Coherence in children with AD/HD and excess alpha power in their EEG.

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Abstract

OBJECTIVE:
This study investigated differences in EEG coherence measures between two groups of children with Attention-Deficit/Hyperactivity Disorder (AD/HD) - one with the more common EEG profile (increased theta), and a group with excess alpha activity as the dominant EEG abnormality.

METHODS:
26 children (aged 9-13 years) with AD/HD were included in each of the excess-theta and excess-alpha groups, and were age- and sex-matched with 26 control subjects. EEG was recorded from 19 electrode sites during an eyes-closed resting condition. Wave-shape coherence was calculated for eight intrahemispheric and eight interhemispheric electrode pairs, for the delta, theta, alpha and beta bands.

RESULTS:
In comparison with the controls, the excess-theta AD/HD group had increased theta intrahemispheric coherences at short-medium inter-electrode distances. Frontally, the excess-theta AD/HD group had increased interhemispheric theta and reduced beta coherences. The excess-alpha group primarily showed increased slow wave (delta and theta) intrahemispheric coherence at short-medium inter-electrode distances, and reduced alpha coherence at longer inter-electrode distances, compared with controls. An increase in frontal interhemispheric theta coherence was also found.

CONCLUSIONS:
These results suggest that AD/HD children with excess alpha power have an underlying connectivity dysfunction in the frontal lobes, which is found in common with other subjects with the excess-theta EEG profile. However, a number of qualitative differences exist that could be associated with other aspects of the AD/HD diagnosis. The excess-alpha group appeared to have fewer frontal-lobe abnormalities than the excess-theta AD/HD group.

SIGNIFICANCE:
This is the first study to investigate coherence in AD/HD children who have the atypical profile of increased alpha power in their EEG.