



Heat & Hydration

The beginning of football season all around the country is characterized by hot, August practices and hard work in equipment. But the environment, equipment, and intensity can place athletes at risk of heat illness. Heat illnesses represent conditions resulting from heat stress, which can be imposed by a number of factors, but usually result from the environment or the body creating this heat load itself. Heat illnesses can range from minor to severe, and in particular, *exertional heat stroke is a life-threatening emergency*. Athletes may not realize when they are reaching their limits and continue to push hard at practice. It is important for you as a coach to be able to modify practices to reduce the risk and learn to recognize and manage heat illnesses. When you take the field, you want to be sure you have done everything you can to protect your athletes from heat illnesses.

1. How does the body handle heat?

High body temperature decreases exercise performance and is a major risk factor for developing a heat illness. During exercise, working muscles produce heat, which is stored in the body until it can be released to the environment. The environment can add heat to the body through high air temperature and radiant heat from the sun. So the body has to keep itself from storing too much heat while continuing to exercise. Sweating is the body's best way to get rid of heat, via evaporation. As sweat evaporates from the skin, heat is transferred away from the body into the environment. However, as relative humidity increases, the body's ability for sweat to evaporate from the skin decreases, resulting in greater heat storage, load, and potential for exertional heat illnesses.

2. How do I protect my athletes?

The best way to protect your athletes is to modify the risk factors that are responsible for causing heat illness. These risk factors can be classified into two categories: extrinsic (factors outside the athlete's control) and intrinsic (factors unique to the specific athlete). Extrinsic risk factors can be modified by changing practice times, taking off equipment, or providing more breaks. Not participating with an illness, maintaining proper hydration, and becoming heat acclimatized are all options to decrease intrinsic risk.

3. What is heat acclimatization and how can my team do it?

Heat illness is most common during the first 5 days of practice. An easy way to protect athletes during this time is heat acclimatization. Heat acclimatization takes an average of 10-14 days, but still provides important protective benefits while it's occurring. Heat acclimatization is a series of adaptations that helps the body prepare for exercise in the heat. These changes help the body maintain lower temperature and heart rate, enhance sweating, and store more water. The lower heart rate and body temperature means that athletes can exercise longer and at a higher intensity, which lowers the risk for heat illness.



4. How do I modify my practice for environmental conditions?

Environmental conditions provide important information about how hard the practice could be on the body. Modifying the length of practice, intensity of practice, the number and lengths of breaks during practice keeps athletes safer when conditions are stressful. Wet bulb globe temperature (WBGT) is the best way to determine how stressful the environment is. WBGT is calculated by taking into account air temperature, humidity, and radiant energy from the sun. If WBGT is not available, the next best thing is heat index, which is a combination of air temperature and humidity. The following guidelines are an example of practice modifications based on the environmental conditions.

A note about the table: these guidelines were created in Georgia and use a few assumptions: athletes will follow/have followed a heat acclimatization protocol, there will be appropriate access to fluid and rest breaks during exercise, and athletes who are from Georgia are used to higher temperatures. For these reasons, the activity guidelines should be altered based on the region of the country you play in.

WBGT	ACTIVITY GUIDELINES	REST BREAK GUIDELINES
Under 82.0°F	Normal Activities	Provide at least three separate rests breaks each hour with a minimum duration of 3 minutes each during the workout.
82.0-86.9°F	Use discretion for intense or prolonged exercise; watch at-risk players carefully.	Provide at least three separate rest breaks each hour with a minimum duration of 4 minutes each.
87.0-89.9°F	Maximum practice time is 2 hours. Players are restricted to helmet, shoulder pads, and shorts during practice, and all protective equipment must be removed during conditioning activities. If the WBGT rises to this level during practice, players may continue to work out wearing football pants without changing to shorts.	Provide at least four separate rest breaks each hour with a minimum duration of 4 minutes each.
90.0 - 92.0°F	Maximum practice time is 1 hour. No protective equipment may be worn during practice, and there may be no conditioning activities.	There must be 20 minutes of rest breaks distributed throughout the hour of practice.
Over 92.1°F	No outdoor workouts. Delay practice until a cooler WBGT level is reached.	



5. What types of fluid should I use for hydrating?

Water is the least expensive and most accessible fluid during exercise. Sports drinks contain electrolytes, sugar, and water, which give athletes important nutrients during exercise. While water is appropriate during all types of exercise, sports drinks are recommended for use during intense exercise that is greater than 60 minutes. Also, kids like the taste of sports drink, so it may lead them to hydrate more than if water is the only available fluid.

6. When should athletes hydrate?

Before exercise, athletes should drink 16-24 oz. of either water or a sports drink.

During exercise, athletes should:

- Have unlimited access to water during exercise/activity
- Be able to drink as much as they want
- Be able to drink for the entire break period if they wish

To achieve this, it's recommended that all exercise sessions should have predetermined breaks approximately every 15 minutes. The timing and length of breaks should be dependent on the environmental conditions. While athletes may be encouraged, or even required to bring their own fluids, as a coach, always make sure extra fluids are available for those that have forgotten or need to refill their water bottle.

7. How do I recognize the various exertional heat illnesses and what can I, as a coach, do to treat my athletes?



	Heat Syncope	Heat Cramps	Heat Exhaustion
Recognition	Refers to a fainting or lightheadedness episode	Are painful, localized muscle cramps and may feel like they are "wandering" throughout the cramping muscle Usually visible and the muscle will feel hard	The inability to continue exercise in the heat from either weakness or exhaustion May feel hot, tired, sweating a lot, weak, dizzy and don't feel able to continue exercise
Causes	Lack of heat acclimatization and poor fitness Blood pools in the lower extremities reducing the heart's ability to provide enough circulation	Combination of fatigue, dehydration and electrolyte losses through sweat Lack of heat acclimatization and poor fitness	Caused by either excessive fluid losses or electrolyte losses Dehydration causes less blood to be available for the working muscles and the skin to give off heat
Treatment	Lay the athlete on the ground and raise their legs about 12 inches This helps blood go back to the heart to normalize blood pressure	Rehydration with water and sport drinks Some light stretching or massage with ice on the cramping muscle	Remove the athlete from activity and put them in a shaded/cool area Lay the athletes on the ground and raise their legs about 12 inches Replenish lost fluids Moderate cooling methods such as ice towels, misting fans, or cold water immersion



<p>Prevention</p>	<p>Heat acclimatization</p>	<p>Arrive to practice well hydrated and having consumed some salt with the last meal</p> <p>Minimize fluid losses during exercise and replace lost fluids post exercise</p> <p>Heat acclimatization</p>	<p>Heat acclimatization</p> <p>Arriving to practice/competition well hydrated</p> <p>Minimizing fluid losses during activity and replace fluid losses after exercise</p>
<p>Return to Play</p>	<p>The athlete should feel better within a few minutes, and full recovery is usually quick (within hours)</p> <p>Return to activity once the athlete feel better and is adequately hydrated</p>	<p>Once cramps resolve</p> <p>Without replacing lost fluids, risk of additional cramps is high</p>	<p>Should not return to activity on the same day</p> <p>Complete recovery usually takes 24-48 hours and must focus on rehydration and rest</p>

Important: If an athlete needs to go to the hospital, have him cool off first and transport him second. Rapid cooling on-site while waiting for transport to the hospital is the key to survival of an exertional heat stroke without medical staff.

30 min to cool down
 Save From Death

30-60 complications = possible Death

+60 Death

→ Ext tremor Hypothermia

→ CNS Breakdown disfunction



Exertional Heat Stroke (EHS)

1. What is exertional heat stroke?

Exertional heat stroke occurs when the body reaches temperatures above 104°F and there is obvious central nervous system (CNS) dysfunction. CNS dysfunction can include any of the following; dizziness, collapse, confusion, irrational behavior, hysteria, aggressiveness, combativeness, disorientation, seizures, and coma. It is a medical emergency.

2. What is the cause of EHS?

When the body is unable to give off heat fast enough, heat is stored and core body temperature continues to rise.

3. How do I treat someone suspected of EHS?

If EHS is suspected in an athlete, immediate action is imperative in order to maximize the chance of survival.

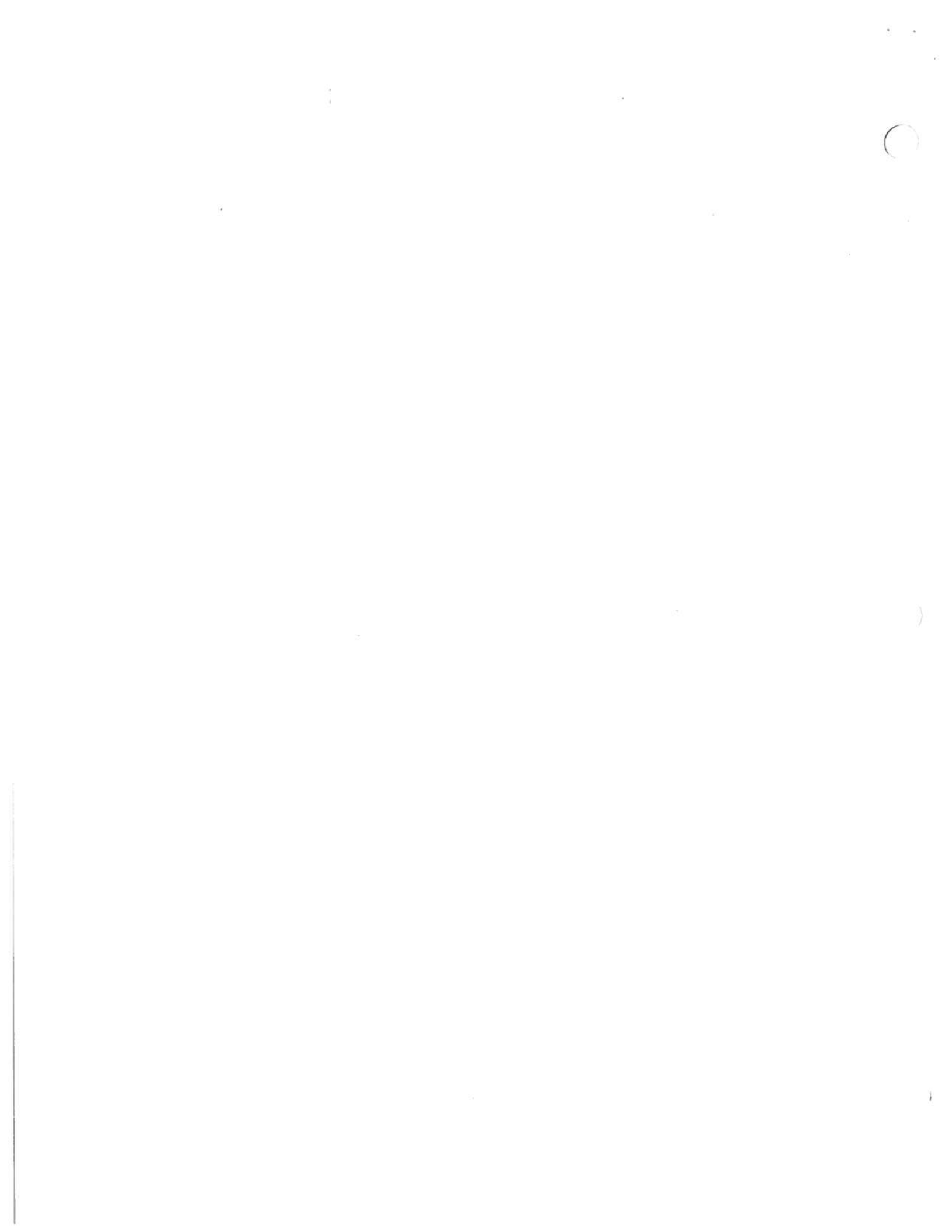
EMS (9-1-1) should be called immediately. Aggressive cooling of the entire body should be done to lower the athlete's core body temperature as fast as possible. Whole-body cold-water immersion is the best treatment for EHS because it cools the body the fastest. If this is unavailable then any attempts to cool the body through continual dousing of water (shower, running a hose over the entire body while covering the body with iced towels) should be done before EMS arrives to take the athlete to the hospital.

4. How do I prevent EHS?

As a coach, there are multiple ways in which you can help prevent the occurrence of EHS:

- Having your athletes undergo a period of heat acclimatization
- Encouraging athletes to come to practice hydrated
- Allowing athletes unlimited access to hydration during activity
- Modifying practice when environmental conditions become extreme (allowing additional rest/hydration breaks, reducing the intensity of practice, reducing the time of practice, and reducing the equipment worn during practice)
- Practicing at an intensity that is appropriate for the fitness level
- Encourage your athletes to speak up when they do not feel well- create a culture where this is considered smart.

For more information, visit www.usafootball.com/heads-up or www.ksi.uconn.edu



THE FACTS

- All concussions are *serious*.
- Most concussions occur *without* loss of consciousness.
- Recognition and proper response to concussions when they *first occur* can help prevent further injury or even death.

There's no doubt about it: sports are a great way for kids and teens to stay healthy while learning important team-building skills. But there are risks to pushing the limits of speed, strength, and endurance. And athletes who push the limits sometimes don't recognize their own *limitations*—especially when they've had a concussion.

That's where you come in. It's up to you, as a coach, to help recognize concussion and make the call to pull an athlete off of the field if you think an athlete might have one. Playing with a concussion can lead to long-term problems. It can even be *fatal*.

What Is a Concussion?

A bump, blow, or jolt to the head can cause a concussion, a type of traumatic brain injury. Concussions can also occur from a blow to the body that causes the head and brain to move rapidly back and forth—literally causing the brain to bounce around or twist within the skull. This sudden movement of the brain causes stretching, damaging the cells and creating chemical changes in the brain. Once these changes occur, the brain is more vulnerable to further injury and sensitive to any increased stress until it fully recovers.



Unlike a broken ankle, or other injuries you can feel with your hands, or see on an x-ray, a concussion is a disruption of how the brain works. It is *not* a "bruise to the brain."



How Can I Recognize a Possible Concussion?

On the football field, concussions can result from a fall or from players colliding with each other, the ground, or an obstacle, such as a goalpost. Even a "ding," "getting your bell rung," or what seems to be a mild bump or blow to the head can be serious.

As a coach you are on the front line in identifying an athlete with a suspected concussion. You know your athletes well and can recognize when something is off—even when the player doesn't know it or doesn't want to admit it.

Sometimes people wrongly believe that it shows strength and courage to play while injured. Discourage others from pressuring injured athletes to play. Some athletes may also try to hide their symptoms. Don't let your athlete convince you that he is "just fine" or that he can "tough it out." Emphasize to athletes and parents that playing with a concussion is dangerous.

Remember, you can't see a concussion, like you can see a broken ankle, and there is no one single indicator for concussion. Recognizing a concussion requires watching for different types of signs or symptoms.

So to help recognize a concussion, you should watch for and ask others to report the following two things among your athletes:

1. **A forceful bump, blow, or jolt to the head or body that results in rapid movement of the head.**
-and-
2. **Any concussion signs or symptoms, such as a change in the athlete's behavior, thinking, or physical functioning.**

What Are the Signs and Symptoms of Concussion?

Athletes who experience **one or more** of the signs and symptoms listed below, or who report that they just "don't feel right," after a bump, blow, or jolt to the head or body may have a concussion.

SIGNS OBSERVED BY COACHING STAFF	SYMPTOMS REPORTED BY ATHLETE
<ul style="list-style-type: none"> • Appears dazed or stunned (such as glassy eyes) • Is confused about assignment or position • Forgets an instruction or play • Is unsure of score or opponent • Moves clumsily or poor balance • Answers questions slowly • Loses consciousness (<i>even briefly</i>) • Shows mood, behavior, or personality changes • Can't recall events <i>prior</i> to hit or fall • Can't recall events <i>after</i> hit or fall 	<ul style="list-style-type: none"> • Headache or "pressure" in head • Nausea or vomiting • Balance problems or dizziness • Double or blurry vision • Sensitivity to light or noise • Feeling sluggish, hazy, foggy, or groggy • Concentration or memory problems • Confusion • Does not "feel right" or is "feeling down"

Signs and symptoms of concussion generally show up soon after the injury. But the full effect of the injury may not be noticeable at first. For example, in the first few minutes the athlete might be slightly confused or appear a little bit dazed, but an hour later they can't recall coming to the practice or game.



So assess the player, then assess the player again, then re-assess the player even later. Make sure that the athlete is supervised for at least one or two hours after you suspect a concussion. Any worsening of concussion signs or symptoms indicates a medical emergency.

Why Should I Be Concerned about Concussions?

Most athletes with a concussion will recover quickly and fully. But for some athletes, signs and symptoms of concussion can last for days, weeks, or longer.

So why is it so important for you to remove an athlete from play?

If an athlete has a concussion, his brain needs time to heal. A repeat concussion that occurs before the brain recovers from the first—usually within a short time period (hours, days, weeks)—can slow recovery or increase the chances for long-term problems. In rare cases, repeat concussions can result in brain swelling or permanent brain damage. They can even be *fatal*.

Did You Know?

- Athletes who have ever had a concussion are at increased risk for another concussion.
- Young children and teens are more likely to get a concussion and take longer to recover than adults.

What Are Concussion Danger Signs?

In rare cases, a dangerous blood clot may form on the brain of an athlete with a concussion and crowd the brain against the skull. Call 9-1-1 or take the athlete to the emergency department right away if after a bump, blow, or jolt to the head or body he exhibits **one or more** of the following danger signs:

- One pupil larger than the other
- Is drowsy or cannot be awakened
- A headache that gets worse
- Weakness, numbness, or decreased coordination
- Repeated vomiting or nausea
- Slurred speech
- Convulsions or seizures
- Cannot recognize people or places
- Becomes increasingly confused, restless, or agitated
- Has unusual behavior
- Loses consciousness (a brief loss of consciousness should be taken seriously)

What Should I Do If a Concussion Is Suspected?

You know that one of the keys to being a good coach is keeping your athletes safe and preparing them for the future—whether it is learning good teamwork or honing their athletic skills. But you also know that there are *unacceptable risks in sports*, especially when it comes to the brain.



So no matter whether the athlete is a key member of the team or the game is about to end, an athlete with a suspected concussion should be immediately removed from play. To help you know how to respond, follow the “Heads Up” four-step action plan if you suspect that an athlete has a concussion:

- 1. Remove the athlete from play.** Look for signs and symptoms of a concussion if your athlete has experienced a bump or blow to the head or body. *When in doubt, sit them out.*
- 2. Ensure that the athlete is evaluated by an appropriate health care professional.** Do not try to judge the severity of the injury yourself. Health care professionals have a number of methods that they can use to assess the severity of concussions. As a coach, recording the following information can help health care professionals in assessing the athlete after the injury:
 - Cause of the injury and force of the hit or blow to the head or body
 - Any loss of consciousness (*passed out/knocked out*) and if so, for how long

- Any memory loss immediately following the injury
- Any seizures immediately following the injury
- Number of previous concussions (*if any*)

- 3. Inform the athlete’s parents or guardians about the possible concussion and give them information on concussion.** This fact sheet can help parents monitor the athlete for sign or symptoms that appear or get worse once the athlete is at home or returns to school.
- 4. Keep the athlete out of play the day of the injury and until an appropriate health care professional says they are symptom-free and it’s OK to return to play.** After you remove an athlete with a suspected concussion from practice or play, the decision about when to return to practice or play is a medical decision.

How Can I Help Athletes to Return to Play Gradually?

Rest is very important after a concussion because it helps the brain to heal. After a concussion the torn or stretched brain cells need the body’s energy to heal. So the more energy an athlete uses doing activities, the less energy that goes to help the brain heal.

That’s why ignoring concussion symptoms and trying to “tough it out” often makes symptoms worse. For example, exercising or activities that involve a lot of concentration, such as studying, working on the computer, or playing video games may cause concussion symptoms (such as headache or tiredness) to reappear or get worse. So only when an athlete’s symptoms have reduced significantly, in consultation with their health care professional, should he slowly and gradually return to daily activities, such as school. Physical **and** cognitive activities—such as concentration and learning—should be carefully managed and monitored by a health care professional.



Progressive Return to Activity Program:

An athlete should return to sports practices under the supervision of an appropriate health care professional. When available, be sure to work closely with your team's certified athletic trainer.

Below are five gradual steps that you and the health care professional should follow to help safely return an athlete to play. Remember, this is a gradual process. These steps should not be completed in one day, but instead over days, weeks, or months.

Step 1: Begin with light aerobic exercise only to increase an athlete's heart rate. This means about 5 to 10 minutes on an exercise bike, walking, or light jogging. No weight lifting at this point.

Step 2: Continue with activities to increase an athlete's heart rate with body or head movement. This includes moderate jogging, brief running, moderate-intensity stationary biking, moderate-intensity weight lifting (reduced time and/or reduced weight from the athlete's typical routine).

Step 3: Add heavy non-contact physical activity, such as sprinting/running, high-intensity stationary biking, regular weight lifting routine, non-contact sport-specific drills (in three planes of movement).

Step 4: Athlete may return to practice and full contact in controlled practice.

Step 5: Athlete may return to football competition.

As a coach, you should pay careful attention to an athlete's symptoms, as well as the athlete's thinking and concentration skills at each stage of activity. Any symptoms should be reported to their health care provider. If an athlete's symptoms come back or he gets new symptoms as he becomes more active at any stage, this is a sign that the athlete is pushing himself too hard. An athlete should only move to the next level of activity if he does not experience any symptoms at each level. If an athlete's symptoms return, he should stop these activities and the athlete's health care provider should be contacted. After more rest and an okay from his health care provider, the athlete should return to the first level and he should then restart the program gradually.

How Can I Help Prevent and Prepare for Concussions?

Insist that safety comes first. No one technique or piece of safety equipment is 100 percent effective in preventing concussion, but there are things you can do to help minimize the risks for concussion and other injuries. For example, to help prevent injuries, ensure that athletes:

- Practice "Heads Up" football—never lower your head during a hit.
- Use proper techniques in blocking and tackling. Learn and apply the fundamentals.
- Follow the rules of play and practice good sportsmanship and self-control at all times.
- Wear properly-fitted helmets and protective equipment. Helmets and other protective equipment should be well-maintained and be worn consistently and correctly. This includes buckling the chin strap on helmets at all times.
- Understand that helmets can help protect their head and brain, but they are not 100 percent effective in preventing concussions.

Check with your league, school, or district about concussion policies. Concussion policy statements can be developed to include the school or league's commitment to safety, a brief description of concussion, and information on when athletes can safely return to play. Parents and athletes should sign the concussion policy statement at the beginning of the football season.

Involve and get support from other school or league officials—such as principals, certified athletic trainers, other coaches, school nurses, and parent-teacher associations—to help ensure that school or league rules and concussion policies are in place before the first football practice.



WHEN IN DOUBT, SIT THEM OUT

For more information and safety resources, visit:
www.cdc.gov/Concussion or www.usafootball.com.



CONCUSSION SCENARIOS

Scenario 1

A wide receiver collides with an opposing player while both are jumping for a high pass. Both players tumble to the ground after the mid-air collision. Both were playing the ball, so there was no 'targeting' or blow directly to the head. The opposing player immediately jumps to his feet, but your receiver rises slowly and struggles toward the huddle, appearing dazed.

You immediately bring him to the sidelines. He says he remembers the play and being hit by the safety. He tells you he just got the wind knocked out of him but is having trouble looking you in the eyes. Please evaluate using concussion symptoms.

Scenario 2

Billy, your left tackle, tells you early in the game that Bobby, your left guard, is acting 'strange' in the huddle. Bobby keeps asking Billy what his blocking assignment is. You cannot recall a hit during the game, and Bobby is performing well.

Your game field shares one trainer in the middle of four fields, and because the trainer is so far away, you ask an assistant coach to evaluate him. Bobby's dad, your offensive line coaches volunteers. Huddle with your assistant coach and to see the results of the evaluation.

Scenario 3

Dave got a concussion two weeks ago. He sat out a game while his parents struggled to get him to a doctor. Dave returned to practice late last week. He missed a second game because he had not practiced. You implemented a gradual return to play protocol and Dave was able to jog on day one and successfully ran hard on day two without symptoms. He rested over the weekend and today, Monday, he ran some pass routes and is complaining that he has a headache and that the ball seems fuzzy. You tell him to sit down for the rest of practice and he may not be able to play this week either.



ROLE PLAY SCENARIO 1

Coach: Do you have a headache

WR: 'ummmm ... A little one.'

Coach: Nausea or vomiting

WR: 'No.'

Coach: Balance problems or dizzy

WR: 'I feel kinda dizzy.'

Coach: Double or blurry vision

WR: 'I can see fine.'

Coach: Sensitive to light

WR: 'Nope, I am good.'

Coach: Sensitively to noise

WR: 'No.'

Coach: Sluggish, hazy, foggy or groggy

WR: 'No, I'm OK.'

Coach: Concentration or memory problem

WR: 'No, Today is Saturday, we are playing Johnsonville, it's either.....um..... the third or fourth quarter.'

Coach: Confusion

WR: 'I am not sure.'

Coach: Does not 'feel right'

WR: 'I feel fine, just tired.'



ROLE PLAY

SCENARIO 2

Assistant Coach (Bobby's Dad) **** You want Bobby to stay in game****:

Head Coach: 'Did bobby look stunned?'

Bobby's Dad: 'I couldn't tell if he was dazed or just really hot. You know those big linemen, he is always staring at the ground.'

Head Coach: 'Was he confused about assignments and plays?'

Bobby's Dad: 'He remembers them all, he just messed up that one screen play.'

Head Coach: 'Did Bobby forget and of your questions or instruction?'

Bobby's Dad: 'I quizzed him and asked him what about that screen and he knows he was supposed to release out to the wide receiver.'

Head Coach: 'Did Bobby know the score.'

Bobby's Dad: 'Touchdowns are for running backs. He never knows the score just if we winning or losing and how he is blocking.'

Head Coach: 'How were his movement skills? Was he moving clumsily?'

Bobby's Dad= 'He is always clumsy.'

Head Coach: 'Were his responses slow? Did he answer questions slow?'

Bobby's Dad = 'Nope, he was fine.'

Head Coach: 'Did he ever lose conscience?'

Bobby's Dad: 'No, He stayed awake.'

Head Coach: 'Any mood, behavior or personality change?'

Bobby's Dad: 'He is completely normal, just being a baby.'

Head Coach: 'Could he recall events prior to the hit?'

Bobby's Dad: 'He remember it all, he was super mad about getting beat for a that sack.'

Head Coach: 'Can he recall everything after the hit?'

Bobby's Dad = 'Sure can?'



ROLE PLAY

SCENARIO 3

****Improve act an open scene****

Coach:

When Dave's parents come to pick him up, please explain to his parents that he failed his progressive return to play and what will be the next steps.

Dave's Parent:

Push for your child to play because he:

- He has already missed two games.
- Paid a lot of money to be in this league.
- Got a new 'better' helmet after the concussion.
- Has a note from the doctor.



WHAT A PSC NEEDS TO KNOW ABOUT: CONCUSSION AWARENESS

- Be prepared to teach the signs and symptoms of concussions
- Research and explain their league's specific removal from play policy
- The importance of medical professionals in evaluation of concussion and reinstatement
- Research and explain their leagues specific return to play policy