Concordance of actigraphy with polysomnography in children with and without attention-deficit/hyperactivity disorder

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Summary
This study sought to: (1) compare actigraphy-derived estimated sleep variables to the same variables based on the gold-standard of sleep assessment, polysomnography; (2) examine whether the correlations between the measures differ between children with attention-deficit/hyperactivity disorder and typically developing children; and (3) determine whether these correlations are altered when children with attention-deficit/hyperactivity disorder are treated with medication. Participants (24 attention-deficit/hyperactivity disorder; 24 typically developing), aged 6–12 years, completed a 1-week baseline assessment of typical sleep and daytime functioning. Following the baseline week, participants in the attention-deficit/hyperactivity disorder group completed a 4-week blinded randomized control trial of methylphenidate hydrochloride, including a 2-week placebo and 2-week methylphenidate hydrochloride treatment period. At the end of each observation (typically developing: baseline; attention-deficit/hyperactivity disorder: baseline, placebo and methylphenidate hydrochloride treatment), all participants were invited to a sleep research laboratory, where overnight polysomnography and actigraphy were recorded concurrently. Findings from intra-class correlations and Bland–Altman plots were consistent. Actigraphy was found to provide good estimates (e.g. intra-class correlations >0.61) of polysomnography results for sleep duration for all groups and conditions, as well as for sleep-onset latency and sleep efficiency for the typically developing group and attention-deficit/hyperactivity disorder group while on medication, but not for the attention-deficit/hyperactivity disorder group during baseline or placebo. Based on the Bland–Altman plots, actigraphy tended to underestimate for sleep duration (8.6–18.5 min), sleep efficiency (5.6–9.3%) and sleep-onset latency, except for attention-deficit/hyperactivity disorder during placebo in which actigraphy overestimated (−2.1 to 6.3 min). The results of the current study highlight the importance of utilizing a multimodal approach to sleep assessment in children with attention-deficit/hyperactivity disorder.