Effects of a structured 20-session slow-cortical-potential-based neurofeedback program on attentional performance in children and adolescents with attention-deficit hyperactivity disorder: a retrospective analysis of an open-label pilot-approach and 6-month follow-up.

Albrecht JS, Bubenzer-Busch S, Gallien A, Knospe EL, Gaber TJ, Zepf FD.


Abstract

OBJECTIVE: The aim of this approach was to conduct a structured electroencephalography-based neurofeedback training program for children and adolescents with attention-deficit hyperactivity disorder (ADHD) using slow cortical potentials with an intensive first (almost daily sessions) and the second phase of training (two sessions per week) and to assess aspects of attentional performance.

PATIENTS AND METHODS: A total of 24 young patients with ADHD participated in the 20-session training program. During phase I of training (2 weeks, 10 sessions), participants were trained on weekdays. During phase II, neurofeedback training occurred twice per week (5 weeks). The patients’ inattention problems were measured at three assessment time points before (pre, T0) and after (post, T1) the training and at a 6-month follow-up (T2); the assessments included neuropsychological tests (Alertness and Divided Attention subtests of the Test for Attentional Performance; Sustained Attention Dots and Shifting Attentional Set subtests of the Amsterdam Neuropsychological Test) and questionnaire data (inattention subscales of the so-called Fremdbeurteilungsbogen für Hyperkinetische Störungen and Child Behavior Checklist/4-18 [CBCL/4-18]). All data were analysed retrospectively.

RESULTS: The mean auditory reaction time in a Divided Attention task decreased significantly from T0 to T1 (medium effect), which was persistent over time and also found for a T0-T2 comparison (larger effects). In the Sustained Attention Dots task, the mean reaction time was reduced from T0-T1 and T1-T2 (small effects), whereas in the Shifting Attentional Set task, patients were able to increase the number of trials from T1-T2 and significantly diminished the number of errors (T1-T2 & T0-T2, large effects).

CONCLUSION: First positive but very small effects and preliminary results regarding different parameters of attentional performance were detected in young individuals with ADHD. The limitations of the obtained preliminary data are the rather small sample size, the lack of a control group/a placebo condition and the open-label approach because of the clinical setting and retrospective analysis. The value of the current approach lies in providing pilot data for future studies involving larger samples.