

Background: Attention Deficit/Hyperactivity Disorder (ADHD), characterized by inattention, hyperactivity, and impulsivity, may confound post-concussion evaluations, particularly during tasks where attention is divided (i.e., dual-task tests). Athletes with ADHD may perform worse on pre-season neurocognitive testing and exhibit more severe symptoms, independent of concussion, than those without ADHD. However, the relationship between pre-concussion ADHD diagnosis and dual-task performance after concussion is unknown.

Hypothesis/Purpose: Our purpose was to investigate whether adolescents with a recent concussion performed differently on single- and dual-task postural control evaluations based on pre-concussion ADHD diagnosis. We hypothesized that those with pre-concussion ADHD would exhibit worse dual-task cognitive performance and slower dual-task tandem gait completion time than those without ADHD, despite similar single-task tandem gait test performance.

Methods: We assessed adolescents within 18 days following concussion. The assessment included demographic and medical history questionnaires, single- and dual-task timed tandem gait, cognitive response accuracy during dual-task tandem gait, and the modified Balance Error Scoring System (mBESS). We grouped participants based on prior ADHD diagnosis and compared groups on single- and dual-task tandem gait completion time, dual-task tandem gait cognitive response accuracy, and mBESS total errors.

Results: We enrolled 107 adolescents. 18 participants (17%) reported a pre-concussion ADHD diagnosis; 89 participants (83%) did not. The groups differed in the proportion of female participants ($p=0.02$), Hispanic or Latine participants ($p=0.04$), and participants who experienced loss of consciousness (LOC) at time of injury ($p=0.04$). All other group characteristics were similar (Table 1). There were no significant between-group differences in single- or dual-task tandem gait completion time, or mBESS errors. Participants with ADHD had worse cognitive accuracy during dual-task tandem gait testing than participants without ADHD. After adjusting for potentially confounding covariates (sex, ethnicity, and LOC at time of injury), dual-task cognitive accuracy was significantly associated with pre-concussion ADHD diagnosis ($\beta=-0.12$; 95% CI=-0.21, -0.03; $p=0.01$). On average, participants with ADHD had 12% (95% CI=3, 21%) worse cognitive accuracy during dual task tandem gait compared to those without ADHD.

Conclusion: Participants with ADHD demonstrated worse cognitive, but not postural control, performance during dual-task timed tandem gait compared to patients without ADHD. Participants with ADHD may prioritize the motor task over cognitive task accuracy during tests that require divided attention after concussion. Incorporating dual-task assessments into concussion evaluation may help identify deficits not detected with single-task postural control measures, particularly among those with ADHD.