Simple Device May Help In Diagnosing Concussion

BY ROBERT FINN

COURTESY DR. JAMES T. ECKNER

Dr. James T. Eckner (standing) demonstrates how a simple ruler-like device is dropped to measure reaction times in athletes who are suspected of having a concussion.

An extremely simple device that tests an athlete's reaction time is showing promise in diagnosing concussions, according to a study announced in advance of its scheduled presentation at the annual meeting of the American Academy of Neurology.

Seven of eight Division I athletes who had suffered a concussion showed significantly slowed reaction times when tested with the device, Dr. James T. Eckner said in an interview.

"It's actually very similar to an experiment that's done commonly in physics classrooms in high schools," said Dr. Eckner, of the department of physical medicine and rehabilitation at the University of Michigan, Ann Arbor. In that experiment, reaction times are judged by the speed with which people can catch a ruler dropped between their fingers.

The device "is a fancier ruler, essentially," he said. "It's basically a dowel rod that we've coated in friction tape, and we've marked it in centimeter increments. And then at the base of it there's a little rubber disc, which is actually a hockey puck that it's embedded in."

The device is so simple that it has the potential of being used on the sidelines of a football game. The person being tested sits with his or her forearm resting on a table. The person administering the test holds the device so that the subject's hand is encircling, but not touching, the hockey puck. At a random moment the tester drops the device, and the subject catches it as soon as he or she can.

"We measure then how many centimeters it fell before they caught it, and then we use a simple physics equation for a body falling under the influence of gravity to convert that into how many milliseconds it fell for," Dr. Eckner said.

For the study, he and his colleagues recruited 209 members of Division I football, wrestling, and soccer teams. Before the start of the season the researchers measured each athlete's normal baseline reaction time. The eight athletes who suffered physician-diagnosed concussions during the season were tested with the device within 72 hours of their injury.

Seven of the eight athletes showed significant slowing of reaction. Their average reaction time increased from 193 milliseconds at the start of the season to 222 milliseconds after their injuries, a statistically significant difference. In practice, a 10%-15% increase in the length of reaction time might clinically significant, Dr. Eckley said.

"Our results are still a little bit preliminary," he added. "We've done some preliminary reliability data showing the inter-tester reliability and the test-retest reliability. But we do want to do that in a bigger sample to firm up the numbers that we have so far. … Once we've done that I think that it would be reasonable to begin using it in a clinical setting."

Meanwhile, the investigators have developed a fancier version of the device, and they're applying for a patent. ■

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