Heat Injuries

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Heat injuries in athletics are a very real and serious problem. The fact is becoming well known nationally after several deaths associated with heat in the last few years. This problem can be particularly difficult in the Southeast where heat and humidity are extremely high. This makes it difficult, if even possible, to exercise in a safe environment.

In cooler climates the problem exists as well, particularly because heat waves do not allow time for acclimation. The primary problem with heat injuries is the loss of fluid needed to cool and supply the body's energy needs. Not only are there medical concerns with heat exposure, but athletic and academic performance decreases with only a 1% body weight loss.

There are several types of heat injuries. First, and often unrecognized, is heat fatigue. Heat fatigue is a generalized weakness and a tired feeling associated with a drop in performance, both in athletics and academics. It occurs most frequently early in the season before an athlete becomes acclimated. Therefore the treatment of heat fatigue is acclimation, fluid replacement, and adequate carbohydrate and electrolyte intake.

The second and much more recognized problem associated with heat injuries is heat cramps. Heat cramps are common and occur frequently in the calf muscles. However, cramps do not necessarily occur even during exercise, but may occur in the evening at rest. Certainly cramps can become very severe in athletic competition during extreme fluid and electrolyte loss where many of the muscles throughout the body cramp creating severe pain and increasing anxiety. Initially cramps are best treated with stretching. Ice is sometimes helpful. The foundation, however, of treating all heat problems is acclimation, fluid

replacement, carbohydrates, electrolytes and rest.

At FSU we have found that it is beneficial to use some type of salt replacement, even as simple as increasing the level of salt during meals during intense practices such as two-a-days when fluid and electrolyte loss is high. This seems to greatly decrease the frequency and severity of cramps. However, when cramps are severe IV fluids can be beneficial to stop cramping and provide needed nutrients to muscles and adequate fluid for cooling.

Heat exhaustion is a much more serious medical problem. It occurs as the body is unable to eliminate heat as fast as it is being produced. The symptoms typically include dizziness, nausea, headache, increased pulse, sometimes cool clammy skin and disorientation. This can progress quickly to the life-threatening condition known as heat stroke. Therefore, early recognition and treatment is critical.

The treatment is to remove from heat immediately and begin cooling the athlete as quickly as possible. Cooling is most effective with water immersion. However, wet towels, fanning and even spraying with water and removal of clothing can be helpful. Fluid replacement is also beneficial as quickly as possible. Having even small kiddy pools available with cool water can be very helpful on the practice field in a shaded area to rapidly cool athletes that are developing heat exhaustion. Cool whirlpools are frequently used for this. However, the athlete does need to be watched during immersion therapy.

Finally, the most severe type of heat illness is heat stroke as it can result in death or permanent brain injury. This occurs with a rapid rise in body temperature to 105oF or above and is a medical emergency. It can occur without having heat exhaustion or other forms of heat illness. The main difference between heat exhaustion and heat stroke is that there is neurologic involvement, typically confusion that can lead to loss of consciousness, seizures, and severe disorientation. The treatment for this is initially to follow the ABC's (airways, breathing, and circulation). CPR is sometimes necessary.

Cooling techniques are extremely critical with immersion if possible and drinking if the patient is alert and can drink fluids. Also, it is helpful to take rectal temperatures. This will help to treat and evaluate the seriousness of the injury. Immediate transportation to the hospital is critical and this requires appropriate preparation. The seriousness of the injury equals the length of time that the heat is elevated. Do not hesitate to treat this type of problem very aggressively.

The goal of all medical problems is prevention. The most effective way to prevent heat injuries is to keep adequate hydration. It is critical to have fluids available at all times and to schedule frequent water breaks which are most beneficial in the shade. A good rule of thumb is at least ten minutes of rest for every fifty minutes. It is also beneficial to schedule practice to avoid the heat of the day. Particularly scheduling practice early in the morning or later in the evening not only helps avoid some type of heat problems, but also can avoid the stress of two-a-days by increasing the recovery period.

As far as types of fluid, I believe the electrolyte replacement drinks are especially beneficial during high fluid loss. They help replenish the electrolyte fluid and glycogen in the muscle. It is never wise to punish an athlete by withholding fluids. Athletes also tend to drink more fluid if the fluids are cooled and flavored. With the environment playing such a vital role, it is important to be aware of the weather at all times. Humidity and temperature in combination affect the severity of the potential heat injury. Even moderate temperatures and very high humidity place the athletes at risk.

To improve cooling during water breaks it is wise to have the athlete remove head gear and sit in the shade. One of the ways to monitor fluid loss is to have each athlete weigh in before and after practice and to restrict athletes who lose more than 3% of their body weight from further practice. It is also helpful to remember that one pound equals each pint of water. Urine color can also be beneficial. As the urine becomes darker it tends to be more concentrated and is a sign that an athlete may be running low on fluids.

Acclimation to the heat prior to the beginning of preseason practice takes from 7-14 days and requires repeat outdoor exposure during this period of time. These outdoor exposures should start with 15-20 minutes and lengthen over the two week course. Younger children may need more time to acclimate since they have less tolerance to the heat. Fluid management should be closely monitored. Choosing clothing is also important. Clothing is best when colors are light, loose-fitting and limited. It is also wise to avoid excess tape since sweat glands will be covered.

Other factors that increase one's risk for heat illness include chronic medical problems such as cystic fibrosis, diabetes, or sickle cell trait. An athlete that has had a previous problem with heat cramps, heat exhaustion, or heat stroke is much more likely to have a second episode. A recent illness with fever is also a significant risk factor, particularly when diarrhea or vomiting is present. These problems decrease the much needed fluid and electrolyte levels, as well as affecting the body temperature if the illness is still present.

Alcohol is also a problem that increases urine output and decreases tolerance to heat. Medications of many types can be harmful or make it more difficult to tolerate heat illness. It is important to evaluate all medications with a physician when the athlete will be undergoing a severe heat and/or humidity exercise challenge. Athletes taking any type of diuretics greatly increase their risk of heat injury. Be especially aware of decreased rest as a very serious risk factor for heat stroke. Therefore, it is important that athletes get adequate rest during periods of intense activities to provide recovery and prevent heat stroke.

In closing, it is very important to remember that heat injuries can be very serious. It is important to take adequate steps to prepare and try to prevent their occurrence. Not only is it safer for the athlete, but an athlete that is well hydrated is quicker to learn and perform in a more effective manner.

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