

# VALLEY NEWS

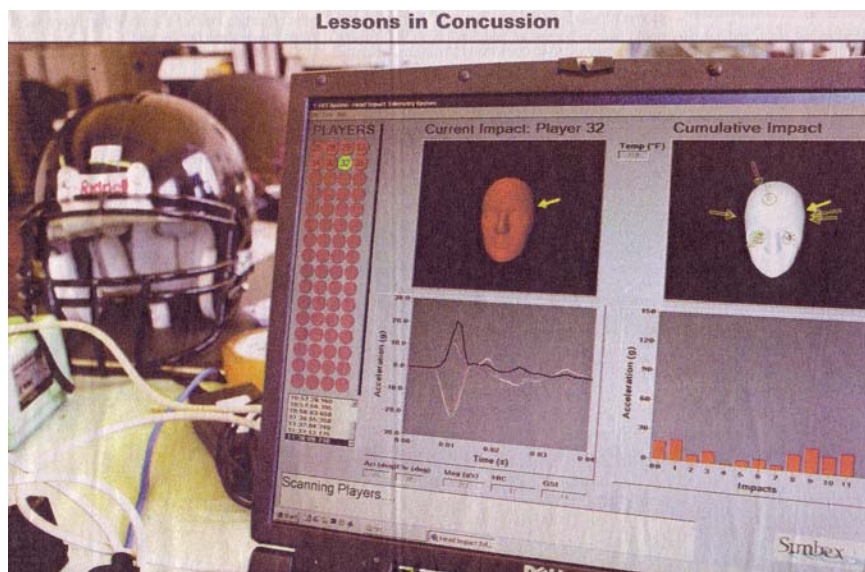
THE NEWS SOURCE OF THE UPPER VALLEY

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## New Method to Collect Injury Data

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Rick Greenwald will be on the sidelines at the Virginia Tech football game tonight, but he won't be watching the scoreboard or worrying about any football stats.

Instead, Greenwald will have his eyes glued to a computer screen. And what he finds may make football a safer sport in the future -- especially dealing with head injuries.

There are approximately 300,000 sports-related mild traumatic brain injuries -- including concussions -- reported each year, particularly in helmeted sports such as football. In fact, according to one survey, there have been some 700 concussions in the NFL over the past dozen years. Numbers like that concern Greenwald, who has been doing head impact research since the mid-1980's, when he worked with the U.S. Aerial Freestyle Skiing team.

His concern and research led to the development this year of the Head Impact Telemetry (HIT) System, which has been produced by Greenwald and his colleagues at Simbex in Lebanon.

HIT is a biofeedback device that monitors what happens to your head when you take a hit on the football field.

The system has the potential to immediately give doctors data to predict whether an impact is likely to produce a concussion, while at the same time producing general data on effects of cumulative concussions. Data from the HIT devices also could lead to development of new, more protective helmets.

And four of those small devices will be in helmets used by Virginia Tech players in tonight's game against Texas A&M in Blacksburg, Va.

“It just makes sense; you have to measure it in the field,” said Greenwald. “All the lab testing in the world doesn't tell you what really happens to the athlete.”

The idea is to chart, for the first time, what happens to the head upon impact. The HIT System measures acceleration of the head, magnitude of the hit and location of impact.

“No one knows what combination of those causes concussion ... and it may be individual; everyone may have a different level,” said Greenwald. “But if we collect data on enough people, then we can start to understand it.”

NFL quarterbacks such as Steve Young and Troy Aikman have had their careers cut short by concussions. Just this season, St. Louis Rams quarterback Kurt Warner has been benched after being diagnosed with a mild concussion in a game against the New York Giants on opening day.

“We need to understand the problem (of concussions),” said Greenwald, who has spent the past 2½ years developing the system, in conjunction with colleague J.J. Trey Crisco, Ph.D., the Director of the Bioengineering Laboratory, Department of Orthopaedics of Brown University. “There's a lot of information on what to do after you get hit -- there's diagnosis and management -- but no one knows what causes the injury in the first place.

“Football has the highest impact rate, so you can get the most data in football, and quickly. And it's the one that has the most publicized problem.”

But it is not just the high-profile professional athlete that Greenwald is targeting.

“We want to stress that the problem doesn't exist just at the professional level,” he said. “The problem goes all the way down to the recreational athlete. If we can better understand concussions in the high-profile athlete, we can start to help -- by design or rules changes -- the recreational athletes, too.”

(Officials planned to carry on with tonight's game, although weather conditions related to Hurricane Isabel will have to be considered.)

Greenwald's background is in sports injury prevention, and his company name -- Simbex, built from the phrase “simply better exercise” -- reflects that direction. Funded primarily with grants through the Small Business Innovation Research Program from the National Institute of Health and the National Science Foundation, Simbex was founded three-plus years ago.

“The idea is to use high-tech engineering, which is what we're good at, merge it with clinical science and make products for what we call active life improvement. We want to keep people playing longer and healthier,” said Greenwald, who works with colleagues Jeff Chu, Aaron Buck and Bob Palifka in their Water Street office in Lebanon.

“The goal is to take good research ideas and actually make products and commercialize them -- in the area of sports.”

And one of those products is the HIT System.

The key to the HIT System was designing it to fit into a football helmet without adding any significant weight or bothering the player, yet at the same time still making contact with the head and measuring the impacts absorbed by the head.

“It tells you how hard you got hit, where and how often. And it creates a database with all that information,” explains Greenwald. “Then we link our data with the clinical data saying the guy has a concussion. In that way, the research will allow us to predict whether an impact is likely to produce a concussion.

“Once we determine what causes an injury, what is the link to the actual injury, this system could be predictive. It can tell you that the hit you just took should be evaluated.”

The small unit -- made up of six acceleration sensors, an encoder and a transmitter --is attached to the inside of the helmet, under the protective foam padding. The accelerometers -- the same kind that trigger the air bags in automobiles — make contact with the player's head. According to Greenwald, it takes about one minute to retrofit the helmet with the HIT System.

Each hit is then either stored in the device's memory banks or transmitted immediately to a computer on the field.

“We have created a novel mathematical program to compute head acceleration from the accelerometers in the helmet,” said Greenwald.

In today's game, there are four helmets in use, each costing \$2,000. Greenwald hopes that, by next year, there will be hundreds in use throughout football.

“It's got to be cost-effective,” said Greenwald. “We've got to put them in enough helmets so that we could do the research, and if that works, then we can make it less expensive and put it in every football helmet out there.”

That's quite a tall order. There are 1 million kids playing football in Pop Warner and high school, about 50,000 playing college football and another 1,500 playing pro ball.

“Obviously, we start with the high-level guys because they have the money, and then we migrate it down to the recreational level and then go to the other sports,” said Greenwald.

Greenwald is quick to add that this system is not intended to replace the doctor, but to be used as a tool to help doctors in the care and management of players who may have a concussion.

“It doesn't tell you you had a concussion; it just tells you what happened to your head,” said Greenwald. This could revolutionize the understanding of head injuries, and that could lead to better helmets. And down the road, it can help kids at lower levels play safely.” The first step on that path back to Lebanon begins tonight, in Blacksburg, Va.