Sex-related differences in oculomotor and cognitive abilities in asymptomatic varsity athletes

Michael Modica

Supervisor: Loriann Hynes

When an athlete is diagnosed with a concussion, rest is commonly the first course of action. Typically, athletes work through a progressive routine of physical and cognitive activities with the assumption that that once an athlete is ready to return to play, their visual and cognitive abilities have reached their perceived normal. The purpose of this research study was to evaluate if sex-related differences presented in oculomotor and cognitive testing for asymptomatic athletes. We tested 133 asymptomatic athletes pre-season; 79 reported no concussion history (36 females, 43 males) and 54 with a history of concussion (28 females, 26 males). Virtual reality (VR) goggles and eye tracking technology (Saccade analytics, Neuroflex) were used to observe differences in oculomotor and cognitive outcomes.

The Stroop task was administered using the VR goggles; overall, females performed significantly better than males (p=0.015). Interestingly, when we investigated further females with a history of concussion performed better than those without (p=0.037). There was no significant difference between the sexes, with and without concussion history for the visual reaction and oculomotor tasks.

This study demonstrates that asymptomatic athletes with and without a previous history of concussion do not show a significant performance difference on visual reaction and oculomotor tasks. Cognitive performance, however, does exhibit sex-related differences which may be due to the nature of the task (males tended to execute the test faster, making more errors). This research provides an example of objective visuomotor and cognitive testing that can be used to further explore sex-related differences in concussion injury effects.