

## Early warning for concussions

### Westwood players test device indicating force of impact

By Justin Rice

GLOBE CORRESPONDENT

WESTWOOD — Jake Antonucci often worried about continuing to play lacrosse after having absorbed a blow to the head.

Had he suffered a concussion?

Now, he worries less.

This spring, Antonucci, 13, and his teammates on an eighth-grade select team in Westwood are piloting Checklight, a sensor produced by Canton-based Reebok International Ltd. that measures the impact of hits to the head sustained by athletes.

Measuring acceleration, deceleration, and rotational movement with a gyroscope and accelerometer, Checklight is the first impact indicator of its kind to be worn directly by an athlete, instead of placed on his or her equipment. Its sensors are attached to a thin skullcap that fits under a helmet, and it has a small panel with three LED lights that hangs down and rests on the back of the athlete's neck. It allows teammates, coaches, and trainers to easily monitor the severity of a blow: A moderate impact would change the blinking display from green to yellow, and a red light would signal a more severe hit.

The information can help the athlete avoid the kind of subconcussive hits that doctors and researchers say are so dangerous because their effects are not felt until after the game.

"Before I got this

worried that if I got hit in the head and I went back on the field, and I didn't know I had a concussion, that I would get re-injured and I would get hit in the head again and be out for a while," said Antonucci, a Thurston Middle School student who has never suffered a con-

cussion but has friends who have.

Now, he said, "if I get a red light I'll know to come off the field."

Since the trial's start, no red lights have flashed for any Westwood player, in a practice or a game, but the yellow light has been illuminated six times.

Westwood coach Eric Deehan said the majority of the "yellows" were the result of sticks to the helmet, in practice, and none resulted in concussions.

"It's the worst thing in the world when there's a violent hit on the field and everyone is looking at you" as the team's coach, said Deehan, who also serves as the youth lacrosse program's president. "All of a sudden you are a doctor, an expert in head injuries."

Reebok released Checklight on the market 11 months ago.

The Wayland-Weston seventh-grade youth football squad tested the device in a pilot program last fall, and registered 24 yellow lights and 22 red lights. Four concussions were diagnosed.

The varsity football team at Lawrence Academy in Groton and a youth hockey team in New Jersey have also used Checklight, which Reebok officials say can be used in a variety of sports, including boxing, skiing, horse jumping, and motorcross.

Checklight retails for \$150. Bob Rich, director of research and development at Reebok, and a past president of Westwood Youth Lacrosse, asked the group whether it wanted to use the product on a trial basis, at no charge.

A headband version for soccer will be available early this summer, according to Rich.

Deehan said that once his players got over the initial fear that they would be benched immediately if their light illuminated, they started wearing Checklight with pride, and showing it off in school and at tournaments.

"Who doesn't want to be part of a new technology and a pilot program?" he said.

But Rich, along with Paul Litchfield, head of advanced concepts at Reebok, emphasized that Checklight is not a diagnostic tool but merely offers a barometer for hits that might go unseen from the sideline, or appear worse than they are.

"All we are trying to do is take the guesswork out of head impact," said Litchfield. "Let the appropriate coaching or medical staff have some idea about force of impact the head has just seen, and address it appropriately."

Litchfield said the device does not come with guidelines for responding to a red or yellow light, or provide details on a particular hit's impact, but it does include the US Centers for Disease Control and Prevention's list of concussion symptoms.

**Dr. Brett Osborn**, a Florida neurosurgeon, cautioned that Checklight could provide a false sense of safety if it's not used in conjunction with a medical evaluation.

"This is something that is not to be used as a black and white tool in isolation to make a diagnosis of concussions," he said.

#### Globe South



But the product, he said, is on the right path, and the technology is only getting better.

The Sports Legacy Institute, a Boston-based nonprofit that focuses on concussions, published a recent report that quantifies a subconcussive hit as a blow of more than 20 G's of linear acceleration within 40 milliseconds.

Jonathan Williams said he will never be totally at ease watching his son, Ian, play lacrosse. His older son, Joe, elected not to play his senior season at Westwood High in 2011 after previously suffering three concussions.

"If your kid is going to get hit to the extent of a concussion, it's going to happen — but it's one of those in-between blows that you don't know about, and the kid might try to stay on the field and tough it out as opposed to coming off the field," Williams said. Reebok's device "might be a good check and balance as he comes off the field, or the coaches see it, or another player sees it so they can get off the field in due time."

Deehan said when the light goes off, he pulls the player aside and asks a few questions to test for symptoms of a concussion.

"This is one more device that raises the awareness for the kid, they should think 'I'm actually wearing this thing for a reason,'" he said. "Concussions are huge nowadays. I could pick anyone on my team and they probably had three of their best friends who've had concussions. It's unbelievable.

"We are not doing things much different than we were 30 years ago, but the technology and awareness about it is much greater these days."

Antonucci said he has registered a yellow light twice. The first came after he was slashed

by a stick while in pursuit of a ground ball.

"The other time I got hit and I just came off on the sidelines for a few seconds," he said. That hit "was noticeable."

*Justin Rice can be reached at [jrice.globe@gmail.com](mailto:jrice.globe@gmail.com).*



**The Checklight** consists of sensors attached to a skullcap worn under the helmet that illuminate a red or yellow LED light to indicate the severity of a hit.

PHOTOS BY MATTHEW J. LEE/  
GLOBE STAFF