

Hydration Review

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As another summer approaches and the weather warms, it is important that the DC be aware of hydration, not only for those who treat athletes on site, but for the family practitioner who manages the weekend warriors. This month we will review some of the highlights from last spring's three-part hydration series.

Fluids

Muscles contain over 70 percent water. Exercising athletes in the heat can lose over one ounce of water per minute. They are only able to absorb one-third of an ounce per minute. This equates to substantial fluid loss which has marked effects on both performance and health.

Dehydration

Athletes with even borderline dehydration have decreased task performance. They will "lose a step," reaction time can be off, unforced errors may rise, and that last burst of strength often is absent. Athletes who are dehydrating will fatigue faster and have an increased chance of heat-related illness and musculoskeletal injury.

Fluid Loading

For any competition or event in the heat, it is a good idea to fluid load the day before the event. The amount of fluid depends on the size of your athlete and the duration of the event. A good rule of thumb is to have your athlete consume 64 to 100 ounces above their normal intake throughout the day. Prior to competition on the day of the event, 32 ounces two hours before activity, and 4-6 ounces each 30 minutes during the event will protect the vast majority of athletes from hydration-related problems.

Sports Drinks

We all know that athletes must drink before they are thirsty, and that people will consume larger amounts if the beverage is flavored. We also know that beverages that have too much carbohydrate in them can actually add to dehydration by slowly absorbing and causing intestinal upset. The optimal amount of carbohydrate is a 6-7 percent solution, which works out to approximately 14 to 17 gm per eight ounces, of 55 to 70 calories. Drinks that have fewer carbohydrates have less flavor, which can decrease consumption and contain less fuel for energy replacement. The most important electrolytes to be included in a sports drink are sodium, potassium, and magnesium. The best types of carbohydrate are glucose polymers, also known as maltodextrin with fructose, glucose, and sucrose following in that order, in this author's opinion.

Related Illnesses

It is important to remember other causes of heat-related problems which can occur even if your patient is adequately hydrated: athletes unacclimated to conditions; athletes who are out of shape, often a result of returning to their sport after periods of inactivity due to minor injuries; excessive

heat and humidity; and athletes who consume alcohol and/or caffeine the day before or prior to their event.

1. Heat cramps are characterized by muscle cramping, especially in the lower extremities, most commonly from lack of fluids or electrolytes.
2. Heat fatigue and heat syncope are commonly seen with unacclimated and/or unconditioned athletes.
3. Heat exhaustion is most common with dehydrated athletes.
4. Heat stroke, not surprisingly, most commonly occurs in times of high temperature, high humidity, and high energy output, and is a medical emergency.
5. "Mixed-heat" syndromes can also occur with signs and symptoms from each of the above four categories. These should be monitored closely.

Note: The purpose of this article is not a review of heat-related conditions, and I strongly recommend that you review the signs, symptoms, biochemistry, and physiology of these conditions prior to any sporting events you work.

What about Water?

For shorter events in moderate weather, water is probably all your athlete needs. It is also excellent for fluid loading. But remember, it does not provide energy or electrolytes. For longer events with intense energy expenditure under hot and humid conditions, a sports drink as described above is highly recommended.

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MAY 1993