Water…How Much Is Enough?

Making up approximately 60% of the body, water helps maintain homeostasis by regulating core body temperature, helping blood pump freely, maintaining proper cell functioning, and assisting other physiological processes. [1,2] When total body water (TBW) decreases in an amount greater than 2% of total body weight, a state of "dehydration" occurs, causing changes in physiological function that can lead to detriments in health and athletic performance.[2,3] Maintaining euhydration (normal TBW level) is, therefore, essential to helping an athlete perform at potential. While there is no one-size-fits-all recommendation to ensure an athlete is hydrated, monitoring hydration status and following an individualized hydration plan can help an athlete reach an ideal hydration state.

The goal for an athlete is to be euhydrated before, during, and after exercise to prevent performance-related decrements due to water loss. Unfortunately, many athletes start practice/competition hypohydrated (decreased TBW) and any attempt to "catch up" is often unsuccessful. Total body water levels vary and are based on age, gender, race, and, mostly, lean muscle mass (fat free mass is 70%-80% water).[1] At the critical 2% point (a mere 4-pound water weight loss in an 195-pound athlete) physiological effects start, such as an increase in core temperature and heart rate and alterations in metabolic and central nervous system function. [2] As a result, these changes degrade aerobic performance, the degree to which is dependent on factors such as type of activity, environmental conditions, heat acclimatization, and athletic ability. [2] The cognitive and mental performance alterations are particularly important in situations where concentration, skilled tasks, and tactical issues are involved, i.e., in all sports, at all times. Dehydration puts athletes at risk for heat exhaustion and stroke due to reduced cardiac stability, altered intracranial volume, and reduced cerebral blood flow responses. [2] Additionally, dehydration and decreased electrolytes can increase the tendency for cramping, [2,3] and dehydration can further the consequences of rhabdomyolysis (release of muscle contents). [2]

The general recommended daily fluid intake is approximately 91 oz for female adults and 125 oz for males (with roughly 20% of that coming from food intake).[1] Athletes, however, have a higher need based on their increased activity levels. When developing a hydration plan for athletes, hydration status should first be assessed and recommendations should follow individualized needs. Multiple measures of hydration exist, but practicality is a major factor guiding use. Urine color and body weight can be easily measured and provide valuable information for the hydration plan. Urine that is a pale, lemonade color indicates a hydrated state, while a darker, apple-juice color indicates a dehydrated state. A morning body weight under normal conditions after initial void should be used as a baseline, hydrated weight. Fluid intake <u>during</u> exercise should be the focus of the hydration plan when there is adequate food/drink consumption and proper recovery time between competition/practice sessions. In situations where there is reduced recovery time (two-a-days, multi-event tournaments), reduced consumption (weight-

controlled sports, lack of food/drink availability, extreme temperatures), or altered fluid loss (increased duration/intensity of exercise, altered temperatures, electrolyte imbalances), dehydration is more likely, and the hydration plan should emphasize hydration before, during, and after practice/competition.

During exercise, water is lost via the release of sweat as a compensatory mechanism for regulating the heat produced from activity. Individual sweat rates vary and depend on weight, genetics, environment, heat acclimatization, exercise intensity and duration, and other factors, with higher sweat rates observed with the male gender, larger size, and increased external temperatures. Weighing an athlete before and after exercise (multiple times and under various conditions) can approximate the amount of sweat lost and offer a starting point for how much fluid consumption is necessary *during* exercise to prevent dehydration. [2,3] For events lasting less than an hour, water is adequate for maintaining hydration. For longer events (and in the case of "salty sweaters"), a sports drink of no more than 8% carbohydrate should be the fluid of choice to ensure fluid absorption and maintain electrolyte balance. The sugar, flavor, and salt in sports drinks can help encourage drinking, so when necessary, a sports drink can be used (alternated with water to prevent energy overconsumption).

To promote euhydration, the athlete should slowly drink approximately 16 ounces of fluid 2-3 hours before activity or competition, along with eight ounces of fluid 15 minutes before. [2,3] As previously described, sweat rate should be determined and necessary measures taken to prevent dehydration *during* activity. If the athlete does become dehydrated, normal fluid and food consumption *after* activity should return the athlete to a hydrated state. Incorporating high water content foods, such as broth soups, fruit, and vegetables, will facilitate regaining hydration status. If rapid rehydration is necessary, 16-24 oz of fluid should be consumed for every pound lost (the extra volume accounts for water losses that accompany rapid consumption of large fluid volumes). [2,3] Sports drinks are quite beneficial in these situations to rebalance electrolytes, increase the amount of fluid ingested, and enhance fluid absorption.

Just like training and proper fueling, maintaining hydration is an essential part of an athlete's performance plan.

In general, athletes know they need to hydrate during activity, but truly personalizing the recommendations for what, when, and how much to drink is key for success.

Written by SCAN Registered Dietitians (RDs). For advice on customizing a hydration plan, consult a RD who specializes in sports, particularly a Board Certified Specialist in Sports Dietetics (CSSD). Find a SCAN RD at www.scandpg.org.

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