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Vestibular/Ocular motor and balance assessment in sports related concussion: A physical therapy approach to assess concussion

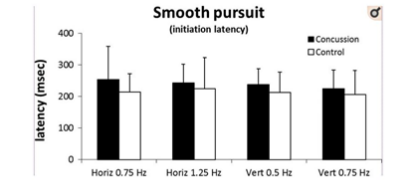
Markus M. Ernst

Plasticity Brain Centers, USA.

Abstract

Statement of the Problem: The awareness of concussion especially in sports has increased significantly over the last decade. An estimated 1.6 to 3.8 million sports-related concussions (SRC), occur each year in the United States. It is becoming more and more common for primary care physicians to refer patients with concussion symptoms to physical therapists who are trained "concussion specialists". Many of these highly trained physical therapists use state of the art equipment like Videonystagmography (VNG) and computerized posturography (CPG) to assess athletes suffering from concussion. The vestibular system is a complex network that includes small sensory organs of the inner ear and neurological pathways to the brain stem, cerebellum, cerebral cortex, ocular system, and postural muscles. Methodology & Theoretical Orientation: Over the last 12 months, VNG (Difra) and CPG (NeuroCom) assessments have been collected and evaluated from 50 athletes (male and female) from different kind of sports. Findings: VNG and CPG assessments performed and analyzed by highly trained physical therapists are reliable assessment tools with high evidence for sports related concussions. Conclusion & Significance: Athletes in the USA, suffering SRC, use physical therapists as a first line of care for concussion assessment and rehabilitation. Vestibular/Ocular motor testing and computerized posturography can be an evidence-based tool to assess concussion in physical therapy. However, more research how vestibular/ocular motor testing and computerized posturography can be utilized to assess sports related concussion is necessary.

Figure 1.



Horizontal and vertical SP test initiation latencies. Shown are the means ± SD for the latencies to start SP tracking at the start of SP tests. Values are shown for concussion subjects (black bars, $n = 50, 49, 49$, and 48, from left to right) and controls (white bars, $n = 170, 169, 165$, and 165, from left to right). Differences are small but significant (by Mann-Whitney *U*) in the 4 SP tests shown. SP indicates smooth pursuit; SD, standard deviation.

Biography

Markus M. Ernst started his career as a physical therapist in Germany and moved to the United States in 2011. He became an expert in using videonystagmography (VNG) and computerized posturography (CPG) in assessing sports related concussion and other brain injuries and brain disorders. After spending years in research and his experience, he developed his own neuro-rehabilitation program utilizing multi-axle rotational devices with individualized movement protocols according to the test results from VNG and CPG. His approach using state of the art diagnostic and treatment tools has revolutionized physical therapy for brain injuries and brain disorders in the USA.

Publication

- Kelly KM, Kiderman A, Akhavan S, et al. Oculomotor, Vestibular, and Reaction Time Effects of Sports-Related Concussion: Video-Oculography in Assessing Sports-Related Concussion. J Head Trauma Rehabil. 2019;34(3):176–188. doi:10.1097/HTR.0000000000000437
- McKeithan L, Hibshman N, Yengo-Kahn AM, Solomon GS, Zuckerman SL. Sport-Related Concussion: Evaluation, Treatment, and Future Directions. Med Sci (Basel). 2019;7(3):44. Published 2019 Mar 15.
- Alsalaheen BA, Whitney SL, Marchetti GF, et al. Relationship Between Cognitive Assessment and Balance Measures in Adolescents Referred for Vestibular Physical Therapy After Concussion. Clin J Sport Med. 2016;26(1):46–52.
- Elbin RJ, Sufrinko A, Anderson MN, et al. Prospective Changes in Vestibular and Ocular Motor Impairment After Concussion. J Neurol Phys Ther. 2018;42(3):142–148.
- Visscher RMS, Feddermann-Demont N, Romano F, Straumann D, Bertolini G. Artificial intelligence for understanding concussion: Retrospective cluster analysis on the balance and vestibular diagnostic data of concussion patients. PLoS One. 2019;14(4):e0214525.

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