

ELECTROLYTES, ETC

Cherry Stockton has been competing athletically for 30+ years. She won her age division and placed 7th overall in the Hawaii Ironman: she is in the Women's Motorcycle Hall of Fame; she, along with her teammate Laurra Maddock, is the only two woman team to finish the Baja 1000 Motorcycle Race; she has been competing in Endurance Racing since 1986

WHAT ARE THEY? - Minerals are among the basic elements of the earth. Of the more than 100 of these earthly elements, the human body requires 16-20 of them (that we know of) for a variety of functions. We categorize these elements as minerals and trace minerals. Electrolytes fall into the mineral category. Electrolytes are a special group of minerals that include Sodium, Potassium and Chloride. To a lesser degree they also include Calcium, Phosphorus, and Magnesium. We call these essential electrolytes.

WHAT DO THEY DO? - As the name electrolyte suggests, these minerals function in a variety of ways. The two most important are electrical reactions that control nerve conduction and muscle contraction. They also regulate chemical reactions and provide structural components to the body.

Because electrolytes have an electrical charge when dissolved in body fluids, they help to regulate and maintain the membrane potentials of cells, are crucially involved in muscle function, high energy levels, heart activity, blood pressure and the Ph balance in the body.

Whew...that's a lot of critical functions for something that comprises about .05%, (five one hundredths of a percent) of total body weight. For a 150-pound individual, that weighs in at a whopping .075 thousandths of a pound.

This is an excellent example of when incredibly important things sometimes come in very small packages.

DEHYDRATION = LOSS IN PERFORMANCE - The human body is basically 60% water. Of the original 60% water, 62% of that water is contained in our blood volume and muscle tissues. The remaining 38% is in our skin, organs, bones and adipose (fat) tissue. Understanding these percentages of where water resides in the body can help you understand why dehydration affects our blood volume and muscle tissues first. When you lose more water than you are putting in, your blood volume and the water content of your muscles are the first things to decrease. After that, dehydration affects the skin, organs, bones and adipose tissue. We know this to be true, oftentimes first hand, with our horses. For some reason, we don't relate it to ourselves.

Performance of any type is dramatically affected by relatively minor dehydration whether due to exercise or, as is the case with most of us, prior to exercising. Most of us live in a constant and chronic state of dehydration. We don't drink enough water along with consuming "diuretics" such as caffeinated drinks, carbonated sugar drinks and alcohol. Sweat also causes dehydration. When we sweat, we lose electrolytes. Electrolyte replacement is crucial. Salts act like a sponge, holding in fluid in the body. Sodium is the most important electrolyte as it is the one lost in sweat in the greatest amounts and that's why it is added to sports drinks along with magnesium, potassium, chloride and calcium. Replacement of essential electrolytes such as those just mentioned can prevent heat illness, nausea, confusion, headaches, sleeplessness, post exercise fatigue, muscle soreness and gastrointestinal distress.

With 2% dehydration, your performance drops 10 – 15%. At 5% dehydration, your performance drops 30%. Using that 150-pound person, a 2% loss in water is equal to just 3 pounds. A 5% loss is equal to 7.5 pounds.

What happens in this 2-5% dehydration range? - *A good portion of the water you lose reduces blood plasma. Blood carries oxygen to the body. As your blood volume goes down, your heart has to beat more quickly to keep up the supply of oxygen to your entire body.

*Reduction in blood volume also increases the saltiness of our blood, which can make us feel thirsty. But, unlike the sedentary individual, the thirst mechanism works too slowly for athletes. By the time we feel thirsty, we are already dehydrated. It is difficult to catch up without a good game plan. Also, when we drink plain water, our sensation of being thirsty disappears before we have consumed enough fluids to be fully hydrated.

* The onset of heat illness is another result. Some of the signs of heat illness include hot, dry skin; a fast, weak pulse; disorientation; dizziness; and nausea. (How many of you have experienced this during or after a ride? I have.) More extreme cases can cause death.

*It takes several days to recover from the effects of severe dehydration - just resting. That means doing nothing! How many of us just sit around doing nothing?

HYDRATION - Hydration is the easiest part of an athletes' training program. (Yes, we are athletes!) However, perhaps it is so easy that it is often forgotten until athletes are in a distressed state. Hydration is a factor anywhere athletes train and compete, not just in hot, humid environments. Activity level, environmental factors and diet also affect water balance. Good hydration will stabilize blood volume and prevent muscle cramping.

While exercising, your goal is to lose no more than 2 percent of your body weight during your workout or competition no matter how long it is. For the 150-pound athlete, that amounts to three pounds. Your aim should be to replace 80 to 100 percent of what you have lost during your activity. That means for every two pounds of weight you lose, you need to replace it by drinking 25 to 32 ounces (one quart) of liquid. Two pounds of weight loss = 32 ounces sweat loss = 32 ounces replenishment.

It can be very useful to determine how much fluid you generally lose via sweat per hour while riding your horse. You can determine that amount by weighing yourself both pre and post training ride without consuming any fluid. This estimate will then tell you how much liquid you need to consume per hour to avoid dehydration. This is called a "game plan".

I've found that athletes, no matter what the sport, tend to consume more fluids when the drinks are readily available and easy to get at. What is your system for carrying fluids when you ride? Perhaps you are one of those riders who don't carry water because you might have to get off your horses during the ride and pee.

Regardless of your pre-ride hydration state, it is important to start drinking as soon as you begin riding and to continue drinking at frequent intervals throughout your ride. Rather than slugging down an entire bottle of liquid all at once, consuming 4 ounces every 15 minutes (one bottle per hour) will make sure your body utilizes the liquid. Studies have shown that if you drink a large volume of plain water, the body thinks it is over hydrated because the water dilutes the concentrations of sodium and other dissolved substances in the blood. This switches off the thirst mechanism and switches on the kidneys to increase urine output, hence having to get off your horse to pee. Drinking a little bit at frequent intervals is definitely more effective at keeping hydrated. There have been studies done to prove this. Think about it...when horses are receiving intravenous fluids at a ride due to dehydration, how long does it take?

WATER VS. SPORTS DRINKS - In the past twenty years, there has been a rapid proliferation of sports drinks on the market. They contain a wide variety of formulas and ingredients. This raises the questions of effectiveness. Sports drinks HAVE been shown to be more effective than plain water in improving hydration, performance, and recovery for athletes participating in activities that last 60 minutes or longer. However, sports drinks need to be used in conjunction with water. Both are needed for optimal performance. This means that you need to look at water and sports drinks as essential nutrients, not just something to satisfy thirst or wash down food.

Most sports drinks on the market are attempting to accomplish the same objectives:

Stimulate the drive to drink: While there are other electrolytes - potassium, magnesium, calcium, chloride, and phosphorus - that are important for maintaining electrolyte balance in the body, sodium is the only one that has a major effect on the desire to drink.

Accelerate fluid absorption: The biggest determinant of how quickly you can absorb the fluids and nutrients in a sports drink is how quickly you can get the drink out of the stomach and into the small intestine. The most effective sports drinks contain a 6-to-8percent carbohydrate solution because this solution is most rapidly absorbed when large volumes of liquid are consumed.

Improve performance by providing carbohydrate: Even though carbohydrate-replacement drinks are only one of the four types of sports drinks, every one of them accomplishes its goal as a result of the carbohydrate it contains. Aside from rapid fluid absorption, ingesting carbohydrate during exercise delays the onset of fatigue by sparing liver glycogen and maintaining blood glucose for use by the brain and the central nervous system.

Maintain blood volume: Sweating during exercise decreases blood volume which increases its sodium concentration. This leads to a host of negative reactions which we have touched upon already.

Quickly restore normal hydration levels: Sodium and carbohydrate in sports drinks accelerate the transport of fluids into the body, and the right amount of sodium also makes people want to continue drinking.

SPORTS DRINKS - All sports drinks are not created equal. There are four main categories of sports drinks, each with different goals and formulations: electrolyte-replacement drinks, carbohydrate-replacement drinks, protein drinks, and energy drinks

1. Drink recommendation for Events lasting less than 60 minutes. Shorter more intense activities have less fluid loss and energy stores aren't depleted. Therefore, there is less need for high amounts of carbohydrate in the drink. Generally, 16 to 32 ounces of plain water or an electrolyte-replacement drink is recommended.

2. Drink recommendation for Events lasting one to three hours. Though intensity tends to be lower than events lasting less than 60 minutes, the total fluid loss will be greater. A decreased sweat rate means you are more able to keep up with fluid loss by ingesting fluids during exercise. Glycogen depletion is a big concern. Ingesting carbohydrate can delay the onset of fatigue and improve stamina. The best sports drinks for these activities should include both electrolytes and carbohydrate. Make sure the drink contains a mixture of carbohydrate including sucrose, glucose, maltodextrin and, fructose. This combination insures fewer gastrointestinal problems. Testing has shown that consuming 24 to 48 ounces of fluid per hour should be adequate to replace fluids lost through sweat. 50 to 60 percent of the fluid you drink should contain electrolytes and carbohydrate. This means, if you drink two bottles per hour, one should be water and one should contain the electrolytes/carbohydrate mixture. You can accomplish the same thing by having both bottles contain one half of the total electrolytes/carbohydrate mixture. Both systems work and are a matter of personal preference. Just get the liquid in your body!

3. Drink recommendation for Events lasting longer than three hours. Again, intensity is lower, sweat rates are lower, sweat loss is less per hour but glycogen depletion is virtually ensured. The ability to sustain adequate energy output is dependent upon carbohydrate ingestion. A combination of sports drinks, plain water, and solid or gel foods is essential for keeping you going. Remember, drinking 24 to 48 ounces of fluid per hour is adequate to replace what you lose through sweat. Again, 50 to 60 percent of the fluid you drink should contain electrolytes and carbohydrate. So along with your two bottles, a food gel and/or bar would be a good idea.

I will only touch on the remaining two types of sports drinks: protein drinks and energy drinks. Current research suggests that a drink containing mostly carbohydrate and some protein increases the rate of glycogen syntheses immediately after exercise (within 30 minutes). The ratio of carbohydrate to protein is 7 to 1. This type of drink will definitely aid you in the recovery process after a ride. I do this and find it to be very beneficial.

Energy drinks basically contain carbohydrate (sugar) and caffeine. Some also include herbal ingredients. While providing lots of carbohydrate and caffeine, they also contain less water which promotes dehydration. Overall, they aren't very beneficial for an athlete during competition. They are more of a novelty than anything else.

In conclusion, rarely do we come across something so simple to do in our training and racing that could potentially yield such dramatic and positive results as proper hydration and electrolyte replacement. Are you up for it?