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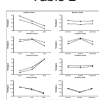
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EEG power and coherence in autistic spectrum disorder

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Abstract

Objective

Autistic spectrum disorder (ASD) has been defined as a neurodevelopmental disorder with associated deficits in executive function, language, emotional, and social function. ASD has been associated with pathophysiology in cerebral organization. The current study investigated quantitative EEG findings in twenty children diagnosed with autistic disorders as compared to 20 controls matched for gender, age and IQ.

Methods

The EEG was recorded during an eyes-closed resting condition and topographical differences in cerebral functioning were examined using estimates of absolute, relative, and total power, as well as intrahemispheric and interhemispheric coherences.

Results

There were group differences in power, intrahemispheric and interhemispheric coherences. Findings included excessive theta, primarily in right posterior regions, in autistics. There was also a pattern of deficient delta over the frontal cortex and excessive midline beta. More significantly, there was a pattern of underconnectivity in autistics compared to controls. This included decreased intrahemispheric delta and theta coherences across short to medium and long inter-electrode distances. Interhemispherically, delta and theta coherences were low across the frontal region. Delta, theta and alpha hypocoherecence was also evident over the temporal regions. Lastly, there were low delta, theta and beta coherence measurements across posterior regions.

Conclusions

These results suggest dysfunctional integration of frontal and posterior brain regions in autistics along with a pattern of neural underconnectivity. This is consistent with other EEG, MRI and fMRI research suggesting that neural connectivity anomalies are a major deficit leading to autistic symptomatology.

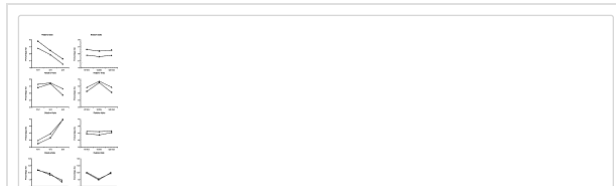
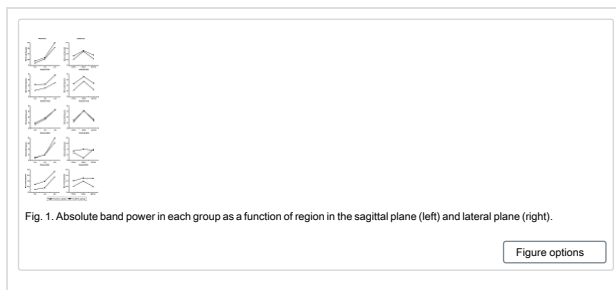
Significance

This paper reports the largest integrated study of EEG power and coherence during a resting state in children suffering autism spectrum disorder.

Keywords

Autism; Children; EEG; Coherence; Diagnosis

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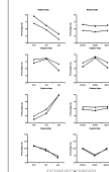


Fig. 2. Relative band power in each group as a function of region in the sagittal (left) and lateral (right) planes.

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