

Assessing the Effects of Sub-Concussive Head Impacts on Clinical Measures of Neurologic Function

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Abstract : Sub-concussive impacts occur frequently in collision sports such as American tackle football. Sub-concussive level impacts are defined as hits to the head that do not result in the clinical manifestation of concussion injury. Presently, there is limited information known about the short-term effects of repeated sub-concussive blows to the head. Therefore, the purpose of this investigation was to determine if standard clinical measures could detect acute impairments in neurologic function resulting from the accumulation of sub-concussive impacts throughout a season of high school American tackle football. Simple reaction time using the ruler-drop test, and oculomotor performance using the King-Devick (KD) test, were assessed in 15 athletes prior to the start of the athletic season, then repeated each week of the season, and once following its completion. The mean reaction times and fastest KD scores that were recorded or calculated from each study participant and from each test session were analyzed to assess for change in reaction time and oculomotor performance over the course of the American tackle football season. Analyses of KD data revealed improvements in oculomotor performance from baseline measurements (i.e., decreased time), with most weekly comparisons to baseline being significantly different. Statistical tests performed on the mean reaction times obtained via the ruler-drop test throughout the season revealed statistically significant declines (i.e., increased time) between baseline and weeks 3, 4, 10, and 12 of the athletic season. The inconsistent and contrasting findings between KD data and reaction time demonstrate the need to identify more robust clinical measures to definitively assess if repeated sub-concussive impacts to the head are acutely detrimental to patients.

Keywords : head injury, mTBI and sport, subclinical head trauma, sub-concussive impacts

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