NEWER FOOTBALL HELMET DESIGN MAY REDUCE INCIDENCE OF CONCUSSIONS IN HIGH SCHOOL PLAYERS, SHOWS UNIVERSITY OF PITTSBURGH STUDY

Preliminary data are encouraging, though researchers stress no helmet can prevent concussions and proper injury management is of critical importance

PITTSBURGH, Jan. 9, 2006 – Newer football helmet technology and design may reduce the incidence of concussions in high school football players, according to results from the first phase of a three-year study by the University of Pittsburgh Medical Center’s (UPMC) Sports Medicine Concussion Program. The current study compared concussion rates and recovery times of high school athletes wearing newer helmet technology to those wearing helmets with traditional designs. There was no significant difference in recovery time between the two helmet groups.

Published in the February issue of the scientific journal *Neurosurgery*, the UPMC study of more than 2,000 high school football players is the first on-the-field investigation to compare concussion rates and recovery times for high school football players wearing the Riddell® Revolution helmet, with its newer technology and design, to concussion rates and recovery times for players wearing standard helmets with traditional design.

Across the three years of this initial study, the annual concussion rate was 5.4 percent in athletes wearing the Revolution helmet, compared to a 7.6 annual percent rate in athletes wearing standard helmets, representing a 2.3 percent decreased absolute risk of concussion for high school football players. In terms of relative risk, Revolution wearers were 31 percent less likely to sustain a concussion compared to athletes who wore standard football helmets.

The Revolution helmet, manufactured and introduced by Riddell in 2002, was developed with the intent of reducing the incidence and severity of concussion. The design features and engineering specifications of the helmet were formulated after several years of biomechanical laboratory testing. The current study compared the new Revolution helmet versus models of traditional design from Riddell and other manufacturers that were on the market prior to 2002.

“This study, the first to look at how the newer designed helmets performed in the field under real circumstances, provides preliminary evidence that the new helmet technology might substantially reduce, though certainly not prevent, the occurrence and incidence of concussion in high school football players,” said principal investigator Micky Collins, Ph.D. “Overall preliminary findings are quite encouraging, and we will continue these studies over the next several years,” added Dr. Collins, who is assistant director of the UPMC Sports Medicine Concussion Program.

“Prior to this study, research evaluating the effectiveness of helmet design in reducing concussions was performed only in biomechanical laboratory settings. We applaud Riddell for its long-term dedication to research aimed at reducing the effects of what can be a very serious and common injury, and for actively supporting continued on-the-field investigations,” said study co-author Mark Lovell, Ph.D. “By continuing this type of study long term, we will be able to obtain essential real-life data and increase our knowledge and understanding of how sports helmet technology and design may be effective in reducing the
incidence of concussions in athletes," said Dr. Lovell, who is director of the UPMC program.

The large-scale observational naturalistic study was conducted by the UPMC Sports Medicine Concussion Program with funding support from Riddell. The research took place over the course of three consecutive football seasons from 2002 to 2004 and involved more than 2,000 football players from 17 high schools in western Pennsylvania for which UPMC directs an ongoing individualized clinical concussion management program.

No Differences In Recovery Time with Newer Helmet Technology: Proper Management of Concussion is Critical

The concussions that occurred during the study were diagnosed by teams’ certified athletic trainers or physicians who were present on the sidelines at the time of injury. Athletes were assessed with ImPACT™ (Immediate Post-Concussion Assessment and Cognitive Testing) to monitor injury effects and recovery and assist with decisions regarding return-to-play. ImPACT is the most widely used computerized neurocognitive test battery that evaluates cognitive functions such as memory, information processing speed and reaction time, as well as symptom levels, all of which can be affected by concussion. Athletes can complete the test on a laptop or desktop computer within about 30 minutes. Most of the athletes in the study had completed the ImPACT battery during the pre-season, which served as a baseline for comparison once a concussion was sustained.

Concussed athletes were followed and treated clinically by the UPMC Sports Medicine Concussion Program. Generally, the athletes were clinically evaluated within 72 hours of injury, then at approximately 1, 2 and 3 weeks post-injury. In some cases, longer-term follow-up and evaluation was needed. Consistent with international concussion management guidelines, no athlete was returned to play until ImPACT scores indicated recovery of cognitive functioning, and the athlete was symptom free both at rest and with physical activity.

In examining the recovery rates between the Revolution and traditional helmet samples, there were no statistical differences found in terms of length of recovery required. Thus, helmet technology played no significant role in rate of recovery in these high school athletes, according to the authors. Across both helmet groups, only 50 percent of the athletes recovered within the first week of injury. Approximately 70 percent had recovered within two weeks, and approximately 15 percent required three or more weeks to fully recover from their sustained concussions. Results also revealed that the two helmet groups did not differ significantly regarding mechanism of injury, region of helmet struck or presence of on-field signs and symptoms of concussion.

“These findings reaffirm numerous previously published studies indicating that careful concussion evaluation and management is absolutely essential for safe return to play,” stressed Dr. Collins. “Perhaps the most striking finding of our study is that even seemingly mild concussions often required weeks for recovery to be complete. Our current and previous data clearly debunk the myth that ‘getting one’s bell rung’ is an innocuous event. In fact, what appeared to be the mildest injuries on the field often required the longest recovery periods.”

UPMC researchers were first to publish such findings, involving severity and recovery of “bell ringers” in high school athletes, in the January 2003 issue of the Journal of Neurosurgery (http://newsbureau.upmc.com/MediaKits/Concussion/MildConcussionStudy.htm ) and January 2004 issue of the American Journal of Sports Medicine (http://newsbureau.upmc.com/MediaKits/Concussion/DingStudy2004.htm ).

Concussion is any change in mental status resulting from the brain being jolted inside of the skull due to a blow to the head or upper body. “Generally, an athlete who sustains an initial concussion can fully recover as long as the brain has had time to heal before sustaining another hit,” explained Dr. Collins. “A concussed athlete should never be allowed to return to contact play until he or she is completely recovered. The tricky part is that concussion signs and symptoms are not always straightforward, therefore the effects and severity of injury and safe return-to-play can be difficult to determine without careful clinical evaluation of symptoms and objective data about cognitive functioning that can be obtained using ImPACT.”
“Our current understanding of the biomechanics, injury markers and symptoms, and recovery of sports-related concussion is advancing rapidly through research efforts around the world. Potential fruits of these efforts are advances in helmet technology and well-designed and controlled field studies. Clearly at this point, no helmet or other technology is available to prevent concussions from occurring, but it is exciting to see that definite strides are being made from both an equipment and clinical management perspective, aimed at reducing the incidence and severity of concussive injury,” said study co-author Joseph Maroon, M.D., professor of neurological surgery at the University of Pittsburgh School of Medicine.

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Note to editors: For information on additional published clinical research by the UPMC Sports Medicine Concussion Program involving sports-related concussion in high school athletes, please access http://newsbureau.upmc.com/MediaKits/ConcussionMain.htm.