AAN SPORTS CONCUSSION CONFERENCE ABSTRACT

Media Contacts:
M.A Rosko, mrosko@aan.com, (612) 928-6169
Renee Tessman, rtessman@aan.com, (612) 928-6137

EMBARGOED FOR RELEASE UNTIL 4 P.M. ET., WEDNESDAY, JULY 29, 2020

Abstract Title: Driving Reaction Time Versus Computerized Reaction Time Deficits Following Concussion: Implications for Return to Driving Recommendations

Objective: To compare simulated driving reaction time (RT) between concussed and control individuals and examine Driving-RTs relationship with computerized neurocognitive testing RT (CNT-RT).

Authors: Landon Bryce Lempke[1], Robert Lynall[1], Nicole Hoffman[2], Hannes Devos[3], Julianne Schmidt[1]
[1]University of Georgia, [2]Illinois State University, [3]University of Kansas Medical Center

Background: Concussed patients have impaired RT and neurocognition following injury that may linger and impair driving performance. Limited research has used direct methods to assess driving-RT post-concussion.

Design/Methods: We employed a cross-sectional laboratory study among 14 concussed and 14 healthy age, sex, and driving experience-matched controls (female: 60%; Age: 20.3 ± 1.1 years). Participants completed driving-RT and CNT-RT (CNS Vital Signs) within 48 hours of asymptomatic (15.9 ± 9.8 days post-concussion). Driving-RT consisted of two simulated driving scenarios: Stoplight (green to yellow stoplight change) and Pedestrian (child running in front of vehicle). CNT-RT outcomes included: simple-, complex-, Stroop-, and composite-RT. Independent t-tests and Hedges' g effect sizes assessed between-group RT differences (seconds), and Pearson correlation coefficients examined relationships between driving-RT and CNT-RT ($\alpha = 0.05$) outcomes.

Results: Concussed participants demonstrated slower complex-RT than controls (mean difference: 0.06s; 95% CI: 0.11, 0.01; $p = 0.03$; $g = 0.86$). No other driving- or CNT-RT outcomes were statistically significant ($p \geq 0.06$), but Stoplight- ($p = 0.13$; $g = 0.61$) and Pedestrian-RT ($p = 0.40$; $g = 0.36$) demonstrated low- to high-magnitude effects for concussed deficits. Complex-, Stroop-, and composite-RT moderately correlated with Stoplight-RT ($p < 0.05$; $r = 0.51$, 0.48, 0.52, respectively). No other significant correlations existed between any driving- and CNT-RT outcomes ($p > 0.05$; r range: -0.19, 0.05).

Conclusions: Post-concussion driving- and CNT-RT outcomes overall normalized once asymptomatic, but complex-RT and large magnitude effects may indicate lingering deficits. Driving- and CNT-RT measures moderately correlated with each other, but a lack of strong correlation likely indicates driving responsiveness is not thoroughly assessed using traditional CNT post-concussion, which may have vital driving safety implications.