TACSM Abstract

Analysis of Cognitive Deficits of Concussion Patients: Dual Task, Motor Cognition, and Memory

Quezada J, Rausch RD, Shaughnessy MF, and Barlow MA

Exercise Physiology Laboratory; Department of Biology; Eastern New Mexico University; Portales, NM

Category: Masters

Advisor / Mentor: Barlow, Matthew (Matthew.Barlow@enmu.edu)

ABSTRACT

The severity of a concussion is determined by the magnitude of the force of impact and the symptoms expressed post-injury. The most current and widely used test to identify a concussion in college athletics is called the Immediate Post Concussion Assessment and Cognitive Testing (ImPACT). It is a computerized neurocognitive test battery that measures different cognitive abilities and compares baseline with post-injury results. In the current study we formulated a series of physical and psychological cognition tests that measure similar cognitive abilities as the ImPACT. The purpose of this study is to demonstrate that physical tests paired with neurocognitive tests are a better determinate of post-concussion symptoms in athletes than a sedentary neurocognitive battery test alone. Such tests included balance, memory, spatial relations, attention and reaction time. Three different groups of post-concussed history were statistically compared. Group one (controls), consisted of participants with no previous history of a concussion (n=32). Group two (concussed), consisted of participants with a concussion in the past three months and who had recently been cleared to resume full sports activities (n=11). Group three (multiple concussed), consisted of participants with at least five concussions in their lifespan (n=7). A one-way ANOVA and two-tailed independent t-test were ran to observe any differences in tests between groups ($p<0.05$). Also, interval and main effects plots where made. The results showed no statistical significance between the groups in the tests. However, the concussed group had a greater range of scores in almost every test when compared to the control and multiple concussed groups. The Dual-Task abilities test show greater differences between the groups concluding that an addition of a simple physical test to a cognitive test created a greater cognitive impairment on concussed participants. The explanation of a greater range in concussed participants can be due to the uniqueness and specificity of a concussion per participant, as every participant experience its own unique concussion. Overall, we came to the conclusion that our tests were able to measure balance and cognitive deficit differences between groups. When the participants where challenged in the Dual-Task tests (physical and cognition), there was a greater neurocognitive impairment present as the ImPACT did indicate. Future direction of this project will increase the number of participants as well as directly compare neurocognitive battery tests with the Dual-Task tests.