

## **CONCUSSION INFORMATION**

### **When in Doubt, Sit Them Out!**

A concussion is a type of traumatic brain injury that interferes with normal function of the brain. All concussions are brain injuries. The WIAA recommends avoiding the use of nicknames like “ding” or “bell ringer” to describe concussion because those terms minimize the seriousness of concussion.

A concussion can be caused by blow to the head or even a blow to the body alone. The force moves or twists the brain in the skull. It is important to know that loss of consciousness is not required to have a concussion. In fact, less than 10% of athletes lose consciousness. A concussion is a very complex physiologic event that causes a problem with brain function not brain structure. Therefore, CT/CAT scan and MRI are usually normal in athletes with concussion. Imaging studies are not indicated for most concussions, but may be needed to rule out brain bleeds or more serious injuries.

Even what appears to be a mild blow to the head or body can cause the brain to suddenly shift or move. This motion can injure and damage brain cells. Research has shown that this damage may take up to 2 weeks to heal, but it can take longer with estimates of nearly 20% of high school athletes taking over 4 weeks to fully recover.

There are unique concerns surrounding concussion in high school sports:

- 1) Adolescents are more vulnerable and get concussions more often
- 2) Adolescents take longer than adults to heal from concussion, unlike muscular-skeletal injuries
- 3) Most high schools may not have access to a team physician or an athletic trainer for all of their teams & activities, thus the responsibility for identifying a possible concussion falls on athletes, coaches and parents
- 4) High school players can be reluctant to admit their symptoms for fear of removal from the contest

Concussion affects people in four areas of function:

- 1) Physical – This describes how they feel: headache, nausea, vomiting, dizziness, tired and loss of consciousness (which is uncommon in concussion).
- 2) Thinking – Poor memory and concentration, responds to questions more slowly and asks repetitive questions. Concussion can cause an altered state of awareness and thinking.
- 3) Emotions – A concussion can make a person more irritable or sad and cause mood swings.
- 4) Sleep – Concussions frequently cause trouble falling asleep and may wake athletes up overnight, which can make them more fatigued throughout the day.

Recent high school injury surveillance information has shown that the following sports have the highest risk of concussion (based on athletic exposures: practice + competition). Concussions occur most frequently in the following sports (in order): football, boys & girls ice hockey, girls lacrosse, girls soccer, boys lacrosse, wrestling, girls basketball, girls field hockey, boys soccer, softball and boys basketball.

Noticeable in this data is that the risk for girls is much higher than boys in the same sports; in fact, soccer & basketball carry twice the risk for concussion in girls than boys.

Most importantly, concussion can happen to anyone in any sport. Concussions also occur away from organized sports in physical education class, on the playground, while skiing or snowboarding, and when involved in a motor vehicle collision.

Everyone involved with high school athletics must be alert for potential injuries on the field and be able to recognize signs and symptoms of concussion. While coaches are not expected to make a diagnosis of concussion, it is expected for coaches to be aware that their athletes may have a concussion and then hold them out of all activity until they are medically cleared by a healthcare provider. “Signs” are what can be seen by others, like clumsiness, while “symptoms” are what the injured player feels, like a headache.

Remember, athletes should report their symptoms, but they may not unless they are asked and even then it is important to consider that athletes may not be telling the truth. Thus, it is important for schools to educate their athletes, coaching staff and parents in the preseason about the seriousness of concussion and the importance of athletes honestly reporting their symptoms and injuries.

These are some SIGNS of concussion (what others can see in an injured athlete):

- Dazed or stunned appearance
- Change in the level of consciousness or awareness
- Confused about assignment
- Forgets plays
- Unsure of score, game, opponent
- Clumsy
- Answers more slowly than usual
- Shows behavior changes
- Loss of consciousness
- Asks repetitive questions or memory concerns

These are some of the more common SYMPTOMS of concussion (what an injured athlete feels):

- Headache
- Nausea
- Dizzy or unsteady
- Sensitive to light or noise
- Feeling mentally foggy
- Problems with concentration and memory
- Confused
- Slow

Injured athletes can exhibit many or just a few of the signs and/or symptoms of concussion. However, if a player exhibits any signs or symptoms of concussion, the responsibility is simple: remove them from participation. **“When in doubt sit them out.”**

It is important to notify a parent or guardian when an athlete is thought to have a concussion. Any athlete with a concussion must be seen by an appropriate health care provider before returning to practice (including conditioning and weight lifting) or competition.

While all concussions are serious injuries, some injured athletes will require emergency care. Anytime you are uncomfortable with an athlete on the sideline, it is reasonable to activate the Emergency Medical System (911). The following are reasons to activate the EMS, as any worsening signs or symptoms may represent a medical emergency:

- 1) Loss of consciousness, this may indicate more serious head injury
- 2) Decreasing level of alertness
- 3) Unusually drowsy
- 4) Severe or worsening headache
- 5) Seizure
- 6) Persistent vomiting
- 7) Difficulty breathing

If you suspect a player may have a concussion, that athlete should be immediately removed from play. The injured athlete should be kept out of play until they are cleared to return by an appropriate health care provider. If the athlete has a concussion, that athlete should never be allowed to return to activity (conditioning, practice or competition) that day.

All athletes are individually assessed and some athletes may be able to begin gentle, non-contact aerobic exercise prior to full recovery. The level of exercise should not cause an increase of symptoms. The athlete should do this exercise under the guidance of the treating healthcare provider (who has experience with concussion management). The athlete should be at full academics (full days of school and doing homework/tests) before allowing this degree of exercise and the exercise should not be associated with practice, but instead independent aerobic fitness. No weight lifting/resistance training until medical clearance. No return to practice without medical clearance.

A player with a concussion must be carefully observed throughout the practice or competition to be sure they are not feeling worse. Even though the athlete is not playing, never send a concussed athlete to the locker room alone and never allow the injured athlete to drive home.

Most concussions are temporary and they resolve without causing residual problems. In the adolescent population, around 20% of athletes with concussion have symptoms that persist beyond 4 weeks. These symptoms of headache, difficulty concentrating, poor memory and sleep disturbances can lead to academic troubles among other problems. Concussion symptoms may even last weeks to months (post-concussion syndrome).

Allowing an injured athlete to return too quickly increases the risk for repeat concussion. Repeat concussion may cause Second Impact Syndrome. Second Impact Syndrome is a rare phenomenon which happens only in young athletes that causes rapid brain swelling and death. Repeat concussions may increase the chance of long term problems, such as decreased brain function, persistent symptoms and potentially chronic traumatic encephalopathy (a disorder that cause early degeneration of the brain similar to what is seen with Alzheimer's disease).

A major concern with concussion in the high school athlete is that it can interfere with school performance. Symptoms (headache, nausea, etc.), poor short-term memory, poor concentration and organization may temporarily turn a good student into a problem student. The best way to address this is to decrease the academic workload, and potentially taking time off from school or going partial days (although the time missed should nearly always be less than 5 days). Injured athletes should have extra time to complete homework and tests, and they should be given written instructions for homework. New information should be presented slowly and repeated. Injured athletes will need time to catch up and may benefit from tutoring. If an athlete develops worsening symptoms at school, he/she should be allowed to visit the school nurse. The school and coaches should maintain regular contact with the injured athlete's parents to update progress.

**Athletes with a concussion should return to full speed academics without accommodations before returning to sports (practice and competition).**

Relative rest remains an essential component of concussion treatment. Further contact is to be avoided at all costs due to risk of repeat concussion and Second Impact Syndrome. Physical exertion can also worsen symptoms and prolong concussion recovery – this includes aerobic conditioning and resistance training. Physical activity should not be started without authorization by an appropriate health care provider.

It is also important to remember that the athlete's concussion can interfere with work and social events (movies, dances, attending games, etc.). It is important for injured athletes to sleep 8-12 hours overnight. It is also helpful for parents to decrease brain stimulation at home by limiting video games, but a reduction in computer time, text messaging, and TV/movies may also be helpful.

Neuropsychological testing has become more commonplace in concussion evaluation as a means to provide an objective measure of brain function. It is best used as a tool to help ensure safe return to activity and not as the only piece of the decision making process. Testing is currently done using computerized neuropsychological testing (example: ImPACT, Axon Sports) or through a more detailed pen and paper test administered by a neuropsychologist.

If neuropsychological testing is available, ideally a baseline or pre-injury test is obtained prior to the season. This baseline should be done in a quiet environment when the athlete is well rested. It is felt that baseline testing should be repeated every one to two years for the developing adolescent brain. Multi-modal baseline evaluation that assess baseline symptoms, cognitive functioning, and balance is ideal. If there is no baseline available, the injured athlete's scores can be compared to age established norms. The WIAA feels that neuropsychological testing can be a very useful tool with regard to concussion management.

## **RETURN TO PLAY**

Current recommendations are for a stepwise return to play program. In order to resume activity, the athlete must be **symptom free** and off any pain control or headache medications. The athlete should be carrying a full academic load without any significant accommodations for 1-2 days. Finally, the athlete must have clearance from an appropriate health care provider.

The program described below is a guideline for returning concussed athletes when they are symptom free. Athletes with multiple concussions and athletes with prolonged symptoms often require a prolonged or different return to activity program and should be managed by a physician that has experience in treating concussion.

The following program allows for one step per 24 hours. The program allows for a gradual increase in heart rate/physical exertion, coordination, and then allows contact. If symptoms return, the athlete should stop activity and notify their healthcare provider before progressing to the next level.

**STEP ONE:** About 15-30 minutes of light aerobic exercise at a slow to medium pace. This allows for increased heart rate.

**STEP TWO:** More strenuous sport-specific exercise (running, sprinting, skating) without any equipment or contact. This allows for more complex movement and agility.

**STEP THREE:** Begin **non-contact** drills in full uniform. May also begin progressive resistance training. This allows for increased coordination and thinking during exertion.

**STEP FOUR:** Following medical clearance, full practice with contact. This helps restore confidence and allows coaching staff to fully assess athlete.

**STEP FIVE:** Full game clearance

## **PREVENTION**

There is nothing that truly prevents concussion. Education and recognition of concussion are the keys in reducing the risk of problems with concussion.

Proper equipment fit and use may reduce the risk of concussion. However, helmets do NOT prevent concussion. They are used to prevent facial injuries and skull fractures. Most importantly, proper technique for hitting/contact are vital, for example, athletes that lower their head while making a football tackle have a significantly higher risk for concussion and neck injuries. Athletes should never lead with their head or helmet. Studies have shown that soccer headgear and mouthguards do not decrease concussion risk, although mouthguards are proven to decrease dental and facial trauma.

All schools should have an Emergency Action Plan. This plan can be used for any medical emergency from a concussion to a neck injury to anaphylaxis (severe allergic reaction). There should be an emergency action plan for every practice and competition area which should be practiced yearly.

The WIAA encourages every member school to promote concussion education and bring about a positive change in concussion culture by discussing this topic with all teachers, coaches, athletes and parents. We recommend a preseason discussion with athletes and families to set forth expectations for what will happen if a student has a concussion and the steps the student must go through to return to play. Coaches should use in-season concussions as "teachable moments" to remind teammates about the importance of reporting their injuries and supporting their injured teammate through the recovery process.

Further reading and additional education material can be obtained through the following locations:

[www.nfhs.com](http://www.nfhs.com)

[www.nfhslearn.com](http://www.nfhslearn.com) (free concussion education video)

[www.cdc.gov/concussion/headsup/high\\_school.html](http://www.cdc.gov/concussion/headsup/high_school.html) (Heads Up program)