Aerobic Exercise and Attention Deficit Hyperactivity Disorder: Brain Research.

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Abstract
PURPOSE:
As adjuvant therapy for enhancing the effects of stimulants and thereby minimizing medication doses, we hypothesized that aerobic exercise might be an effective adjunctive therapy for enhancing the effects of methylphenidate on the clinical symptoms, cognitive function and brain activity of adolescents with attention deficit hyperactivity disorder (ADHD).

METHODS:
Thirty-five adolescents with ADHD were randomly assigned to one of two groups in a 1:1 ratio; methylphenidate treatment + 6 week exercise (Sports-ADHD) or methylphenidate treatment + 6 week education (Edu-ADHD). At baseline and following 6 weeks of treatment, symptoms of ADHD, cognitive function, and brain activity were evaluated using DuPaul’s ADHD rating scale (K-ARS), the WCST, and 3 Tesla functional magnetic resonance imaging, respectively.

RESULTS:
The K-ARS total score and perseverative errors in the Sports-ADHD group decreased, compared to those in Edu-ADHD group. Following the 6 week treatment period, the mean β value of right frontal lobe in the Sports-ADHD group increased, compared to the Edu-ADHD group. The mean β value of the right temporal lobe in the Sports-ADHD group decreased. However, the mean β value of the right temporal lobe in the Edu-ADHD did not change. The change in activity within the right prefrontal cortex in all adolescents with ADHD was negatively correlated with the change in K-ARS scores and perseverative errors.

CONCLUSIONS:
The current results indicate that aerobic exercise increased the effectiveness of methylphenidate on clinical symptoms, perseverative errors and brain activity within the right frontal and temporal cortices in response to WCST stimulation.