



Virginia Tech, HITS team up to study hits

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By MARK BERMAN The Roanoke Times

BLACKSBURG - Stefan Duma, Bill Bussone and their computer looked out of place on the sideline at Lane Stadium last Friday. Then there was the equally puzzling sight of young women peering down at them over the rail of the stands.

Do computer guys have groupies? And what were they all doing at a Virginia Tech junior varsity football game?

Duma, a Tech associate professor of mechanical engineering, and Bussone, one of his graduate assistants, are part of a group collecting and analyzing data from a new Head Impact Telemetry System. Tech was the first college to buy the system, which records the number of hits to a player's head and measures the impact of each hit on the skull. Those women were some of Duma's students, who came to the game to see their professor's new research project.



The system, which includes six sensors attached to the padding inside players' helmets, will be used in an NCAA game for the first time when the Hokies host Texas A&M on Thursday night.

Tech began using the system last week in varsity practices and in last Friday's JV game against Hargrave Military Academy and will use the system in home games and practices the rest of the season. Hokies team physician P. Gunnar Brolinson and trainer Mike Goforth will evaluate the data with Duma and others each week. The research project could eventually help doctors better treat brain injuries and perhaps prevent concussions.

"The big goal is: Can we have a better understanding of what causes concussion? And if we can, can we design the helmets to reduce these, or can we come up with better treatments?" said Duma, the director of the Virginia Tech College of Engineering's Center for Injury Biomechanics. "We've got the [Tech] engineering side to measure what caused it, and then we've got the medical and sports medicine side to evaluate it.

"Instead of just asking a guy, 'Hey, are you okay? What day is it?' how do we have a better understanding of whether or not there's going to be an injury and whether or not they have an injury? . . . There's going to be huge ramifications from this study. It's going to really unlock the mysteries of concussion."

The sensors in each helmet transmit through the air real-time data to Duma's sideline computer via an antenna attached to the computer. When impact occurs, an illustration on the computer screen immediately shows the place on the skull where the player was hit. Another illustration shows the cumulative number of hits and where on the skull they occurred. Charts on the screen show the force of each hit.

"We're actually measuring what the skull sees in an impact, and that's never been measured before," Duma said.

The computer has the capability to monitor 64 helmets simultaneously, but Tech will be monitoring only four Hokies in each game or practice. Tech bought enough sensors for only five helmets. Duma said Tech bought the sensors, computer and other hardware from Simbex, the firm that designed the system, at a reduced cost of \$20-25,000.

In an NFL game two weeks ago, St. Louis Rams quarterback Kurt Warner was sacked six times and was hit 12 times, but his first-half concussion wasn't diagnosed until after the game. Someday, if a player such as Warner were wearing a HITS-equipped helmet, a doctor could know on the sideline that a hit or series of hits was serious enough to warrant the player getting an immediate exam.

The system will measure and record the hits that cause concussions and the hits that don't. Tech's analysis of the data could someday enable doctors to better understand if a player is predisposed to a brain injury and perhaps predict if a brain injury is likely.

"This is like a Holy Grail of concussion research," Rick Greenwald, president of Simbex, said from his Lebanon, N.H., office. "It's not a diagnostic tool by itself. In conjunction with the other tools the medical staff currently has, this could be an important piece of the puzzle."

The National Institute of Health provided some funding to Simbex for the research and development of the system. Duma met Greenwald at a conference on head injuries last February and became interested in the project. Tech is seeking money from the NIH and other sources to get the money to buy enough sensors for the entire team.

Duma and Greenwald hope other colleges will buy the system in a few years and share their data with Tech and Simbex. No NFL team has bought the system.

The project might reveal that where on the head a player is hit is just as important as how hard the hit is. Tech and Simbex also hope to learn whether players at certain positions have a higher risk of brain injuries than players at other positions.

Duma and the others also want to discover the cumulative effect of hits during a game.

"What if you've taken 10 medium-range impacts throughout the game and that 11th medium-range [hit] pushes you over the edge?" Duma said.