	Placebo

Recruitment

NL

Recruitment status:	Pending
Start date (anticipated):	01-11-2014
Enrollment:	50
Type:	Anticipated

Ethics review

Positive opinion

Date:	17-09-2014
Application type:	First submission

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
NTR-new	NL4649
NTR-old	NTR4792
Other	: METC 13-3-061

Study results

Summary results

Peeters F, Oehlen M, Ronner J, van Os J, Lousberg R (2014) Neurofeedback as a treatment for major depressive disorder--a pilot study. PLoS One 9: e91837.