

Post-concussion, peripheral vision reaction times substantially impaired

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After a concussion occurs, symptoms most commonly experienced are headache, dizziness, memory problems and sleep disturbances, as well as visual dysfunction. Such symptoms can be difficult to quantify and follow in patients on a long-term basis.

Patient reports of feeling 'slower than normal' after a concussion have been associated with visual dysfunction of the central vision reaction times (CVRT). However, until now, little research has been done on [peripheral vision](#) reaction times (PVRT) post-concussion. In athletes, where slowed reaction time can put them at higher risk for injury or re-injury, monitoring reaction times in players can be a key assessment before allowing them to return to play.

Results of a study conducted at the University of Cincinnati College of Medicine reported that patients who sustained a concussion, followed by symptoms of visual dysfunction, experienced significantly delayed central and peripheral vision reaction times when compared with a [control group](#) of patients with no history of concussion. The study is published online this month by the *Clinical Journal of Sport Medicine*.

"We concluded that CVRT and PVRT are both substantially slowed in patients with post-concussion visual dysfunction with the PVRT being disproportionately prolonged when compared with the healthy control group," says Joe Clark, PhD, professor in the Department of Neurology and Rehabilitation Medicine.

"Disturbances to peripheral vision can have major implications not only on performance, but also safety, including sports-related return-to-play decisions," says Clark. "Peripheral vision in particular plays an important role in protecting athletes from impending impacts because they must see and react to events in their periphery."

Similarly, peripheral vision is important in day-to-day activities of the general population, namely balance and driving. Studies have found that visual sensory symptoms following a concussion can actually be useful indicators and aid in [concussion management](#), but those studies generally depend upon reliable baselines. The current study suggests that comparing central to peripheral [reaction times](#) are less dependent upon baselines. Not requiring baselines might make the measurement of the PVRT to CVRT ratio a very useful diagnostic method.

The pilot study used the Dynavision D2, a visual motor and neuro-cognitive rehabilitation and sports training device used by occupational, physical and speech therapists, neurologists, athletic trainers, coaches and tactical professionals.

For athletes, current return-to-play guidelines rely heavily on self-reporting of symptoms, which can be flawed in its subjectivity, Clark says.

"There is a need for methods to objectively assess a patient's [concussion](#) symptoms, in order to best aid their recovery over time. Based on this preliminary study ... data on CVRT and PVRT and the ratio between them may provide objective diagnostic data independent of [symptoms](#) subjectively reported by the patient."

More information: Joseph F. Clark et al, Analysis of Central and Peripheral Vision Reaction Times in Patients With Postconcussion Visual Dysfunction, *Clinical Journal of Sport Medicine* (2017). [DOI:](#)

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