

Hydration, Part I

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As another summer approaches, it is important to remind your patient how critical water is. This month we will discuss some interesting water facts and heat-related conditions.

Water is life. It is the main ingredient in almost every tissue in the body (with the exception of bone, teeth and nails). The amount of body water ranges from 50 percent of body weight in older and obese individuals to over 80 percent of body weight in children and athletes. Muscles are over 70 percent water. Red blood cells are around 60 percent water. Over 90 percent of blood plasma is water.

Water is the main transport medium in delivering nutrients to the cells as well as removing cellular waste products. It is essential for anabolic reactions in all types of athletes participating in all types of sports, from bodybuilders and football players to marathon runners and triathletes. Water is also mandatory for proper joint lubrication, both for injury recovery and prevention.

Water is the body's most important nutrient for homeostatic temperature control. It takes a great amount of heat increase or heat loss to alter water's temperature. This is because water compared to other substances releases and absorbs heat very slowly. Thus, the athlete who is adequately hydrated will perform effectively longer in both hot and cold environments.

Athletes exercising in a hot environment can lose 22 ounces of water through respiration and perspiration every 20 minutes. Conversely, the body is only able to absorb 6 ounces every 20 minutes, which results in a 16 ounce loss every 20 minutes. A 3 percent loss of body weight (4.5 pounds in a 150 pound athlete) can result in performance losses from 20-30 percent. To combat this, pre-event hydration is essential.

Pre-event Hydration

1. Athletes should consume 50 to 100 ounces of fluid above and beyond their normal intake the day before the event.
2. The athlete should consume 20 to 32 ounces of water 2 hours prior to the event.
3. Instruct your athlete to eliminate the bladder 15 minutes prior to the event.
4. Drink six to eight ounces of water five minutes before the event.
5. If possible, drink cold water during the event (it is absorbed faster and cools the body better

than warm water).

Note: Numbers 1 and 2 above will vary depending on the size of the athlete, the length and weather conditions of the event, and the availability of fluids during the event. For sports played outdoors under the hot summer sun, the chances of hyperhydration are very slim.

Finally, we will review the three major heat and hydration-related problems athletes face when competing in warm environments.

Heat Cramps

Athletes who sweat profusely lose water and NaCl from the body. The loss of sodium causes involuntary hypertonicities of the muscles. Heat cramps are more common in hot environments and in cases where fluid replacement is inadequate. The body temperature is normal. Treatment consists of hydration with sodium-containing beverages. Prevention focuses on adequate pre-event fluid intake.

Heat Exhaustion

Athletes who sweat profusely and/or participate in hot conditions they are not accustomed to can be at risk for heat exhaustion. The body attempts to cool itself by moving blood from the interior to the skin. This results in cardiac and central nervous system blood shortages. Body temperature is normal. The skin is clammy, and the athlete feels weak, dizzy, and faint. Headaches and rapid, shallow breathing may also be present. The patient should be treated for shock and given cool fluids that contain electrolytes and small amounts of simple carbohydrates, such as glucose, fructose, or sucrose. Prevention, again, is accomplished by insuring that the athlete has hydrated sufficiently before the event occurs, and is able to practice fluid replacement during the event.

Heat Stroke

Heat stroke occurs with strenuous activity in hot, humid conditions. High temperature with high humidity makes it difficult for the body to lose heat by evaporation. This leads to a decreased blood flow to the skin, and a loss of the ability to perspire. The internal body temperature soars. The skin is hot and dry and the victim may lose consciousness. Body temperature must be reduced as soon as possible with cool water and cold compresses. This is a medical emergency. Failure to adequately cool the athlete may result in permanent nervous system damage and death.

As sports chiropractors, one of our responsibilities is to pay close attention to the athletes while they're participating in their various sports. Whenever you notice an athlete who is performing hard and not sweating, in a climate where perspiration is expected and is occurring in other participants, that athlete should be monitored, and the athlete should be asked questions concerning the amount of fluid he has consumed over the past few hours. Participants who fall into the category of inadequate fluid intake with decreased or a lack of perspiration, coupled by a high temperature, should be removed from activity before a crisis occurs.

Hydration, Part II, will focus on fluid replacement drinks, such as glucose, complex carbohydrates and electrolyte-replacement formulas.

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