

Concussion testing makes everyone tired

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Testing athletes for concussions may induce mental fatigue in subjects whether or not they have a head injury, according to Penn State researchers.

"Testing for a long period of time can induce fatigue," said Semyon Slobonouv, professor of [kinesiology](#). "But at the same time, fatigue is a symptom of [concussion](#). ... How do you rule out fatigue if you get fatigued while taking the test?"

A standard way to test patients for concussion is to use an hour-and-a-half to two-hour set of neuropsychological tests -- enough to make anyone tired.

The [Centers for Disease Control and Prevention](#) estimate that nearly 4 million concussions occur in the United States every year. Concussed athletes who return to the field too quickly are three to six times more likely to get injured again in the same season, according to the American Association of Neurological Surgeons.

Several medical problems can occur when someone with a [traumatic brain injury](#) is not allowed enough time to heal. Boxer's encephalopathy, identified in the early 20th century, today is recognized as affecting any person who repeatedly suffers blows to the head.

Second-impact syndrome is a deadly second blow after a person has received one concussion and not fully healed. The second impact -- minutes, days or weeks after the first injury -- can cause nearly instant

death.

The researchers created a baseline measurement of how tiring the [neuropsychological tests](#) made healthy, athletically active subjects. They report their study in the current issue of *Clinical Neurophysiology*.

Slobounov's goal is to test all athletes at the beginning of their season -- specifically in high-contact sports like ice hockey, rugby and football. In this way, if athletes are suspected of suffering a head injury, there is a personal baseline for comparison.

"Fatigue can be characterized by a sensation of weariness, reduction in motivation, attenuation in efficiency, or impairments in vigilance and [task performance](#); it is a multidimensional construct with subjective, behavioral and physiological components," the researchers note in their article. "A comprehensive characterization of fatigue thus requires the assessment of all three domains."

A group of tests was administered to each athlete in the study. First the researchers determined a fatigue rating, which includes measures of both mental and physical fatigue. Then they administered a Stroop Neuropsychological Screening Test, which is composed of the names of five colors printed in any of those five colors. The researchers gave the Stroop test in two rounds, involving 112 words each. In the first round, athletes read the words out loud. In the second round, they said the color of the word. An electroencephalograph recorded brain waves during the test. At the end of the Stroop test a fatigue rating was measured again.

Provided by Pennsylvania State University

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