School Nurses and Athletic Trainers Team Up on Concussion Management
Carilyn A. Rains and Brian Robinson

*NASN School Nurse* 2010 25: 234 originally published online 29 July 2010
DOI: 10.1177/1942602X10376672

The online version of this article can be found at:
http://nas.sagepub.com/content/25/5/234

Published by:
SAGE
http://www.sagepublications.com

On behalf of:
National Association of School Nurses

Additional services and information for *NASN School Nurse* can be found at:

Email Alerts: http://nas.sagepub.com/cgi/alerts
Subscriptions: http://nas.sagepub.com/subscriptions
Reprints: http://www.sagepub.com/journalsReprints.nav
Permissions: http://www.sagepub.com/journalsPermissions.nav
School Nurses and Athletic Trainers Team Up on Concussion Management

Carilyn A. Rains, RN, BSN, MEd, Massachusetts
Brian Robinson, MS, ATC, LAT, Illinois

Keywords: athletics; concussion; injuries

Sport-related concussions have become a major public health concern in the past few years, the focus of numerous Congressional hearings, and the topic of countless articles and broadcast reports. The statistics are startling: There are an approximately 1.6 to 3.8 million sport-related concussions each year (Langlois, Rutland-Brown, & Wald, 2006) and an estimated one in every 10 high school football players will suffer a concussion (Centers for Disease Control and Prevention [CDC], 2010). With nearly 7.5 million high school students participating in interscholastic athletics during the past school year (Brown, 2009), most alarming is the fact that 41% of those high school students who suffered a concussion while participating in athletics returned before they were completely symptom free (Gessel, Fields, Collins, Dick, & Comstock, 2007). The study by Gessel et al. followed nine sports and reported that concussions accounted for 8.9% of all injuries, compared to 5.5% 10 years ago.

In the face of these alarming statistics, it is no wonder that school nurses and athletic trainers charged with the medical care of high school students are finding themselves on the frontlines of concussion management. The athletic trainer is the first on the scene to determine if an athlete has in fact suffered a concussion. Yet, many high school athletes may not realize that they are experiencing concussion symptoms and may not report their symptoms to the athletic trainer or school nurse until the next day.

Furthermore, not all schools employ athletic trainers. The consequences of ignoring or mismanaging these concussive injuries may result in undetected cumulative incidents, with devastating results for the high school student athlete. Concussions are not entirely preventable, but school nurses and athletic trainers, working together, can provide proper education, accurate detection, and improved management and treatment in an attempt to prevent long-term implications.

A concussive injury is one that is functional, rather than structural, in nature. School nurses and athletic trainers are faced with the dilemma of dealing with students who “look fine” after a concussive incident. Additionally, radiologic studies, such as CT scans, may not reveal neurological evidence of injury to the brain—another false assurance that everything is fine. Research has shown that these scans, although valuable for detecting brain hemorrhage, cannot diagnose concussions or determine when an athlete has recovered.
There are many myths and misconceptions regarding concussions, within the general public, as well as in the medical community. A prevalent misconception is that loss of consciousness must occur in order to have a diagnosis of a concussion. Unfortunately, this misconception is now a major obstacle to early identification, accurate diagnosis, and early intervention for athletes, especially at the high school level.

Medical professionals agree that a loss of consciousness (LOC) is not necessary for a concussion diagnosis, and in actuality, LOC occurs in less than 10% of concussive injuries (Guskiewicz et al., 2003; McCrea et al., 2003).

Sport concussions can potentially affect the student athlete in four different areas. These areas may include, but are not limited to, the following:

- Physical symptoms (headache, nausea, dizziness, light and/or noise sensitivity)
- Behavioral or emotional changes
- Sleep disturbances
- Neurocognitive implications (changes to attention span, memory, processing, reaction time, focus, impulse control)

Communication is the key to the assessment process. The use of open-ended questions is critical with regard to the specific history of events that preceded the onset of symptoms. The students themselves may not draw a parallel or even understand the connection between what happened to them during a game the night before and how they are feeling the next day. Furthermore, parents may not even realize the behavior they observe in their adolescent has any connection to a mild brain injury suffered in a recent athletic event.

It is not uncommon for a student to report that he or she is more tired than usual and wants to sleep more. They may report that “school is harder than usual.” The student may experience difficulty concentrating during class and may have problems completing homework assignments. Many will report that the bright lights of a classroom are bothersome or the noise in the hallways creates uncomfortable physical symptoms. Furthermore, these students may start the day feeling fine, but as their academic rigors mount, by the end of the day, they may experience a return of symptoms, such as headaches, dizziness, and loss of focus.

School nurses and athletic trainers based in high schools are in a unique position to observe and track symptoms related to a concussive incident. These individuals are likely to have worked with an athlete on a daily basis, thus understanding the athlete’s normal personality. Coaches and parents may have difficulty understanding the concept that concussions affect each athlete differently, therefore an individualized approach to management must be taken. Faculty may verbalize similar concerns, such as why one concussed student was able to fulfill academic requirements within a shorter time span than another. Continued education must reinforce the concept that individuals will recover at their own pace.

One of the difficulties in dealing with the competitive student athlete is the
“warrior mentality” that is prevalent in high school sports. Athletes often feel a sense of duty to their teammates, coaches, and even parents to ignore these symptoms and return to play before they have completely healed. As a result of this attitude, a dangerous and life-threatening condition called second impact syndrome can occur when there is a second injury to the brain before the symptoms of the first injury have resolved. This occurs because the athlete, coach, or parent may not realize that it may take days or weeks for the brain to recover from the initial injury and they allow the athlete to return to play too soon.

A second impact, although minor and may not even be caused by a direct blow to the head, but rather just a jarring of the body, disrupts the regulation of the blood flow through the brain. The loss of regulation leads to a rapid swelling of the brain, resulting in intracranial swelling and possible herniation. Such a condition could lead to brain stem failure in 2 to 5 minutes.

This tragic consequence can be avoided by allowing the athlete to completely recover before resuming athletic participation. Second impact syndrome seems to be particular to high school athletes, with few, if any, cases reported at the collegiate or professional level. Researchers believe this is due to the fact that the adolescent brain is still developing and therefore more vulnerable.

There are various neurocognitive measurement systems available to schools that will establish a baseline for neurocognitive function for each athlete. These baseline tests are valuable if the athlete experiences a concussive incident and will help health care professionals gauge the extent of the injury, as well as determining progress toward recovery. These tests are computer based, requiring the athlete to answer questions related to such areas as physical symptoms, memory, reaction time, attention span, and problem solving. When an athlete is suspected of having a concussion, it is recommended they retake the neurocognitive test within 24 to 72 hours of the incident. The scores will then be compared to the athlete’s original baseline test to determine the extent of the injury.

When using this type of program, it is recommended that the athlete not return to participation until all physical symptoms have dissipated and their scores have returned to the level of the initial baseline. However, neurocognitive testing is just one of the tools used when determining the athlete’s readiness to return to play. It is highly recommended that clinicians also assess balance and mental status.

The Balance Error Scoring System (BESS) can be used as a sideline evaluation tool. The BESS evaluates the motor component of neurological function. It has been noted that balance deficits have been shown to last approximately 72 hours after a sports concussion incident. Balance can be quantified during the preseason and then again in the event of a concussive episode. Another sideline evaluation tool, the Sport Concussion Assessment Tool 2 (SCAT2) allows athletic trainers to evaluate cognitive function using a series of brief neuropsychological function tests for memory and attention. The previous method of asking the athlete questions regarding time, place, and person have shown to be unreliable.

Athletic trainers should also develop a progressive program of exertional testing prior to the athlete’s return to play, after all physical symptoms have been resolved and neurocognitive data has returned to baseline status. A gradual 5-day program of increasing intensity and sport-specific activity is recommended and can be monitored by the athletic trainer. Typically, the first phase is complete physical and cognitive rest in order to aid recovery. When the athlete is symptom free, light aerobic exercise may begin, followed in sequence by sport-specific activity, noncontact training drills, full-contact practice, and finally full return to play. There should be a minimum of 24 hours between steps. If any post-concussion symptoms occur during this step program, the student athlete should rest for 24 hours and then begin at the step where symptoms were not exhibited.

As awareness of the long-term effects of concussions increases, schools are realizing the importance of developing a comprehensive concussion management program. These programs should include:

- Concussion education programs for athletes, parents, and coaches focusing on recognition, the recovery process, and return-to-play guidelines
- Guidelines for faculty, administrators, parents, and students to ensure cognitive rest
- Concussion-prevention strategies including proper fit and maintenance of protective equipment, teaching correct sport technique, and proper maintenance of fields and facilities
- Baseline and post-concussion neurocognitive testing for student athletes
- Strict accident reporting protocol for coaching staff

The school nurse and athletic trainer can work together to impress upon the student, parents, teachers, guidance personnel, and coaches the importance of cognitive rest. Cognitive rest includes the recommendation that the injured student athlete refrains from use of the computer, reschedules tests or quizzes, and completes homework assignments as tolerated. This also applies to driving, texting, and playing video games. Parents/guardians must help enforce these criteria. Cognitive rest is considered to be as important as physical rest to promote full recovery. Approximately 80% of high school athletes recover within 3 weeks, but it is not unusual for this process to take many more weeks or months. A student athlete that continues to be symptomatic in the weeks and months after a concussion may be diagnosed with a condition referred to as post-concussion syndrome.

The school nurse and the athletic trainer are both in an ideal position to work collaboratively on this growing public health problem, leading the school community in the management
of concussive injuries. The duties and responsibilities of the school nurse and athletic trainer may overlap when it comes to the academic and athletic realm of concussion recovery. The school nurse utilizes the nursing process to direct an individualized plan of care (individual health plan) for the injured student athlete while directing academic accommodations for cognitive rest. Ultimately, the role of the school nurse in a coordinated school health program is to promote an optimal level of health/wellness and learning—the keys for academic success—for the injured student athlete.

The role of the athletic trainer is to develop a comprehensive athletic health care program. As a medical professional skilled in the prevention, diagnosis, treatment, and rehabilitation of injuries and illnesses, the athletic trainer can direct return-to-play protocols, working with coaches to develop prevention strategies that ensure equipment is fitted properly and well maintained, as well as assisting them with field and facility inspections. Additionally, the athletic trainer can work with the athletic director and coaching staff to develop and implement an emergency action plan as part of a comprehensive concussion management program. The key to student athlete health and safety is a coordinated team approach that utilizes communication and collaboration; the school nurse and athletic trainer have the expertise to provide leadership, support, education, and advocacy for the entire school community.

### Resources

The school nurse and athletic trainer have many resources to call upon in their quest to educate all those concerned with the health and safety of the student athlete. The Consensus Statement on Concussion in Sport (McCrory et al., 2009) and the National Athletic Trainers’ Association Position Statement: Management of Sport-Related Concussion (2004) can provide extensive guidance in the development of a concussion management program for high school student athletes.

### References


