Individualized neurofeedback training for ADHD children

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BACKGROUND

Inattention, impulsivity and hyperactivity characterizing ADHD are associated with enhancement amplitude of low frequency range and decreasing amplitude of SMR or low beta EEG oscillations (Lubar et al., 1995). It is the main reason why theta/ beta ratio (TBR) is traditionally used in neurofeedback training (NFT) protocols to treat children with ADHD (Monastra et al., 2005). Still its efficacy is debatable (Cortese et al., 2016). The most probable cause NFT low efficacy level is the absence of individualization in detection of target frequency ranges (Bazanova & Aftanas, 2010). In D.Kaiser (2001) and later in Bazanova and Aftanas (2006) studies it was shown that taking into account individually determined EEG alpha band could improve efficiency of NFT for ADHD. (Bazanova & Aftanas, 2010). Moreover later it was recognized that EEG mean frequency in children with ADHD is slowed down in comparison with healthy peers (Rudo-Hutt, 2014). Both facts reveal the idea that traditional EEG frequency band cannot be applied to ADHD EEG data analysis and NFT application. Consequently theta and beta ranges should be detected according to alpha band. Alpha band width in its turn could be defined easily due to frequency range where Berger effect appears (Bazanova & Vernon 2014).

The question arises if individual EEG frequencies used in NFT will change the treatment efficiency. The aim of this study was to refine NFT protocol for ADHD treatment.