Sideline test accurately detects athletes' concussions in minutes, study shows

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A simple test performed at the sideline of sporting events can accurately detect concussions in athletes, according to study by researchers at the University of Pennsylvania School of Medicine. Current sideline tests can leave a wide amount a brain function untested following concussion. Penn researchers showed that this simple test was superior to current methods and accurately and reliably identified athletes with head trauma. The study appears online now in *Neurology*.

The one-minute test involves the athlete reading single digit numbers displayed on index-sized cards. Any increase (worsening) in the time needed to complete the test suggests a concussion has occurred, particularly if the delay is greater than five seconds compared to the individual's baseline test time.

The test, called the King-Devick test, captures impairments of eye movement, attention, language and other symptoms of impaired brain function. It looks at saccadic and other types of eye movements that are frequently abnormal following a concussion.

"This rapid screening test provides an effective way to detect early signs of concussion, which can improve outcomes and hopefully prevent repetitive concussions," said the study's senior author, Laura Balcer, MD, MSCE, Professor of Neurology, Ophthalmology and Epidemiology at the University of Pennsylvania School of Medicine. "If validated in future studies, this test has the potential to become a standard sideline test for athletes."

While more extensive testing can best capture post-concussion syndrome symptoms, and these tests may be influenced by other factors such as intellectual ability or depression, tests of rapid number naming such as the King-Devick test are objective and capture many aspects of function. This may help coaches and athletic trainers determine whether players should be removed from games or not.

As emphasized by the study's lead author, Kristin Galetta, MS, "Concussion is a complex type of brain injury that is not visible on the routine scans we do of the brain, yet is detectable when we measure important aspects of brain function, such as vision. The K-D test is only one test on the sidelines, though, and the diagnosis of concussion requires a combination of tests and input of medical professionals."

In a study of 39 boxers and MMA fighters, post-fight time test scores were significantly higher (worse) for those who had head trauma during their matches (59.1 ± 7.4 vs 41.0 ± 6.7 seconds, p head trauma worsened by 11.1 seconds. fighters who lost consciousness were 18 seconds slower on the test after their bouts.

The study was funded by a grant from the National Eye Institute.

A follow-up study, looking prospectively at college athletes at the University of Pennsylvania, is examining changes in athlete test scores over the course of a season, reliability of retest or tests conducted by different testers such as athletic trainers, and establish test norms and expected ranges of pre-competition scores for this age group. It will also provide large-scale results to further evaluate the effectiveness of the test to identify closed head injury and concussions accurately.

Provided by University of Pennsylvania School of Medicine

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