The Effect of Sport-Related Concussions on Balance Stability

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NCUR UNC Asheville 30th Annual Conference April 7-9 2016

Background

- Long-Term effects of concussions are not well documented.
- Balance problems are one of the most commonly reported physical symptoms following sport-related concussions.
- Giving subjects a cognitively demanding task (cognitive load) has been shown to negatively effect gait., especially immediately after concussion.

Participants (Preliminary)

- *Male college students ages 18-24, who played 3 years of high school football.*
- *Groups*
  - *Football Concussed (N = 12)*
  - *Football Non-Concussed (N=8)*

Hypothesis

- College students who played football in high school and experienced a concussion will show larger increases in the amount of sway under dual task conditions than college students who played high school football but never experienced a concussion.

Materials

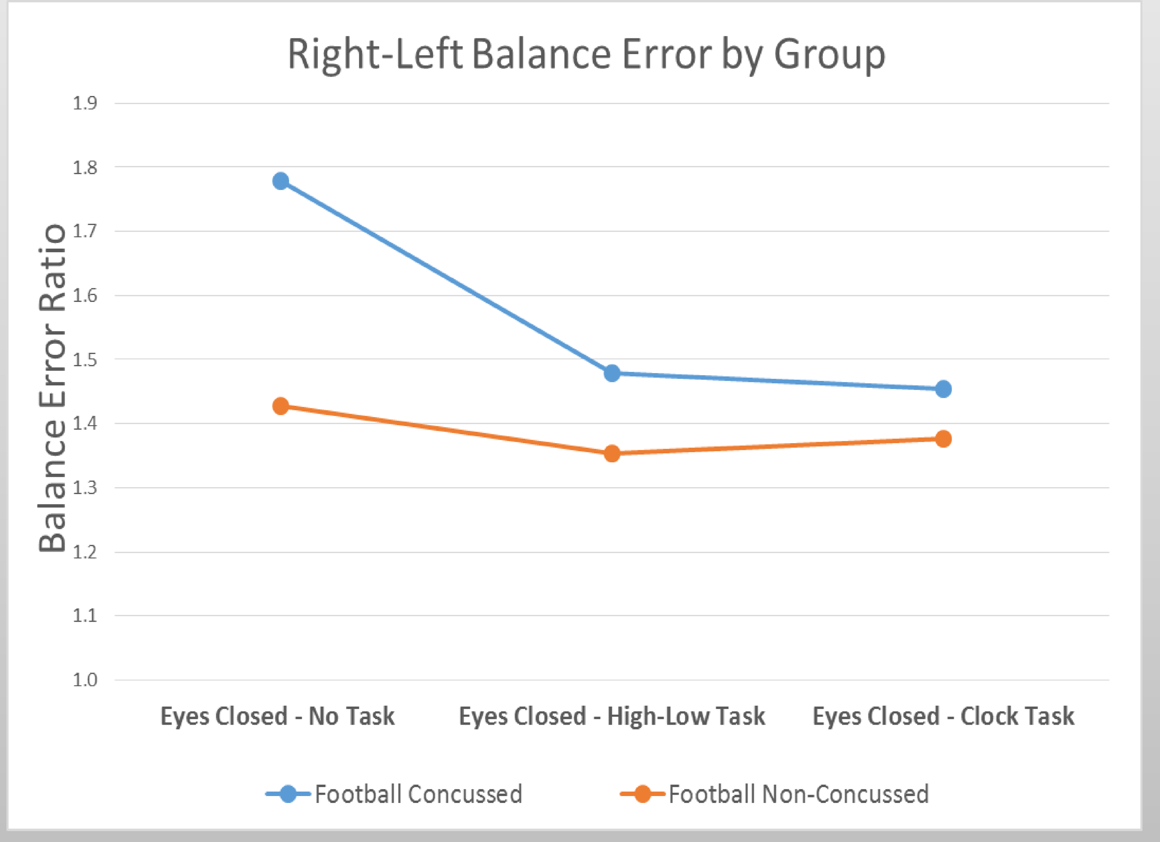
- Balance board with pressure sensors to measure balance stability
- Biopac amplifier to record data from balance board

Procedure

- *Questionnaire of high school sports history*
- Stance used – feet together, hands on hips.
- *Balance Conditions*
  - *Eyes Open Baseline*
  - *Eyes Closed*
  - *Eyes Closed with Auditory Stroop*
  - *Eyes Closed with Clock-Task*

Stance used by subjects in all conditions.

Preliminary Results



Preliminary Conclusions

- Eyes-Open Condition: Both groups showed similar balance stability.
- Eyes-Closed Condition: Both groups showed increased instability. Concussed group showed twice as much instability as the No Concussion group.
- Eyes Closed with Cognitive Load: Adding a cognitive load to eyes closed condition had little if any effect on the No Concussion group but enhanced balance stability in the Concussed group.

Implications & Next Steps

- Under normal conditions (eyes-open) previously concussed individuals use visual feedback to compensate for long-term balance issues they may be experiencing. However, once the visual information is removed (eye-closed, no task) balance issues become observable to the individual.
- Adding a cognitive task may facilitate balance for concussed individuals because it draws their attention away from their much increased instability and allows more automated balance mechanisms to take over.
- We will eventually add comparison groups that include concussed and non-concussed male college students who played non-contact sports in high school. This will allow us to determine the extent to which repetitive, sports-related, head impacts might also influence long term balance problems.