

## PRACTICING AND THE HEAT

With the recent highly publicized deaths of professional and college football players, hydration and its relationship to heat illness has garnered significant recent attention from the media. At this time of year, when football practice sessions begin, many athletes will get "overheated." In most cases, dehydration will be a significant underlying cause. When exercising in the heat, it is important to pay close attention to fluid intake.

Fluid balance is probably the most important nutritional concern for athletes. Optimal bodily function and peak athletic performance cannot be achieved without proper fluid intake before, during and after exercise. The most common manifestation is the football players that "cramp up" in the 4th quarter. Without proper fluid intake before exercise, the athlete can quickly become dehydrated during exercise. As progressive dehydration occurs, anything can result on the continuum from muscle cramping to hyperthermia, heat exhaustion or in extreme cases even death. Many high school and college football programs are taking a preventive stance, avoiding practice in the heat of the day and encouraging athletes to hydrate before, during and after practice.

Football players are particularly prone to dehydration. The extreme physical demands of the sport combined with the required bulky equipment predispose a football player to have a higher body temperature and sweat more. The helmet, shoulder pads, and other padding act as insulation, keeping the heat close to the body and increasing fluid losses from sweat. During twice-a-day workouts, the average football player can lose up to 14 liters of fluid in 24 hours. It is not uncommon for them to lose between five and seven pounds during a single practice. Even with careful monitoring, it is difficult for players to replace all of the fluid prior to the next practice.

Fluids are lost from the body through a number of mechanisms; direct (bodily waste) and indirect (sweating and breathing). During exercise, an athlete will control his body temperature by sweating to release heat and cool the body through the evaporation of sweat. The human body is about 60% water and many organ systems rely on hydration for their function. These include the heart, lungs, muscles, nerves and the thermoregulatory system. When a person loses bodily fluid through sweating and breathing, that fluid is moved from inside body tissues into the arteries and veins to maintain adequate circulation. This is a normal physiologic process that the body uses to maintain body temperature within set limits. When too much fluid is lost, the circulation becomes overwhelmed, unable to keep body temperature from rising too high. When this happens, heat exhaustion sets in and the body begins to shut down. Usually the first symptom is an elevated body temperature and a "heat headache", but athletes can also have dizziness, fatigue, anxiety, chills, nausea, and "heat cramps." With continued exercise, these symptoms can progress to include disordered thinking and even seizures. This is known as heat stroke - a very serious and sometimes life-threatening condition.

The key to avoiding dehydration (and the heat injury that can come with it) lies in understanding the factors that contribute to overheating and how to overcome them. There are many variables which contribute to an athlete's fluid status and body temperature. These include the ambient temperature, humidity, the athlete's baseline health, their fitness level, sun exposure, and the amount and intensity of activity. It is important to acclimatize to the heat. Wearing light colored clothing with fibers designed to "wick" away sweat helps. A wet cotton t-shirt can actually act as an insulator in hot weather and hinder heat loss. Avoiding the hottest part of the day (11 AM - 2 PM)

Probably the single most important action that athletes can take is to be proactive about hydration. Just as not training prevents an athlete from improving, dehydration can actually hinder athletic performance. The body starts recognizing thirst when the athlete is 2% dehydrated; athlete's performance begins to decrease dramatically with as little as 1% dehydration. The take home message is that once you've become thirsty, you are already behind in performance.

So what is the best way to stay well hydrated? Prevention is the key!

The old adage of drinking six to eight glasses of water a day still holds true for most individuals. Athletes should drink 16 oz of water or sports drink 1-2 hours before exercise. This should be repeated 15 minutes before exercise. Athletes should use the summer to get used to this level of fluid; at the beginning of football practice, the athlete may become nauseous or vomit if his body is not accustomed to drinking this much. If the athlete is adequately hydrated before exercise, the urine will be clear.

During exercise, athletes lose large amounts of electrolytes and burn many calories that water alone will not replenish. Sports beverages, such as Gatorade® or Powerade®, have electrolytes and simple sugars, taste good and can be easily taken during practice or competition. It is also important to drink them in the first 15 minutes after exercise, when muscles are replenishing energy stores most efficiently. A rough guide to fluid replacement is to drink two 8 oz glasses of fluid for every pound of body weight lost during exercise.

There are a number of other "performance sports drinks" on the market. While some are considered better than others, sports drinks are not inherently "good for you". An individual who does not exercise and drinks these beverages will accumulate extra calories and gain weight. There are some fluids that won't help you rehydrate. Alcoholic and caffeinated beverages actually promote dehydration by causing the body to lose more fluid in the form of urine.

Many teams are now adopting a "prevention hydration" policy to avoid heat injury and dehydration. Athletes should not take scheduled "water breaks" but instead have a constant access to either Gatorade® or water. Training staff finds that the athletes stay more focused on practice when they are not thinking about their next break. Players are constantly offered and encouraged to consume fluids and have the option of water or Gatorade. There is also an "oasis" which consists of a shaded area

and two large tubs filled with water for quick cooling off if needed. Some players opt to wear "cool shirts" during games which circulate cool water over the skin while on the sideline and help to lower body temperature. Cool hoods are also worn at times which resemble a balaclava and are kept cool while not in use. Players are also not allowed into their team meetings unless they bring along something to drink. This proactive approach has helped us significantly decrease the number of heat injuries.

Everyone, athlete or not, can benefit from good hydration. Coaches, trainers and physicians should educate and encourage their athletes to pay close attention to this important aspect of sports in order to avoid tragedies. Proper preparation and hydration not only helps athletes avoid dehydration and heat injury but also speeds recovery after exercise and improves performance during exercise.