

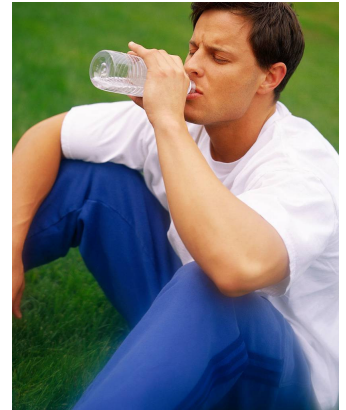
Finding the Proper Hydration Balance

Dawn Weatherwax – Fall, RD, CSSD, LD, ATC, CSCS

Understanding the fundamentals of hydration can help sports health professionals protect their athletes' safety while giving them the tools they need to perform at their best.

Consequences of dehydration

Hydration is critical to every function in the body, especially during training and competition. Losing even a small amount of body fluid, as little as two percent of body weight, can impair athletic performance and make it difficult for the body to cope with exercise in warm weather. Dehydration can lead to early fatigue and an increased risk of overheating. During exercise, heart rate and cardiac output increase as the body tries to maintain blood supply to active muscles, the skin (for heat loss), and vital organs. The decrease in blood volume caused by dehydration puts a greater strain on the heart to keep up with the demand, making it difficult for athletes to maintain their performance.



Body Fluid Basics:

- ▶ Fluid makes-up approximately 55% to 65% of body weight
- ▶ Two-thirds of fluid is retained within cells and the remaining one-third is outside of the cell, including the blood stream.
- ▶ Skeletal muscle is composed of approximately 70% water.
- ▶ Adipose tissue consists of only 10% water.

Preventing Dehydration

Everyone's sweat rate is different, so it's important for athletes to monitor their own hydration status. An easy method is to have athletes check their urine each morning after they awaken. If the color of their urine is pale like lemonade, that's a sign of proper hydration. If the color of their urine is dark like apple juice, they should consume more fluids during the day. No need to overdo it: usually an extra quart of fluid is sufficient.

The best way for athletes to determine their fluid loss during workouts and competition is to better understand how much sweat they typically lose. This can be easily accomplished by weighing themselves before and after practices and games. Weight loss of more than a pound or two indicates the need to drink more; weight gain indicates the need to drink less. Athletes should work to prevent fluid losses over two percent of their body weight. This can generally be accomplished by fluid breaks every 15 minutes to 30 minutes if the sport or activity allows. Weighing before and after exercise will also help athletes determine how much to drink during recovery – 20oz to 24oz for every pound lost. Complete recovery can take hours depending on the extent of dehydration.

Each athlete sweats differently. An individual's sweat rate can be calculated with a few simple measures associated with a one hour workout (Sweat Rate = $\frac{\text{pre-exercise body weight} - \text{post-exercise body weight} + \text{sweat rate} - \text{urine volume}}{\text{exercise time in hours}^{(4)}}$). Therefore, weigh in before the workout (either naked or in very minimal clothing). Complete a one hour moderate workout. If you ingest water during the workout, keep track of how many ounces you drink. Avoid using the toilet during the workout. Weigh in after the workout. Be sure to wipe any sweat off your body, wear the same clothes you weighed in before activity, and wring them out so there is no excess water weight in the clothing. Your sweat rate may vary depending on heat and humidity and the activity you are participating in. Re-test yourself at various times in a variety of activities to understand your sweat rate.

Most people cannot absorb as much fluid as quickly as they lose it through sweat. Trying to consume too much fluid and fuel to make up for that which is lost during activity can lead to symptoms like nausea and vomiting. Come up with a hydration strategy to match your sweat rate and fluid absorption rate that includes consuming some fluids before activity (pre-hydration) as well as after activity. This should become second nature and part of your regimen.

Avoid Overdrinking

Drinking too much fluid can lead to a rare but serious condition called hyponatremia, which occurs when too much fluid is taken in and the blood sodium concentration becomes diluted, causing the brain to swell. The signs of over-drinking are similar to the signs of dehydration so sports health professionals should be diligent about educating athletes about proper fluid intake.

By weighing in and out of practice, athletes will be able to determine if they are over-drinking. The goal is to weigh the same weight you started. If you weigh over that you will want to cut back on your fluids. You never want to exceed more than two pounds of your starting weight to prevent possible complications. If weighing athletes is not possible, sports health professionals should teach athletes to weigh themselves on their own. The more athletes follow this technique, the better they will be at gauging their hydration needs during activity.

Benefits of Proper Hydration

Proper hydration can lead to improved performance. Studies have shown that soccer players and youth basketball players sprinted faster when they were hydrated with a sports drink compared to water during simulated trials^(2, 3). For peak performance, athletes participating in continuing activity should take in 30g to 60g of carbohydrates per hour. Sports drinks are a better choice than plain water as they provide sodium and flavor to encourage drinking, carbohydrates to fuel working muscles, and electrolytes to help replace what is lost in sweat. Proper hydration protects performance, while dehydration impairs performance. Having palatable fluids available in accessible locations, utilizing techniques such as body weight monitoring, and having a hydration plan for each athlete can help ensure that every athlete is using proper hydration to their advantage.

References

1. Burge, C.M. et al. Rowing performance, fluid balance, and metabolic function following dehydration and rehydration. *Med Sci Sports Exerc* 25 1358-1364, 1993.
2. Smith, K. et al. Effects of a carbohydrate-electrolyte beverage during a soccer-related running test. *J Sports Sci* 16: 502-503, 1998.
3. Dougherty, K. et al Two percent dehydration impairs and six percent carbohydrate drink improves boys basketball skills. *Med Sci Sports Exerc* 38: 1650 – 1658, 2006.
4. Cassa, D.J., et al. National Athletic Trainers' Association Position Statement: Fluid Replacement for Athletes. *J Athletic Training* 35 (2): 212-224, 2000.



Dawn Weatherwax-Fall RD, CSSD, LD, ATC, CSCS is a Registered/Licensed Dietitian with a specialty in Sports Nutrition and Founder of Sports Nutrition 2Go. In addition, she is a Certified Athletic Trainer and Certified Strength & Conditioning Specialist. Weatherwax-Fall is the author of *The Official Snack Guide for Beleaguered Sports Parents* and *The Complete Idiot's Guide to Sports Nutrition*. She is an Official Speaker for the Gatorade Sports Science Institute and on the approval speaker list for the NCAA. She has also been featured on television/radio shows including: *Good Morning America*, *MSNBC*, *Geraldo Rivera*, *Fox News* and *Montel Williams*. Dawn is an active member in the American Dietetic Association (ADA), Sports, Cardiovascular, and Wellness Nutritionists Dietetic Practice Group (SCAN), American College of Sports Medicine (ACSM), National Strength & Conditioning Association (NSCA), National Athletic Training Association (NATA), & Greater Cincinnati Athletic Training Association (GCATA).



SPORTS PERFORMANCE

www.iaisportsperformance.org

September, 2009