An Investigation of Stimulant Effects on the EEG of Children With Attention-Deficit/Hyperactivity Disorder.

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Abstract

Stimulant medications are the most commonly prescribed treatment for Attention-Deficit/Hyperactivity Disorder (AD/HD). These medications result in a normalization of the EEG. However, past research has found that complete normalization of the EEG is not always achieved. One reason for this may be that studies have used different medications interchangeably, or groups of subjects on different stimulants. This study investigated whether methylphenidate and dexamphetamine produce different levels of normalization of the EEG in children with AD/HD. Three groups of 20 boys participated in this study. There were 2 groups with a diagnosis of AD/HD; one group, good responders to methylphenidate, and the second, good responders to dexamphetamine. The third group was a normal control group. Baseline EEGs were recorded using an eyes-closed resting condition, and analyzed for total power and relative delta, theta, alpha, and beta. Subjects were placed on a 6-month trial of methylphenidate or dexamphetamine, after which a second EEG was recorded. At baseline, the children with AD/HD had elevated relative theta, less relative alpha and beta compared with controls. Baseline differences were found between the two medication groups, with the dexamphetamine group having greater EEG abnormalities than the methylphenidate group. The results indicate that good responders to methylphenidate and dexamphetamine have different EEG profiles when assessed before medication, and these differences may represent different underlying central nervous system deficits. The 2 medications were found to result in substantial normalization of the EEG, with no significant differences in EEG changes occurring between the 2 medications. This indicates that the degree of pretreatment EEG abnormality was the major factor contributing to the degree of normalization of the EEG. As good responders to the 2 medications appear to have different central nervous system abnormalities, it is recommended that stimulant medications be treated independently and not used interchangeably in research and treatment of AD/HD.