

Neurofeedback with direct training of specific brain regions compared to other biofeedback training methods in patients with Attention Deficit Hyperactivity Disorder (ADHD)

Submission date 20/01/2010	Recruitment status No longer recruiting	<input type="checkbox"/> Prospectively registered
Registration date 02/02/2010	Overall study status Completed	<input type="checkbox"/> Protocol
Last Edited 02/02/2010	Condition category Mental and Behavioural Disorders	<input type="checkbox"/> Statistical analysis plan
		<input type="checkbox"/> Results
		<input type="checkbox"/> Individual participant data
		<input type="checkbox"/> Record updated in last year

Plain English summary of protocol
Not provided at time of registration

Contact information

Type(s)
Scientific

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Additional identifiers

Study information

Scientific Title
Specificity of tomographic neurofeedback training compared to other biofeedback training methods in patients with ADHD: A randomised controlled trial.

Study objectives

There is growing evidence that neurofeedback training is an effective treatment method for ADHD, but its specificity and underlying mechanisms still need to be explored.

In this study, we investigate specific and unspecific effects of three biofeedback training methods: 1. tomographic neurofeedback, 2. conventional neurofeedback and 3. Electromyogram (EMG) biofeedback.

Ethics approval required

Old ethics approval format

Ethics approval(s)

The Cantonal Ethical Committee of the Canton of Zurich, Subcommittee on psychiatry, neurology, neurosurgery (Kantonale Ethikkommission des Kantons Zürich, Unterkommission für Psychiatrie, Neurologie, Neurochirurgie) approved on the 3rd of October 2008 (ref: E57/2005)

Study design

Single centre prospective controlled randomised parallel groups intervention study

Primary study design

Interventional

Study type(s)

Treatment

Health condition(s) or problem(s) studied

Attention Deficit Hyperactivity Disorder (ADHD)

Interventions

Interventions consist of three biofeedback-training methods, using the same training software and parallel training protocols:

1. Tomographic neurofeedback allows targeting the frontal brain regions which are most affected in ADHD (lateral and mesial), and train patients to modify their activation within these areas according to specific training protocols. To this end, current densities are computed using the standardized Low Resolution Brain Electromagnetic Tomography (sLORETA) algorithm and fed back visually to the subjects in order to change the activation in the particular Regions of Interest (ROIs).
2. In conventional neurofeedback the signal is fed back from the surface of the scalp by one electrode.
3. In EMG-biofeedback, fine motor regulation is fed back.

Duration: 18 double training sessions, over a period of 10-12 weeks. The total follow up time will be 3 months.

Intervention Type

Other

Phase

Not Specified

Primary outcome(s)

1. Clinical ADHD scales (parent-, teacher-, self-report)
2. Neuropsychological tests (subtests from computerised test batteries Test for Attentional

Performance [TAP], Child-TAP [Kinder-TAP; KITAP] and D2)
3. Quantitative Electroencephalography (qEEG) and Event-Related Potentials (ERPs)
Measured at baseline and 3-month follow-up.

Key secondary outcome(s)

Quantitative measures of learned control during the biofeedback training.
Measured at each training session.

Completion date

31/12/2010

Eligibility

Key inclusion criteria

1. Diagnosis of ADHD
2. Children (age >8.5) and adults (age >18).

Participant type(s)

Patient

Healthy volunteers allowed

No

Age group

Other

Sex

All

Key exclusion criteria

1. (Severe) psychiatric comorbidity
2. Neurological diseases
3. IQ<80

Date of first enrolment

01/03/2009

Date of final enrolment

31/12/2010

Locations

Countries of recruitment

Switzerland

Study participating centre

Neumuensterallee 9

Zurich

Switzerland
8032

Sponsor information

Organisation

University of Zurich (Switzerland)

ROR

<https://ror.org/02crff812>

Funder(s)

Funder type

Government

Funder Name

European Union - EU Project (COST-B27 ENOC / C06.0071)

Funder Name

Department of Health of the Canton of Zurich (Switzerland)

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary

Not provided at time of registration

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Participant information sheet	Participant information sheet	11/11/2025	11/11/2025	No	Yes