Poster #: 17

Abstract Title: The Evaluation of Near Point Convergence (NPC) and modified Balance Error Scoring System (mBESS) in Acutely Concussed Athletes in Comparison to their Healthy Baseline and its Association with Recovery Length.

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ABSTRACT:

Abstract Theme: Mild TBI / Concussion

Topic(s) of Interest: Clinical Research

Purpose of Project: The purpose of this study was to (1) Evaluate the acute effects of concussion on vision and balance in comparison to pre-injury baseline values (2) Compare post-injury vision and balance parameters in those with normal recovery (<28 days) and those with delayed recovery (=28 days).

Methods, Procedure, Results/Outcome, Conclusion: Methods: This study was a subset of a prospective longitudinal cohort study recruiting healthy and concussed athletes between September 2016 and February 2019 at a Canadian university. Forty-one athletes with healthy pre-injury baseline and acute post-injury (PI) assessments were included. Athletes were then stratified into one of two groups based on recovery length (days to recovery < 28 days and = 28 days). A concussion diagnosis was made by a sport medicine physician in accordance with the Concussion in Sport Group guidelines. Primary outcome measures for both study objectives included NPC and mBESS assessments.

Procedures: Participants were assessed prior to the start of their competitive season and within one-week following concussion. Participants completed a self-report 27-item symptom inventory similar to the symptom evaluation from the Sport Concussion Assessment Tool 5 (SCAT5). Three NPC tests were completed at each assessment. NPC was determined as the point at which diplopia was reported or the outward deviation of the eye was observed. NPC average and difference were calculated. Balance was assessed using the mBESS on the C3 Logix application (NeuroLogix Technologies, Cleveland, Ohio) which consisted of three stance positions: double, single, and tandem stance. Balance measures include number of errors and ellipse volume in each position, total errors, and average ellipse. For the statistical analysis of both objectives, a Bayesian framework was employed to model group differences in vision and balance measures.

Results: Following acute concussion, no differences were observed in NPC average (estimated difference=0.36, 89% credible interval=0.00-0.72) and NPC difference (estimate difference= 0.45, 89% credible interval=0.1-0.8) in comparison to healthy baselines. Similar results were identified within the mBESS stance errors and ellipse volume with no differences identified acutely PI in comparison to healthy baseline. No differences in NPC or mBESS measures were observed between those with normal and delayed recovery.

Conclusions: No differences in NPC and mBESS were observed acutely post-concussion. Moreover, NPC and mBESS measures were not associated with length of recovery following concussion. This contrasts previous literature and expected findings, however, highlights the complexity of post-concussion evaluation. Furthermore, it is possible that PI balance and vision deficits may have resolved prior to PI assessment.