

Dehydration and Hyponatremia - The Evil Twins

Greetings to the net. My name is Gary and my call is KF5FD. Tonight's training is on dehydration and its evil twin brother, hyponatremia. As a few of you know, I'm involved in the sport of cycling as a rider and a coach, so there will be some tips based on those experiences.

Why talk about dehydration in mid January? It's actually a condition that can occur at any time of the year. It's quite easy to become dehydrated in the winter, by performing any amount of exercise and because it's cool outside, you don't think about fluid replacement.

Dehydration is defined as a loss of water and important blood salts like potassium and sodium. Vital organs like the kidneys, brain and heart can't function without a certain amount of water and these salts. With flu symptoms or excessive sweating by exercise, it is possible to become dangerously dehydrated in a matter of just a few hours. Even without these conditions, it's possible to become dehydrated if you don't monitor your fluid intake. With every breath you exhale, you are giving up a small amount of water, and this water must be replaced.

There are three levels of dehydration symptoms, from mild to severe. These range from having a dry mouth and thirst to a rapid, weak pulse, cramps, cold extremities, rapid breathing, and confusion and lethargy. A loss in athletic performance is another major symptom of severe dehydration.

How do athletes avoid dehydration? To be honest, no athlete avoids it, they just have learned to limit its effects. The most common advice is to become well hydrated before their event. If an athlete is up several times the night before an event to answer nature's call, they are probably well hydrated. The other is hydration during the event, or as we've been told here before, "Drink, drink, drink!" As a cyclist and a coach, I recommend that if an athlete has a sports watch, they set it to trigger an alarm every 15 minutes to remind them to drink. If they consume 8 ounces every 15 minutes, they are taking in 32 ounces an hour, which should be enough to get through an endurance event.

What you're drinking is just as important as how often you drink. You'll find most athletes drink a combination of water and a sports drink. The sports drinks, under names like Gatorade and PowerAde, are specially formulated to contain both carbohydrates for energy along with essential salts like potassium and sodium, to keep these needed minerals in the proper blood level balance. Drinking water by itself is not enough, especially in hot conditions, or during events that take longer than an hour to complete. Also, taking salt tablets is not recommended, as this tends to pull more water from the cells and sends it to the digestive system.

A suggestion that I make to my riders is to check their weight before and immediately after a ride or event, to give them a guideline of how much water they actually lost during their event or training session. A loss of 2 to 3 pounds is not uncommon, especially during a Texas summer. A loss of 2% will cause a fall off of athletic performance by 10 to 20%. If the loss is more than that, it can be considered the onset of moderate to severe dehydration. A loss of 7 to 8% of body weight is life threatening and requires IV fluids and possibly hospitalization to resolve. If more than just a few pounds are lost, it is impossible to take in enough fluids by mouth to return to proper levels.

To see how dehydration can affect athletic performance, we only need to go back this past summer. The 2003 Tour de France was contested under some of the hottest conditions in years. As you may remember, France experienced hundreds of heat related deaths during July. Although there were no deaths, heat related or otherwise during the 2003 Tour, we saw first hand what dehydration can do to affect performance.

Stage 12 was an individual time trial with a length of 47 kilometers. At this point the riders had already put over 2,000 kilometers in, or over 1200 miles. The weather conditions for the day were 97 degrees with 30% humidity. This is roughly a heat index of 103 degrees.

The Tour was currently being lead by Lance Armstrong, with a 2 minute 10 second over Jan Ulrich, the rider currently in 6th place. I'm comparing these 2 riders, as the results in this stage greatly influenced the final outcome of the Tour.

Since 1999, when Armstrong returned to the Tour after his fight against cancer, he had only lost one of 8 individual time trials. Against Ulrich in the Tour, Armstrong had won by 25 seconds, 1 minute even and 1 minute 39 seconds.

As the 6th place rider, Ulrich started before Armstrong, which gave Armstrong the advantage of knowing how fast Ulrich was riding over the course. At the 13 kilometer check point, the riders were dead even. Over the next 34 kilometers, Armstrong lost 96 seconds. When Armstrong arrived at the finish, the salt rings around his mouth, and salt stains on his skin suit were obvious. Ulrich moved into second place behind Armstrong, whose lead had dropped to a mere 34 seconds.

The following day, it was announced that Armstrong weight went from 62.5 kilos to 56 kilos, a water loss of 6.5 kilos, about 15 pounds, or 9% of his body weight. Armstrong was severely dehydrated. It took several days of IVs during the night, to return his body weight to the proper weight. Add in that he continued to race every day was staggering.

As I'm sure most of you know, Armstrong went on to win the Tour for the 5th straight time, beating Ulrich by 1 minute 14 seconds.

Now on the evil twin of dehydration, hyponatremia. Hyponatremia is defined as a massive loss of essential blood salts, again those being sodium and potassium. Sounds a lot like dehydration. The difference is that the fluid levels in the body may be normal, or even above normal. Symptoms of hyponatremia are extremely similar to dehydration, but can have a quicker onset than dehydration, and can cause coma or death. Because the symptoms are so similar, hyponatremia is often misdiagnosed as dehydration. It takes a blood test to determine the proper diagnosis.

Hyponatremia can occur without any athletic involvement. There is a hazing case going on right now at a Texas university involving a case of hyponatremia, more commonly known as "water intoxication." In this, a student was forced to consume large quantities of plain water, causing a dilution of the blood salts to the point of causing what appears to be a loss of coordination, finally passing out, similar to being intoxicated by alcohol. This is a prank that can turn from funny to deadly in a matter of just a few hours.

In athletic pursuits, especially endurance events, hyponatremia can occur by the athlete sweating out essential salts, and thinking that they are dehydrated and only drinking plain water to rehydrate. The water, since it doesn't contain the needed salts, further dilutes the salt concentration, leading to more symptoms without the proper treatment. Left untreated, death can occur without intervention.

For most athletes, drinking a fluid replacement drink on the 15-minute schedule discussed above, will keep the possibility of hyponatremia at a minimum. Adding a salty snack, like pretzels, or salted peanuts, will again help. A trick used by triathletes is to consume a little chicken soup every so often to keep their salt consumption up. As with dehydration, a salt tablet is not recommended.

To summarize, it's important to keep yourselves well hydrated at any time of the year and in any type of weather. Drinking plain water is good, if you're not exerting yourself. But if you're obviously sweating or showing any signs of dehydration, a sports drink is a must. There are many to choose from, my personal preference is PowerAde, but others are available. Pick one you like and drink, drink, drink.

