How to Stay Hydrated During Your Summer Runs

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Dehydration is arguably the single most preventable impedance to running performance, while overhydrating remains a danger for runners all too aware of the first fact. In the height of the dog days of summer, how do we find the precise balance between extremes of fluid intake?

During its semi-annual symposiums, which routinely present the latest research from nationally renowned fluid experts and hematologists, the American Medical Athletic Association has devoted much of its time and energy to offering up-to-date and nuanced answers to this question. Every long-distance runner differs in fluid need, but a few general principles apply to bring a picture into focus.

Dehydration decreases blood volume, increases heart rate, and impedes heat loss. All of this compromises running performance, and in the extreme can lead to heat exhaustion or heat stroke. Faster runners (sub-4 hour marathon) are at a higher risk of dehydration than of overhydrating and developing hyponatremia. Slower runners have a greater opportunity to drink more fluid than they sweat out. There are several reasons for this.

To understand hyponatremia, remember that there are essentially two ways of developing the condition. Hyponatremia occurs when blood sodium levels become dangerously low. Therefore, it can develop in runners who are sweating out sodium at such a rapid rate that water or sports drink are not adequately replacing it. These are the "salty sweaters" who often show white caking patterns on their clothing during and after a race. They may not be stopping at any fluid stations at all. This is the type of runner who exemplifies that you can actually be both dehydrated and hyponatremic at the same time. This type of runner is more at risk of developing hyponatremia at ultra-distance events.

The second way hyponatremia may develop is in runners who are drinking more fluid than they are sweating; these runners are therefore diluting their blood sodium. This is the far more common cause of hyponatremia, and can begin up to a week before the actual event, when runners attempt to ensure proper hydration, but overdo it, carrying water bottles with them everywhere they go and sipping incessantly several days before the race. These runners are often inexperienced, conscientious, and very slow runners who additionally will be out on the course for much longer, and often at a more leisurely pace, thereby stopping at every water station, and not necessarily needing or using the amount of fluid they are ingesting.

Gender can influence susceptibility to hyponatremia; it is important to remember that women need less fluid than men, even after body weight is taken into account. Water makes up a greater percentage of male body weight, and therefore a greater percentage of water in relation to body weight needs to be replaced during exercise. The best way to monitor your fluid consumption is to weigh yourself before and after your long runs. You should never gain weight after a run. To perform an accurate test of your sweat rate, weigh yourself and then run for one hour in similar conditions and at a similar pace as the race you are planning for, refraining from drinking during the run. Weigh in again afterward. The resulting discrepancy in weight represents the amount of fluid consumption in ounces that you should not exceed during each hour of your race.

Finally, a word about caffeine. Caffeine consumption has been under scrutiny for years as to its possible role in dehydration. Because caffeine is a known diuretic, its effects on body fluid balance and heat storage are potentially negative. Yet it is also a readily available, legal performance enhancer. Recently, some clarity has been shed on this topic.

At rest, caffeine increases urine production, as well as the excreted amounts of sodium, chloride, and potassium within a given amount of urine or sweat. Prior research has shown that the volume of urine and sweat is not affected by caffeine during exercise—but what about the amount of electrolyte loss within these substances?

In one recent study, seven endurance-trained males completed six experimental trials each, consisting of pedaling for 120 minutes at 65 percent VO2max. The subjects received during exercise: 1.) no fluid; 2.) water replacing 97 percent sweat losses; 3.) Gatorade sports drink; and then each of these treatments plus caffeine in 6 mg doses per kilogram of body weight. The trials were conducted in a hot, dry environment of 97 degrees Fahrenheit.

The results indicated that caffeine does not produce more heat or have a negative effect on heat dissipation, even in such a warm exercise environment. This coincides with a 2001 study published in Clinical Physiology. The new research did find, however, that combining caffeine with water increased urine production, but this did not exacerbate dehydration—due to a low contribution of urine to total fluid loss. The drug did increase the concentration of electrolytes in the sweat, but blood sodium levels remained unaltered.

It looks as though the effects of caffeine at rest simply do not match those found during submaximal exercise, thereby making caffeine an acceptable choice for runners, without increased dehydration or heat-exhaustion risk.