



Nutrition NEWS

The dog days of summer are over and you toughed out the heat and humidity by drinking plenty of water and running in the morning or evening when it was cooler. Now that winter is just ahead, you can forget about all

Essential Water

— ALL YEAR ROUND

Life's Key Element

Water is by far the most important element for human survival, comprising 60% or more of our body weight. It serves a number of valuable, life-sustaining purposes. It provides an optimal medium for cellular reactions and metabolism, promotes passage of waste products and aids in temperature regulation.

It is through these functions that the human body's fluid levels are governed. The body loses water through evaporation when we sweat and breathe, and through excretion as urine and in our feces.¹ Of these, evaporation is the body's primary means for dissipating heat during exercise.

Water and the Environment

Evaporation, and consequently its cooling effect, are regulated by air temperature and humidity. On hot, dry days, sweat is easily evaporated from the skin. When it is very humid, your body's ability to dissipate heat is greatly compromised since the air contains nearly as much fluid as your sweat and evaporation is reduced. The heat generated through exercise remains trapped in your sweat and tissues and raises your body temperature. Your body will continue to

that extra water intake, right? Wrong. Making sure you are properly hydrated during the colder months is just as important to effective training and peak performance.

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produce more and more sweat in an effort to reduce heat, leading to dehydration. Drinking fluids well before you ever feel thirsty can avoid this danger. A loss of only 2% of your body weight through fluid loss can have a detrimental impact on performance.^{1,2,3}

Cold Weather

When it's cold outside, an athlete may not feel like he or she is sweating as much since there's a greater difference between body temperature and air temperature. When it's cold, humidity tends to be lower, and heat dissipates through evaporation more quickly. But an athlete's body continues to produce sweat.

Making sure you are properly hydrated during the colder months is just as important to effective training and peak performance.

When exercising in cold weather, you will fare better by dressing in layers. This allows you to peel them off as you warm up, thereby promot-

ing the evaporation of sweat. A bulky jacket can trap in heat by hindering evaporation, causing you to lose more water and risk dehydration.

Altitude's Effects on Fluid Levels

Winter often lures us to the mountains for skiing and other snow sports. Unfortunately, many people aren't aware of the altitude's effects on hydration. Air temperatures are cooler and humidity is generally lower, making for greater ease of sweat evaporation during exercise. More fluids are also lost at high altitude since we need to breathe faster in the thinner air and we lose fluids through evaporation in our respiratory tract.⁴

What To Drink:

Water vs. Sports Drinks

Distance runners don't have to take dehydration as a given when they train. Regular fluid intake before, during and after exercise can reduce the risks and help maintain performance levels. Now the question remains: What kind of fluid should you drink?

Water provides an optimal medium for cellular reactions and metabolism, promotes passage of waste products and aids in temperature regulation.

Water

Whether you should drink plain water depends on the intensity, frequency and duration of your workouts. Water is generally sufficient to replace fluid levels if you are completing low- to moderate-intensity aerobic runs lasting less than an hour. At higher altitudes, however, it's wise to drink more than if you were at sea level. Your post-exercise meals will easily replace the nutrients you

lost through sweat and metabolism before your next workout. Drinking tap water or a variety of bottled waters is a personal taste choice and won't make a difference for hydration purposes.

Sport Drinks

Prolonged, vigorous exercise lasting more than an hour may require that you consume sports drinks. They not only rehydrate you, but also replenish carbohydrates as your body's stores of glycogen in the muscles and liver dwindle.⁴ Most sports drinks are made with simple carbohydrates that your body can quickly transform and burn for energy during a workout.

Longer, more intense runs can also lead to electrolyte imbalances that drinking water alone won't correct, leading to a condition called hyponatremia, or low blood sodium.³

Sports drinks can prevent this situation by providing the necessary

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electrolytes in the appropriate quantities. Furthermore, they may also be more palatable than water.

Coffee, Soft Drinks, Alcohol

Caffeinated coffee and soft drinks are not advisable for hydration, particularly in the cold and at altitude. Caffeine is a diuretic which promotes urination and can hasten dehydration. Decaffeinated soft drinks are also not a wise choice since the sugar content may be considerably higher than in a sports drink, drawing more water into your digestive tract to aid in dilution and digestion. This can cause gas, bloating and diarrhea.

Alcohol is a central nervous system depressant that can impair performance by affecting motor skill acuity. Like coffee and soft drinks, it can also promote dehydration by increasing water loss in the urine.²

How Much To Drink and When

As little as a 2% loss of body weight through dehydration can have a negative affect on performance. Research has proven that countering water output with sufficient fluid replacement can eliminate the threat of dehydration. But how do you know how much to drink?

First, it is important to know the golden rule of fluid intake: By the time you feel thirsty, it's probably too late since you have already experienced some degree of dehydration. Your best bet is to drink 8 to 16 ozs. of fluid 15 minutes before exercise and then 4 to 8 ozs. every 15 minutes during exercise. You can tailor these numbers to your own personal fluid needs and weather and altitude conditions in which you are training. After a run, you should drink at least 16 ozs. of fluid for every pound of body weight you lost.^{2,3}

Fluid Temperature: Cold vs. Warm

There has been debate over whether fluid should be consumed cold or warm. According to Wilmore and Costill,¹ warm fluids provide some protection against overheating, but cold fluids can better enhance cooling by absorbing some of your body's core heat. Different water temperatures have not been shown to compromise performance since there's no proof that warm and cold water leave the stomach at different rates.⁵ Cold water may simply be more palatable and refreshing to most runners.

Summary

Clearly, the value of proper hydration cannot be overstated. A body's dynamic water balance is perpetual-

ly challenged, and for athletes that challenge is exacerbated by exercise. Under exercise stress, the human body strives to maintain homeostasis by excreting sweat to cool its muscu-

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lar machinery. In order to maintain a fine-tuned machine, it is critical that runners consume fluids in a timely manner and in proper proportions.

Just because the temperature is dropping this time of year doesn't mean runners can be less diligent about hydration. Cold can blunt an athlete's perception of exertion and sweat loss. Don't let that diminished awareness lull you into ignoring your body's need for vital fluids. Life's most basic element can make all the difference between peak performance and disaster.

References

1. J. Wilmore & D. Costill, "Physiology of Sport and Exercise," *Human Kinetics*, Champaign, IL, 1994, pp. 270, 362-369.
2. E. Coleman & S. Steen, *The Ultimate Sports Nutrition Handbook*, Bull Publishing, Palo Alto, CA, 1996, pp. 85-99.
3. D. Nieman, *Fitness and Sports Medicine: A Health-Related Approach*, Mayfield Publishing Company, Mountain View, CA, 1995, pp. 259-266.
4. J. Walberg-Rankin, "Dietary Carbohydrate as an Ergogenic Aid for Prolonged and Brief Competition in Sport," *International Journal of Sport Nutrition*, 1995, Supplement to vol. 5, pp. S13-S28.
5. M. Hamilton, et al., "Fluid Replacement and Glucose Infusion During Exercise Prevent Cardiovascular Drift," *Journal of Applied Physiology*, 1991, vol. 71, pp. 871-877.

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