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Study flags over-reliance on computer tests in return-to-plan decisions after concussion

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A new study by researchers at Indiana University-Purdue University Columbus and Pace University is critical of the widespread use of computerized neuropsychological tests (CNT) in decisions regarding when athletes can return to play after suffering a concussion.

"Our knowledge of the effects of concussions continues to evolve," said Thomas Redick, assistant professor of psychology at IUPUC. "We should continue to ask ourselves what the best practices are when dealing with a brain injury, which is what a concussion is."

The use of computer tests to measure an athlete's thinking ability before and after concussion has become commonplace at all levels of contact sport, typically beginning in high school, and the post-trauma test result is one part in determining when an athlete can get back in the game. The dangers of returning to play prematurely can be grave -- including the rare cases that lead to a degeneration of brain tissue (chronic traumatic encephalopathy) and even death. Yet the ability to determine the severity of a head trauma and stage of recovery is very difficult.

"We should note that no 'gold standard' exists for concussion diagnosis and management," the researchers wrote. "Sports medicine practitioners still lack simple, reliable and affordable techniques to confidently address these issues. Although experienced first responders can accomplish a clinical diagnosis in most instances of suspected concussion, concerns related to return of play and whether or not to continue specific sport participation are not resolved by current CNT."

The study, published online in the *Journal of Clinical and Experimental Neuropsychology*, reviewed previously published research articles involving Immediate Post-concussion Assessment and Cognitive Testing (ImPACT), one of several CNT in use today and considered the most scientifically validated computerized concussion evaluation system. The researchers cautioned against over-reliance on CNT in return-to-play decisions for the following reasons:

- The tests, which are often measured in the preseason as a baseline and then again after a concussion, may not possess adequate levels of reliability to use in the management of individual athletes. This could lead injured athletes to return to play before being fully recovered. In contrast, low test reliability could keep athletes out of further contests longer than necessary, which can have adverse effects for the team and the athlete.
- The tests do not measure other important aspects of brain function, such as functional and metabolic impairments of the brain. Tests using other techniques have revealed abnormal brain function for up to 28 days after the injury. Studies have indicated that ImPACT cognitive performance typically normalizes within three weeks of the injury. "Postconcussion cognition recovery appears to occur relatively quickly, but this does not equate to rapid healing of an injured brain," the researchers wrote in the research article.
- The only treatment for concussions is physical and cognitive rest. Taking a 20-minute detailed test in order to confirm a clinically apparent concussion could harm recovery.
- Future research with ImPACT and other CNT is warranted to provide the most accurate and reliable information possible about the cognitive state of athletes after suffering a concussion.

The journal article will be available online for about a month beginning

Feb. 2.

More information: "Clinical utility of ImPACT assessment for postconcussion return-to-play counseling: Psychometric issues," will appear in the *Journal of Clinical and Experimental Neuropsychology* in mid-February. The co-author is Lester B. Mayers, M.D., Division of Sports Medicine, Pace University.

Provided by Indiana University