



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 into 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 to get the full benefits, 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.



Achieving heat acclimatization.

Heat acclimatization can be achieved by using the model below.

The following are important for understanding the table:

- Practice is defined as time on the football field (including warm-up, stretching, break time, cool down, and any conditioning time), and it should never exceed 3 hours.
- During the first 5 days, practices should be limited to 2 hours.
- A walkthrough is defined as time dedicated to reviewing plays and field positions, and should not exceed 1 hour.
- Heat acclimatization days should be continuous if possible, meaning few days off. However, if your practice schedule is only a few days a week, then remember that the days between your practices (the days off) do not count towards acclimatization days. It will take longer to acclimatize in situations like this.

AREA OF PRACTICE MODIFICATION	PRACTICES 1-5		PRACTICES 6-14
	Days 1-2	Days 3-5	
# of Practices Permitted Per Day	1		2, only every other day
Equipment	Helmets only	Helmets & Shoulder Pads	Full Equipment
Maximum Duration of Single Practice Session	2 hours	3 hours	3 hours (a total maximum of 5 hours on double session days)
Permitted Walk Through Time (not included as practice time)	1 hour (but must be separated from practice for 3 continuous hours)		
Contact	No Contact	Contact only with blocking sleds/dummies	Full, 100% live contact drills

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.

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.	

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.

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 or during intense exercise in the heat. 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

- Hydrate with 16-24 oz. of water or a sports drink

During Exercise

- 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
- Access to sports drinks when exercise is greater than 60 minutes or in exercise is going to be intense and in the heat

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.



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

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.

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

4. How do I prevent EHS?

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

