

Neurocognitive and Behavioral Significance of Periodic Limb Movements during Sleep in Adolescents with Attention-Deficit/Hyperactivity Disorder

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Abstract

STUDY OBJECTIVES:

The purpose of this study is to examine the association of abnormal periodic limb movements (PLMS) with neurocognitive and behavioral outcomes in adolescents with attention-deficit/hyperactivity disorder (ADHD) from the general population.

METHODS:

421 adolescents (17.0 ± 2.2 y, 53.9% male) from the Penn State Child Cohort, a random general population sample, underwent 9-hour polysomnography, clinical history, physical examination, neurocognitive evaluation, and completed the Child or Adult Behavioral Checklist (C/ABCL). The presence of ADHD was ascertained by parent- or self-report of receiving a diagnosis of ADHD. PLMS was defined as a PLM index (PLMI) ≥ 5 events per hour of sleep.

RESULTS:

Adolescents with ADHD had a significantly higher PLMI (5.4 ± 7.3) and prevalence of PLMS (35%) as compared to controls (3.4 ± 5.6 , $p=0.006$ and 21%, $p=0.004$). Significant interactions between ADHD and PLMS showed that adolescents with both disorders were characterized by deficits in control interference, as measured by Stroop test, and elevated internalizing behaviors, as measured by C/ABCL. ADHD severity and externalizing behaviors were elevated in a dose-response manner across ADHD-alone and ADHD+PLMS groups. The association of ADHD with other neurocognitive functions did not vary as a function of PLMS.

CONCLUSIONS:

PLMS is significantly more frequent in adolescents with ADHD. Importantly, adolescents with both disorders not only have worse neurobehavioral functioning than adolescents with ADHD-alone but specifically presented with executive deficits and anxiety symptoms. These data suggest that PLMS may be a marker of more severe underlying neurobiological deficits in adolescents with ADHD and comorbid internalizing problems.