Balance control in varsity athletes with a history of recent concussion (> 3 months) during a lower limb reaching task.

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BACKGROUND
A sport-related concussion (SRC) can affect sensorimotor and cognitive function. Deficits in balance control, may persist beyond resolution of symptoms.

OBJECTIVE
To assess balance control in athletes with previous SRC >3 months beyond medical clearance compared to athlete without SRC during a visuomotor reaching task.

FINDINGS
Athletes with recent history of SRC exhibited poor neural control of COP displacement in the A-P plane during a combined visuomotor balance task.

METHODS
Participants (N=26) were divided into SRC (n=13) and CONTROL (n=13) groups. Participants stood in single support and were instructed to hover their non-stance limb over the GREEN FitLights and withhold movement for the RED FitLights to extinguish them as quickly as possible. A total of 6 trials (3 trials x 2 feet) of approximately 45 seconds each were completed.

Data Collection: Nintendo Wii Balance Board (WBB) (100Hz) & FitLight Trainer™ lights (Aurora, ON, Canada).

Data Analysis: RMS displacement of COP (dCOP) in the A-P and M-L directions was calculated. The A-P dCOP signal was further analyzed using a mean power frequency analysis (MPF) between 0.1 to 1.0Hz.

RESULTS
No significant effects between groups were observed for A-P or M-L RMS dCOP during the visuomotor reaching task.

DISCUSSION & IMPLICATIONS
• ↑ mean power in the low frequency (0-0.3Hz) of the A-P signal is indicative of greater reliance on the visual system to perform the visuomotor balance task (0.3-1.0Hz= vestibular & somatosensory).
• Asymptomatic athletes > 3 months post-concussion demonstrated ↓ feedforward anticipatory control while performing a dynamic balance task with a cognitive component.
• Assessment of visuomotor integration and balance control may identify reduced performance in asymptomatic athletes post-concussion compared to their age-, sex- and position-matched teammates.
• Implementation during rehabilitation may help determine when medical clearance is appropriate for safer return to sport after a concussion injury.

REFERENCES

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