



Heat, Physical Activity, and the Need for Fluids

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(Much of this article was excerpted from R. Bokram's Nutrition for young athletes, in V. Seefeldt, M. Clark, & E. W. Brown (Eds.), *Program for Athletic Coaches' Education* (3rd Ed.), pp. 71 – 80. Traverse City, MI: Cooper Publishing Group, LLC.)

Most of us were horrified to learn the hard way last Fall about the importance of water for athletes who are practicing in the heat. While we have known that it is important to provide youth plenty of water while they are practicing and playing, many of us could not understand how athletes at all levels of performance (i.e., high school, college, and professional) could die due to dehydration during practice.

Water has a vital role in the nutrition and performance of an athlete. Performance significantly deteriorates after dehydration of more than 2% of body weight. Yet athletes may lose more than 2% of their body weight due to dehydration from prolonged and intense competition or long workouts. Physical exercise increases the amount of heat produced in the body. If sufficient water is not available for perspiration, the body temperature may exceed safe limits. During dehydration, the athlete will tire more rapidly, and in severe cases, heat exhaustion and heat stroke may result. Drinking frequently and in adequate amounts is an absolute necessity, and it should be done before thirst is even felt. In fact, by the time an athlete feels thirsty, he or she may have already suffered a dangerous level of body water depletion. Once dehydration has occurred, it can take several hours to achieve water balance.

Children have a less effective thermo-regulatory system than do adults. Research shows that they tend not to voluntarily drink enough fluids to meet their needs, especially during physical activity and warm weather. Much attention, therefore, has been focused on how coaches and other adults can get young athletes to drink more often and greater quantities of fluid.

The concern for preventing dehydration has often led coaches to wonder whether to recommend that their athletes consume plain water or a sports drink during practice and/or competitions. Traditionally, plain water has been the recommended fluid of choice during non-endurance activity (e.g., less than 60 to 90 minutes in length). Research in the past few years has suggested there is actually a benefit to consuming a 6 to

8% carbohydrate beverage during some activities of shorter duration (Bar-Or, 2000). Beverages containing a higher concentration of carbohydrates (such as soft drinks and juice) take longer to be digested and absorbed. The carbohydrates will not be available for use during exercise and these drinks will be more likely to cause gastrointestinal distress during activity. This results from their taking longer to digest and absorb. Therefore, an athlete participating in a sport involving intense bursts of energy (such as soccer, hockey, volleyball, basketball) or one considered to be an endurance event (longer than 60 to 90 minutes) can actually benefit from drinking a sports drink. The carbohydrate in such beverages is easily absorbed and readily delivered into the bloodstream to be used for energy. This can avoid or delay depletion of the athlete's muscle stores of glycogen.

In addition, it appears that young people tend to drink more of a beverage that is flavored. Consequently, if flavored beverages are available, young athletes may be more likely to consume adequate fluids without being prompted and so they lessen the risk of dehydration. A recent study determined the fluid intake in 9 to 12 year old boys by offering liquids in a three-group design. Each group was assigned to drink a specific liquid for hydration from unmarked bottles. The bottles contained either plain water, grape-flavored water or grape-flavored water with carbohydrate and sodium. The children consuming the plain water became dehydrated at the rate of 0.2 to 0.3% body weight per hour. The grape-flavored water group remained close to water balance, while the boys drinking the grape-flavored carbohydrate solution actually gained weight (Wilk & Bar-Or, 1996).

Keeping enough water or fluids available at sites of practices or competitions may be difficult, especially if there is not a water fountain or similar source at or near the site. While it may be possible to transport a large enough container of water for the athletes, it is recommended that athletes be required to bring their own water bottles with them at all times. This is an



essential habit to develop, one that if started early, will enhance athletic performance and become second nature by the time the athletes reach high school.

Specific guidelines for fluid consumption are listed in Table 1. In addition, coaches should remember the following points:

- Encourage athletes to drink fluids before, during and after exercise.
- Encourage your athletes to drink even before they are thirsty.
- Have athletes drink on a schedule, every 15 to 20 minutes.
- Young athletes drink more if the beverage is flavored rather than plain water.
- Fruit juices and soft drinks are too high in carbohydrates to be absorbed quickly.
- Carbonated beverages can cause upset stomachs, bloating, and a burning sensation in the mouth and should not be used during activity.
- Teach athletes the signs of dehydration: dry lips and tongue, sunken eyes, bright colored or dark urine, infrequent urination, apathy, and lethargy.
- Use clear beverage bottles so athletes can see how much they have and have not consumed.
- Salt tablets irritate the stomach and intestines and can increase dehydration by causing diarrhea if taken before a practice or contest.

But, the most important thing for every coach to remember is:

There is no physiological reason for restricting water intake before, during, or after athletic contests or practices.

Table 1: Guidelines for Fluid Consumption to Prevent Dehydration

Before exercise	0.5 to 1 cup
During Exercise	0.5 cup every 15 minutes
After Exercise	2 cups for every pound lost or until urine is clear

Source: Adapted from information in *Nutritional Applications in Exercise and Sport*

Coaches must do more than just provide water at the practice and game site. Encourage athletes to bring their own beverages to practices and games. In addition, coaches should check to see that athletes are ac-

tually drinking enough fluids as many will take only a sip as they run from one drill to another. This is not sufficient to replace the fluids that are being lost. Coaches and parents need to teach young athletes the value of drinking plenty of fluids as the weather gets hotter. They will maintain their energy level and feel better. Let's not lose anyone to dehydration this summer!

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Wilk, B., & Bar-Or, O. (1996). "Effect of Drink Flavor and NaCl on Voluntary Drinking and Rehydration in Boys Exercising in the Heat." *Journal of Applied Physiology*, 80: 1112-1117.

What would you like to know?

The Institute would like you to let us know what questions you have regarding coaching, youth participation, parent participation, and community or agency policies. Also, if you have a topic you would like us to discuss, please let us know.

Please send your questions and comments to:

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