Functional Imaging Changes in the Medial Prefrontal Cortex in Adult ADHD

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Objective: Functional imaging studies have found reduced frontal activity, mainly in dorso/ventro-lateral regions and reduced task-related de-activation of the default mode network in childhood ADHD. Adult studies are fewer and inconclusive. We aimed to investigate the potential neural bases of executive function in ADHD adults, examining brain activity during N-back task performance, and to explore the potential corrective effects of long-term methylphenidate treatment.

Method: We recruited a large adult ADHD-combined sample and a matched control group and obtained functional magnetic resonance imaging (fMRI) images during task. ADHD participants were subdivided in a group under long-term treatment with methylphenidate (washed out for the scan) and a treatment-naive group.

Results: ADHD participants showed deficient de-activation of the medial prefrontal cortex during 2-back task, implying default mode network dysfunction. We found no relationship between blunted de-activation and treatment history.

Conclusion: As de-activation failure in the medial frontal cortex is linked to lapses of attention, findings suggest a potential link to ADHD symptomatology.