Sensory Integration in Adolescents with a History of Multiple Concussions

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Past research has shown that athletes have higher susceptibility to multiple concussive events after initial injury. Novel understanding of the detrimental effects of multiple concussions have resulted in a need for investigation a potential deficits associated with multiple concussive events. Studies have demonstrated that neuronal damage can result in the early onset of dementia-related symptoms and chronic traumatic encephalopathy. This study aimed to examine the sensory integration of high school athletes with a history of multiple concussive injuries using virtual reality as a novel approach to isolate visual dependence and discover differences in reaction and postural sway. Two sets of high school aged participants were used comprising of one set composed of students who had experienced more than one concussion and another who had no history of concussive events, which was used as a control. The participants experienced several virtual reality scenes including two star scenes as well as a park scene, allowing for the reaction time and body movement of each participant to be recorded and mapped in order to comprehensively document the sensory integration ability of athletes. In tandem with reaction time, the postural sway and balance of participants was recorded to establish a correlation between sensory integration and motor output. This correlation further reveals the pivotal influence of sensory integration on athlete's vulnerability to concussive events. This can be determined through the movement of a participant's head in a 3D environment. Expanding our understanding allows for the development of new and novel therapies to better rehabilitate athletes.

Awards Won:
Intel ISEF Best of Category Award of $5,000
First Award of $3,000
American Psychological Association: Certificate of Honorable Mention