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November 8, 2

## Concussions & Helmets

The deaths this fall of several high school athletes after head-to-head football collisions have once again brought the issue of head injuries in sports to the forefront. As this ScienCentral News video reports, several universities are now testing a system that can measure the force of these collisions in real time.

### Hard Hits

During a football game early last season, [Virginia Tech Hokie](#) linebacker [Brandon Manning](#) took a [hard hit](#) that shook him up a little bit. But he shook it off and stayed in the game.

"It wasn't necessarily a matter of me not wanting to tell them," says Manning. "I just maybe didn't realize it. I'm worked up, I'm in the game, and I'm maybe able to put some things behind me and continue to play like I hope I can. It wasn't really till the next day when I came in to watch film that I found I didn't really remember half the plays that I was in [in] the game. I started to see myself but I didn't really remember what I was doing, and that's when I really sort of realized that I had had a concussion."

[Micky Collins](#), a concussion specialist at the [University of Pittsburgh Medical Center Sports Medicine Concussion Program](#), says Manning's continued play put him in great danger, especially if he had gotten hit again. "The worst that can happen is [second impact syndrome](#), when you have two concussions in relatively short duration," says Collins. "That can cause death in an athlete."

Now the Hokies are participating in a study that might help team trainers spot these dangerous collisions right away. The team's helmets are rigged with tiny sensors—like the ones that deploy airbags in cars—called accelerometers, which measure the impacts to the helmets. During play, a transmitter immediately sends real-time information about the force of a collision to a laptop computer on the sideline. The system is called [HITS](#)—Head Impact Telemetry System—and is manufactured by [Simbex](#).

After a year of [collecting data with HITS](#), Hokie head trainer [Mike Goforth](#) decided to set a threshold to determine how hard might be too hard.

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 Video



image: Virginia Tech

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"If you're in a game and that threshold is met, the computer will send a signal to the



The helmets are rigged with tiny sensors called accelerometers.

pager [worn by a trainer], and warn us that a player has received that type of blow," says Goforth. "Now that doesn't mean that we pull him off the field at that time. What it means is that we'll kind of evaluate the player. We'll go over and ask him a couple questions, get a teammate to ask him a question about the play, or how they liked the pre-game meal, anything just to kind of be as specific as possible and just try to get a feeling for how that player is reacting to the question that you ask him."

Elliot Pellman, chairman of the [National Football League's](#) Subcommittee on Mild Traumatic Brain Injury, says the technology is promising, but remains cautious. "Yes, they can measure real time forces, forces that are generated when there is contact to an athlete's helmet," says Pellman. "But the real question is whether that type of information will translate into the ability to diagnose concussions because ultimately concussions are still a clinical diagnosis. It's a diagnosis made by physicians clinically by corroborative data. Whether that data be [MRIs](#), physical examinations, [or] neuropsychological testing, ultimately it's made from the clinician. I'm not sure whether or not that technology will ever be able to replace that."

Goforth agrees that concussions should be diagnosed by a doctor, not a computer. And he adds that right now, the system is used only as a guideline.

Virginia Tech's research was presented at the September, 2004 conference of the [American Society of Biomechanics](#), and was funded by the [Edward Via Virginia College of Osteopathic Medicine](#), the [Virginia Tech College of Engineering Department of Sports Medicine](#), and by [Simbex](#). Simbex's research and development was funded by the [National Center for Medical Rehabilitation Research](#) at the [National Institute for Child Health and Development](#) at the [National Institutes of Health](#). The HITS technology was recently bought by helmet manufacturer [Riddell](#).

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by Karen Lurie

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