

# Hydration and Athletic Performance

*Kyle D. Flack, PhD, RD, Harry Michael Hays, BS, BA, and Jack E. Moreland, BS, Dietetics and Human Nutrition*

*The best performance enhancer for athletes that doesn't cost money is water. However, many athletes overlook the importance of this essential nutrient.*

## What are the functions of water?

About 66 percent of the human body is water. Water is needed for all of our body's functions, without it, we could not survive. This essential nutrient is required for moistening food (saliva), digesting food, transporting nutrients (blood), discarding waste (urine), and lowering your core temperature (sweat). The evaporation of one liter of sweat from the skin represents a loss of about 580 calories.

## How much water should I consume?

Athletes that perform at high intensity or long durations, especially in hot and humid environments, need to increase their water intake to replace what is lost in sweat. Athletes that work intensely in the heat can lose 2½ liters (12 8-ounce glasses of water) of sweat per hour. Due to different types of exercise, there is no common recommendation of water intake for athletes; however, in order to ensure you

are consuming enough water you should monitor your urine color. If hydrated, you should be urinating frequently and your urine should be the color of pale lemonade rather than apple juice. Tracking water consumption with smartphone apps or motivational water bottles with time markers are also a great way to keep track of your hydration status.

## How does dehydration hinder my athletic performance?

Athletes that lose more than 2 percent of their body weight (3 lbs. for a 150-lb athlete) from dehydration can decrease their ability to perform optimally in the heat. Endurance athletes experience a 2 percent slower pace for each percent of body weight lost through dehydration. However, 3-5 percent dehydration doesn't seem to have any effect on muscle strength or performance for athletes that engage in short, intense bouts of an-



aerobic exercise (weight lifting for example).

How hydration enhances athletic performance:

- Keeps heart rate from going too high
- Keeps your core temperature from rising too much
- Improves heart function and blood flow
- Reduces muscle carbohydrate usage (which increases exercise duration)

## What's the best way to stay hydrated?

Two to four hours before exercise athletes should consume 2-4 ml of fluids per pound (a 16 oz water bottle is about 475 ml) to ensure adequate hydration. After this, athletes should sip on fluids (about 1 cup every 20

minutes) up until the activity to maintain hydration. During exercise athletes should consume fluids during breaks or every 15 minutes to stay hydrated. After exercise, up to ½ liter of fluid should be consumed immediately after exercise to maintain hydration. After consuming this large volume of fluid, athletes should consume a quarter liter of fluid every 15 minutes until 3 liters of fluid is reached. However, the larger the athlete, the greater the sweat loss and the more fluid they need.

## What about sports drinks?

Sports drinks can be useful during long training sessions or competitions (over one hour) as they have carbohydrates in them that can help athletic performance. However, sport

drinks should be limited to during exercise because they contain only simple carbohydrates. Sports drinks also have some electrolytes that may help replace what you lose in sweat, but water is usually enough for most events.

## References

- Benardot, D. (2006). Advanced Sports Nutrition. Champaign, IL, Human Kinetics.
- Marie Dunford, J. A. D. (2008). Nutrition for Sport and Exercise. Belmont, CA, Wadsworth Cengage Learning.
- Thomas, D. T., K. A. Erdman and L. M. Burke (2016). "American College of Sports Medicine Joint Position Statement. Nutrition and Athletic Performance." Med Sci Sports Exerc 48(3): 543-568.