

Electrolytes the spark plugs for your bike - by Val John Anderson

The human body has often been compared to a finely tuned engine. The engine that powers a bicycle is, of course, the human body, and the better that body runs and feels, the more performance and enjoyment one can experience while cycling. In keeping with the analogy of the human body as a finely tuned engine, if food or calories are the fuel in the gas tank, then electrolytes are the spark plugs. Electrolytes are also essential to the proper functioning of fluids in the body, which not only act as the body's electrical system, but also as the cooling system and highway, delivering nutrients in and wastes out. Here's a quick guide to understanding electrolytes and how they can take your customers' riding to a new level.

Electrolytes are charged, water-soluble, essential minerals that make the body's fluids electrically conductive. They govern a number of functions in the body including energy usage, regulating fluid balance and proper muscle function and are also essential to hydration.

Electrolytes influence energy on a number of levels within the body. First, they are essential carriers of energy. They generate and conduct energy. Second, they are essential converters of energy. Without electrolytes, the body cannot convert dormant energy into active energy. Third, the movement of electrolytes is a basic energy source tapped by the body. The energy in a battery is created by the movement of charged ions, i.e., electrolytes, and the body uses the same process.

The Electrolyte Team and Its Functions:

- **Magnesium** Essential for all energy conversion as well as to the proper function of sodium, potassium, and calcium within the body. Essential for muscles, nerves, the cell pump, bones and teeth and pH balance. The most expensive major electrolyte.
- **Potassium** The most abundant electrolyte in the cells. Essential for muscles, nerves, water balance and pH balance.
- **Sodium** Commonly excessive in modern diets. Essential for thirst response, heat tolerance, muscle contraction, nerve conduction, water balance and pH balance. The least expensive electrolyte.
- **Calcium** Essential for bones and teeth only. Small amounts in electrolyte form found in body fluids but it plays critical roles in that form.
- **Chloride** The most abundant negative electrolyte (anion) in the body. Essential for oxygen exchange, digestion, water and pH balance.

Dehydration and Hyponatremia: Two Electrolyte Disturbances at Opposite Ends of the Spectrum

The body is constantly working to maintain a tight equilibrium of electrolytes, and there are many factors that can disrupt these levels and balance of electrolytes. (Hot temperatures, stress and physical exertion are just a few.) During high heat conditions and grueling rides, whenever a cyclist loses fluids, he or she is losing electrolytes. This loss of body water and essential electrolytes is dehydration. If a cyclist isn't replacing electrolytes, the body will pull electrolytes from the tissues in order to meet its immediate demands. Therefore, it's critical to replace lost fluids and electrolytes.

Signs of Dehydration:

- **Mild Dehydration:** Dry lips and mouth, thirst, low urine output, headache and muscle cramping
- **Moderate Dehydration:** Extreme thirst, very dry mouth, sunken eyes, tenting (pinch and lift skin light if it doesn't bounce back readily, this is tenting), low or no urine output, lack of sweating and not producing tears
- **Severe Dehydration:** All signs of moderate dehydration, rapid and weak pulse, cold hands and feet, rapid breathing, blue lips and lethargic / comatose / seizures.

Severe dehydration requires immediate hospitalization and causes imminent risk of death.

There is a consistent flow of electrolytes into the body through foods and beverages and out of the body through sweat, urine and feces. If the body is deficient, it will work harder to absorb and hold onto an essential electrolyte. If the body has an excessive level of an electrolyte or an overly high ratio of one electrolyte to another, it will work to offload that electrolyte and restore balance. Usage of electrolytes by the body also increases electrolyte excretion.

Electrolyte Replacement Tools

Sports Drinks

- **Pros:** Usually taste good, combines source for electrolytes, fluids and calories. Electrolytes support hydration and conversion of sugar calories to energy.
- **Cons:** Fixed ratio of electrolytes to fluids to sugars that may be problematic for certain individuals or situations. Read the label for the range and balance of electrolytes contained.

Gels

- **Pros:** Can be an additional source of electrolytes, which support conversion of calories to active energy.
- **Cons:** Fixed ratio of calories to electrolytes. Same potential problems as above.

Sugar-free Electrolyte Drinks

- **Pros:** Generally taste good and can be a nice treat when sugar tolerance has been maxed out or for those who can't tolerate or don't like sugar.
- **Cons:** Tend to have artificial ingredients.

Electrolyte Pills

- **Pros:** Allows for large, quick dosing
- **Cons:** Can be difficult to keep "fresh" or to handle and swallow on the go.

Pure Electrolyte Add-In

- **Pros:** Can provide excellent value. Used to customize sports drinks and gels. Can make pure electrolyte water that doesn't require extra clean up.
- **Cons:** Some are sensitive to flavor and / or don't want the effort to mix it with other beverages or foods.

Food is an excellent source for electrolytes. Processed foods can provide a lot of sodium. Fruits and juices can provide potassium. Green, leafy vegetables can provide magnesium. Dairy products can provide calcium. Foods today tend to be lower in magnesium and calcium than they were in generations past. Top athletes can now find it difficult to consume sufficient electrolytes through normal foods.

Guide your customers. Let them know that consuming an appropriate level and balance of electrolytes can elevate performance, endurance and the sheer enjoyment from cycling to an entirely new level.