UNIVERSITY OF PITTSBURGH MEDICAL CENTER RESEARCHERS FIRST TO STUDY RELEVANCE OF HEADACHE IN EVALUATING CONCUSSION RECOVERY IN HIGH SCHOOL ATHLETES

Headache Even One Week Post-Injury is Likely Associated With Incomplete Recovery

PITTSBURGH, March 14, 2003 — Any degree of post-concussion headache in high school athletes even one week after injury likely is associated with incomplete recovery, indicating the need to keep the athlete from returning to contact play until headache and all other post-concussion symptoms resolve, according to a study by the University of Pittsburgh Medical Center (UPMC) Sports Medicine Concussion Program and published in the March-April 2003 issue of *The American Journal of Sports Medicine*.

In the study, concussed high school athletes with any degree of headache at one week post-injury also had significantly more other post-concussion symptoms and performed more poorly on neurocognitive tests measuring reaction time and memory than concussed athletes who reported no headache at one week post-injury.

Athletes with headaches one week post-injury also were four times more likely to have experienced memory loss and other symptoms on the playing field immediately after the injury, and were five times more likely to experience on-the-field symptoms that lasted longer than 5 minutes. Thus, the presence of headache was also associated with more severe concussion.

“Our study results suggest that headaches in concussed high school athletes be taken seriously. An athlete with post-concussion headache should receive further evaluation before being allowed to return to play. Headache certainly appears to be associated with lingering problems and incomplete brain recovery following concussion,” said principal investigator Michael W. Collins, Ph.D., a neuropsychologist and assistant director of UPMC Sports Medicine Concussion Program.

“The significance of headache after sports-related concussion is often questioned because of the high frequency of headaches among athletes who have not sustained concussions,” said Melvin Field, M.D., study investigator and chief resident in the department of neurological surgery at UPMC. “Even though as many as 86 percent of athletes with concussion report post-injury headache, until this study, there has been no published study examining whether post-concussion headache is associated with neurocognitive impairment and other symptoms, thus suggestive of incomplete recovery,” said Dr. Field.
“We are concerned about returning a concussed athlete to play before the brain has had time to heal, given that the effects of a second concussion may be more harmful and serious,” said Mark R. Lovell, Ph.D., study investigator and director of UPMC’s concussion program. “Most athletes who sustain an initial concussion can recover completely as long as they are not returned to contact sports too soon. But, no athlete should return to play following concussion until recovery is complete.”

“The problem is that concussion symptoms are not always straightforward and not always reported by the athlete. Evaluation of the injury’s effects and knowing when it is safe to return the athlete to play can be difficult to measure objectively,” added Dr. Lovell.

An estimated 63,000 high school athletes sustain a concussion each year. A concussion occurs when the brain is violently rocked back and forth inside of the skull due to a blow to the head or upper body, much like an egg yolk inside of an eggshell. Concussion is a trauma-induced alteration of mental status that may or may not result in loss of consciousness. Other symptoms may include headache, disorientation, confusion, dizziness, amnesia and uncoordinated hand-eye movements.

The UPMC researchers reviewed the cases of 109 high school athletes who sustained concussions during the 2000-2001 school year. The athletes were divided into two groups on the basis of self-reported headache at one week post-injury evaluation. Seventy-three of the athletes reported no headache while 36 athletes reported various degrees of headache. At that time a neurocognitive function test was administered to all study participants to compare headache presence to objective neurocognitive function data. Athletes with postconcussion headaches had significantly slower reaction times and reduced memory performance as measured by the neurocognitive test scores.

The test used in the evaluation was ImPACT™ (Immediate Post-concussion Assessment and Cognitive Testing), a 20-minute computer assessment tool developed by Dr. Lovell. ImPACT includes tests of mental function such as attention, memory, reaction time and information processing speed. Approximately 250 high schools nationwide currently use the ImPACT system to objectively evaluate the effects of concussion and more accurately determine when it is safe for an athlete to return to contact play.

The athletes in the study were from 20 high schools in Pennsylvania, Michigan, Illinois, Oregon and Maine. The average age of the athletes was 15.8 years; 93 were male, 16 were female; the majority were football players, while the rest represented basketball, soccer, hockey, lacrosse, softball, track, volleyball and wrestling.

Other investigators in the study are: Grant Iverson, Ph.D., department of psychiatry, University of British Columbia, Vancouver; Karen M. Johnston, M.D., Ph.D., department of neurosurgery, McGill University, Montreal, Canada; Joseph Maroon, M.D., department of neurological surgery, UPMC; and Freddie H. Fu, M.D., department of orthopaedic surgery, sports medicine, UPMC.

The UPMC Sports Medicine Concussion Program is an ongoing clinical service that provides oversight and consultation regarding the implementation of neuropsychological tests, such as ImPACT, to assist team medical staff in making objective return-to-play decisions after the occurrence of sports-related concussion. More information is available at www.upmc.com.

The American Journal of Sports Medicine is a bimonthly publication of the American Orthopaedic Society for Sports Medicine (AOSSM), a world leader in sports medicine education, research, communication and fellowship.
Note to media: To arrange interviews with the researchers, please contact Susan Manko, UPMC News Bureau (phone: 412-624-2607, e-mail: mankosm@msx.upmc.edu). Copies of this research paper, “Relationship Between Postconcussion Headache and Neuropsychological Test Performance in High School Athletes,” are available to media upon request from the AOSSM director of communications, Brian Haefs (phone: 847-292-4900, e-mail: brian@aossm.org)