Computerized tests help schools 'manage' concussions

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Several weeks had passed and Joey McLaughlin's headaches were gone and he felt ready to return from the concussion he suffered during a Londonderry High preseason football scrimmage.

All he had to do was pass a computerized neuropsychological test.

"I didn't do so hot on it," he said.

McLaughlin was sidelined for another week — his fourth consecutive week out of action. He passed the test the next week and returned to play.

Londonderry High is one of five Southern New Hampshire high schools using computerized tests to help decide when athletes are ready to return after a concussion.

Salem, Windham, Kearsarge Regional and Keene are also participating in the New Hampshire High School Sports Concussion Management Project, a three-year pilot program. Sanborn High in Kingston, N.H., is not part of the project but is using the same test, sold by ImPACT Applications, based in Pittsburgh, Pa. HeadMinder and CogState Sport are among other companies selling versions of the test.

In Massachusetts, Brooks School in North Andover and Phillips Academy in Andover are using ImPACT. None of the local public schools is using computerized testing. Central Catholic in Lawrence, Andover High and North Reading High have considered purchasing some version of the test, as have Pelham and Pinkerton in New Hampshire.

HOW THE TEST WORKS

Student athletes take the test before the season to set a baseline measurement of their mental agility. If they suffer a concussion, they take the test again to evaluate how they've been impaired by the head injury.

Brain functions weakened by a concussion include memory, attention and speed and efficiency in processing information. Tests like ImPACT are designed to measure these functions, said Dr. Arthur Maerlender.

Maerlender, a neurophysiologist and assistant professor at Dartmouth Medical School, chairs the New Hampshire Sports Concussion Advisory Council and is examining the test results at the five New Hampshire schools taking part in the pilot project.

The ImPACT test has six different "modules."
The first asks the test-taker to remember a group of 12 random words that flash on the computer screen one at a time and are then repeated. The test-taker is then asked whether certain words were part of the group of 12.

The second module asks the test-taker to remember shapes. Another test module instructs the test-taker to press the "Q" button on the keyboard as fast as possible whenever a red circle appears and the "P" button when a blue square flashes.

Dr. Micky Collins, chief clinical officer of ImPACT Applications and one of the developers of the software, said the test provides objective data in an otherwise subjective process.

"A lot of times, kids won't understand what they are going through until they see those numbers," he said. "And parents won't understand what kids are going through until they see those numbers. So if you have a kid who's an A student, and they are at the first percentile for memory, it really gets the parents' attention and the kid's."

Experts have some concerns about baseline testing. One is the possibility that athletes can manipulate the results by deliberately underperforming on the initial test. That way, they might be able to match their baseline score even after a concussion and return to play more quickly.

"A lot of athletes have told me that they've tried to fake it," Maerlender said. "The test program we have has a couple of things built in it that are red flags (to catch an abnormally low score)."

Scores can also be affected by factors like a bad night's sleep or failure to take the test seriously.

Maerlender said he has the athlete retake the test if he suspects the initial results.

Another worry is that some athletic officials are misusing the test, said Dr. Robert Cantu, chief of neurosurgery service and director of sports medicine at Emerson Hospital in Concord (Mass.).

"What's happening," Cantu said, "is that those tests are being used as a red light, green light: 'Are you ready to go back or not?' They cannot be used that way. ... But they're marketed that way and a lot of high school athletic trainers are using them that way."

Cantu said the test can only measure cognitive functions. "It doesn't assess at all balance and vision and a number of other parts of the brain that can be involved with post-concussion issues."

NH PILOT PROGRAM
The Brain Injury Association of New Hampshire is funding the New Hampshire pilot project that includes Salem, Londonderry and Windham.

Maerlender said he hopes to add five more New Hampshire high schools in each year of the three-year program.

Not all the athletes at the schools are being tested — Salem tested only those who played football, field hockey and girls soccer. The schools have tried to test an even number of girls and boys.

Maerlender said the project is meant to show the effectiveness of concussion management at schools and to show that athletic trainers as well as neurophysiologists are important in the management process.

There also is a political agenda.

"Part of what we're politically trying to push for is better support through insurance for covering these costs," said Maerlender. He said insurance does not cover any of it now, even though "it does save money for them in the long run."

ImPACT offers three different packages. The cheapest is $500 per year and per school. It includes baseline tests for 300 athletes and 30-post injury tests the first year, then 150 baseline tests and 30 post-injury tests in subsequent years.

"The first year you start at a high school you have to test everybody," ImPACT technical support director Doug Tauchen said. "You're testing your freshmen through seniors. Year No. 2, all you have to do is your freshmen and your juniors because you want to baseline every other year."

ImPACT also sells other packages for $750 and $1,000 that include more tests for bigger schools. HeadMinder and CogState Sport are comparable in price to ImPACT.

There is also the cost of having a neurophysiologist interpret the test results.

Maerlender said he charges a school between $500 and $1,000 per year, depending on the school's size.

"The cost really is probably less than $10 per athlete a year when you accrue it over all the athletes," Maerlender said.

"Research is pretty good suggesting that it's a better indicator of when somebody's brain is back to normal and healed," Maerlender added. "It's a safer time to return to play once those test scores come back to the baseline."