Detection and protection team up

Local students on team developing trauma detector under helmet to determine if hit could cause concussion

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WOONSOCKET – Jennifer Roy was 12 years old when she blacks out in the middle of a hockey game with the Providence Junior Bears. Slammed to the ice by an opponent’s body-check, Roy had suffered a concussion, though she did not know it at the time. She had no recollection of the rest of the game, and after it was over she threw a temper tantrum because she thought she’d been benched.

That's when she found out she actually scored a goal in the third period.

"It was very scary because I didn't know anything about concussions," said Roy, a city resident. "I played hockey for so long at that point and I had never gotten one before. I had no idea how dangerous they were."

Now a junior at Wentworth Institute of Technology in Boston, Roy is part of a team of students who have developed a high-tech trauma detector that fits comfortably under protective sports helmets.

The device allows coaches, parents or trainers to monitor athletic head-strikes in real time to determine if a player has suffered a minor blow or an injurious hit that requires medical attention.

Sewn into a cloth skullcap or headband, the device sits at the base of the skull and uses electronic sensors to gauge rotation and acceleration. Together, says Roy, they can measure the concussive force of the brain striking the interior wall of the skull. The information is immediately transmitted to a special app that is compatible with Apple iPhones and Droids.

Since quick intervention is critical in treating concussions, the device serves a valuable function as a kind of early-warning system for parents and other guardians of at-risk athletes.

Roy says it is also capable of red-flagging concussions that might otherwise go undetected, and empower parents to make informed decisions about whether their children should continue playing sports that may expose them to further harm.

Repetitive sports-related head-injuries have been linked to a condition known as Chronic Traumatic Encephalopathy, or CTE, which causes structural changes in the brain. Experts say the symptoms are still poorly understood, but they may include dramatic emotional changes, loss of motor skills, and erratic, aggressive behavior.

In 2013, the NFL reached a $765 million settlement with thousands of retired players who claimed injury as a result of repeated head trauma, including some deceased players who were diagnosed with CTE after their deaths.

But Roy says she doesn't envision an adult-sports application for the trauma detector. She says it makes more sense to focus marketing efforts on youngsters, for whom it can do the most good.

"I know a lot of parents are scared to have their children play sports because they're going to get hit and hurt their heads," she says. "They'll know if they do get hit they'll be aware of it."

The daughter of Claire and Arthur Roy of Woonsocket, Jennifer grew up off Logee Street and graduated from Mount St. Charles Academy. She played hockey from the time she was three years old, but she was forced to stop her senior year in high school after she was diagnosed with Lyme disease as a result of a tick bite. She says she was undiagnosed for some time, until she developed a case of meningitis that landed her in the hospital for months.

"She says she's still struggling with the symptoms."

An industrial design major at WIT, Roy developed the trauma detector with four seniors, Alex Schwarzkopf, Dylan Powers, Sean Iacobone and Matthew Joyal, who is from North Smithfield. They spent more than two years developing the prototype at Accelerate, WIT's fledgling innovation and entrepreneurship center.

The students won a $13,000 grant to work on the project from Accelerate, which was launched in 2012 to advance creative thinking, foster entrepreneurial spirit and encourage student partnerships with private industry. Team members rely heavily on guidance from WIT faculty advisors to make hands-on product development as important a component of the learning process as academics.

Senior members of the design team are planning to get to work on bringing the trauma detector to the market as soon as they graduate.

Roy, who will graduate a year after she fellow teammates, will catch up to them soon enough.

For now, she is doing an internship at Pawtucket-based Hasbro. There, she's helping the worldwide toy giant bring the next generation of playthings to the marketplace.

"It's not as serious as building medical devices designed to protect child athletes, but it's very satisfying learning experience."

"I love it," says Roy.

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