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LAST WORD

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Deadlines

Subscriptions

Feedback

Jobs

Events at Brown

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Academic calendar

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NIH funds work on helmet technology that will shed light on head impacts in contact sports

by **Kristen Cole**

When two athletes collide on the field, they can receive mild head injuries that are undetectable to coaches on the sidelines.

Brown researcher J.J. Trey Crisco is a member of a team that is developing a system to help coaches and others measure the severity and frequency of head impacts sustained by athletes during contact sports such as football and hockey.

Called the Head Impact Telemetry System (HIT System), the new technology is designed to continuously monitor and record a player's head impact history during practice and game situations according to Crisco, associate professor of orthopedics (research).

Crisco and a number of other researchers representing academic institutions and companies, all coordinated by Simbex LLC of Lebanon, N.H., developed the product with the support of the National Institutes of Health. Crisco and Richard Greenwald, Simbex president, came up with the idea several years ago.

This semester, the HIT System moved from development in the lab to testing on the playing field at Virginia Polytechnic Institute. The college's Division I football players are using the technology in real practice and game situations, according to researchers. The data will be analyzed and correlated with studies at the Pennsylvania State University Concussion Program.

With some 300,000 sports-related mild traumatic brain injuries reported each year in this country, most in helmeted sports such as football and hockey, such technology is needed, according to the researchers. Experts expect a rising occurrence of head injuries in football because the speed of the players and the violence of the impacts continue to increase, said Greenwald.

Researchers designed the HIT System to be small enough to fit in a helmet or headgear without affecting its fit or function. The system uses accelerometers and state-of-the-art telemetry to provide real-time hit-by-hit data. The information is transmitted to someone on the sidelines using a system similar to those used in the National Football League to transmit instructions to the quarterback.

The processed data measure the location, magnitude and duration of head impacts, angular and linear acceleration components, and the time of each impact. Those who need the information can access it immediately or later on with any computer, researchers said.

In addition, medical personnel may be able to use the information about the severity of an individual hit or the number of impacts to diagnosis an injured athlete. Also, manufacturers may use it to evaluate and design protective equipment.

Currently physicians, trainers and coaches use standard neurological examinations and cognitive questioning to determine the relative severity of a head injury and its effect on an athlete on the playing field, the researchers said. But the more information coaches have about a player's injuries, the better able they will be to decide whether to return that player to a game.

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