Using Virtual Reality to Test Balance in Athletes Following Concussion

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Current testing for return to athletic activity following a concussion is controversial and is generally based on a series of cognitive tests and assessments of gross balance activity (such as timed standing with the eyes opened and closed with the feet in different positions). The use of inexpensive and commercially available virtual reality (VR) to manipulate the visual surrounding to promote body sway, but not the loss of balance, could provide clinicians and trainers with another tool to use for establishing readiness to return. The purpose of this study is to examine balance in athletes who are at least 2-weeks post-concussion and have received medical clearance to return to practice/play and age, gender, and sport matched athletes who have no history of concussion. Body sway while standing still with the eyes opened, eyes closed, and with a VR scene translating forward and backward at 0.1 Hz is assessed through analysis of center of pressure movement (COP) recorded with a force plate, a commonly used device for assessing balance. We have examined center of pressure movement in 3 recently concussed female athletes and 2 controls.   Though we hypothesized that both groups would have similar levels of body sway on the standard balance tests (eyes open and eyes closed conditions), and body sway would be different in the concussion group compared to the control when viewing the translating scene, our preliminary analysis shows little difference between the two groups. This preliminary finding could be due to our small sample of analyzed data, but it could also be attributed to the length of time from clearance to resume activity to our test of body sway (over 2 months).