

Published in Trail Runner Magazine - January 2006

## **Balancing Act: Stay hydrated and fueled for the short and long run**

By Dave Sheldon

Ninety minutes into a serene mid-week run, my calf imploded in a spasm of pain that had me hopping to a furious stop. Attempts to rub and stretch the offending cramp brought a short reprieve, but the gremlin returned and I began a long walk back to the trailhead. Improper hydration and fueling is often the source of such meltdowns. And even if you have never suffered from dehydration, cramps or the bonk, the importance of staying well hydrated and fueled should not be underestimated.

We humans are composed of 60- to 70-percent water by weight, and even a two-percent loss of fluids can dramatically impact performance. For runs over an hour, staying fueled with carbohydrates and electrolytes is also crucial, and most runners suck down sports drinks and gels. But how do you hydrate adequately and choose drinks and gels?

### **Timing Tips**

The human thirst mechanism is fairly ineffective, and by the time your thirst sensation kicks in, dehydration is well under way. This goes for re-hydration as well, stop drinking when you no longer feel thirsty and you may leave your cells craving more liquid.

The best way not to dry up while running is to simply make sure you drink enough when not exercising. Eight to 12 cups of water a day should suffice (you may need to drink more if you live in a hot, arid environment). Using the color of your urine is a good gauge -- if it becomes darker than light straw, it's time to head to the water cooler. Make sure you drink two or three glasses of fluid in the hour preceding exercise, too. Says Pam Vagnieres, nutritionist and exercise physiologist for Boulder, Colorado's Nutri-Physique, "If possible, drink 20 ounces of liquid during every hour of running, but not all at once. Most runners can only absorb six to eight ounces every 20 minutes." To monitor the effectiveness of your hydration strategy, weigh yourself before and after a workout. But don't beat yourself up if you lose a pound or two.

In many scenarios, it is impossible to finish a run without some degree of dehydration. However, knowing how much liquid you did lose makes it possible to systematically rehydrate: for every 16 ounces of weight lost, drink 24 ounces of water. Those extra eight ounces offset natural losses from urination and sweat that take place while recovering.

### **The Long Run**

When your workouts exceed 90 minutes almost all of your muscle glycogen has been used up, so to keep energy levels high and ward off the bonk, you will need to consume carbohydrates.

Around 100 calories of easily digested complex carbohydrates every 45 to 60 minutes suits most people. And because most of your blood is shunted out of the digestive tract and into the muscles while working aerobically, avoid heavy foods.

Energy drinks and gels shine -- they quickly pass through the stomach and enter the small intestines where diffusion into the bloodstream takes place. The most popular carbohydrate used for both drinks and gels is the manufactured glucose polymer, maltodextrin, which is easy to digest and provides quick energy without a sudden spike in blood sugar. Avoiding such spikes is important for sugar-sensitive and diabetic runners, because after a sudden rise, there may be a fall or crash, resulting in a shaky feeling and/or weakness. Brown rice syrup and corn syrup are other quickly absorbed complex carbs.

Fructose and glucose are composed of simple molecules and, surprisingly, take more time to empty from the stomach than their more complex relatives. However, having a slower absorption rate, or burn time, is not necessarily a bad thing, as these simple sugars can provide longer lasting energy. Many drinks and gels include both simple and complex carbohydrates.

"It is estimated that nearly 40 percent of Americans have some degree of insulin resistance, meaning their cells cannot take up and utilize glucose efficiently," says Vagnieres. "Therefore, the slower the sugars enter the bloodstream, the easier it is on the cells to process it over the long run."

A good way to guard against insulin resistance is to stay properly fueled during your workout, and also throughout the remainder of your day. Electrolytes, e.g. sodium, potassium and chloride, play a vital role in muscle contraction, blood pressure and the transmission of nerve impulses. And because sweat contains these vital molecules, most energy drinks and gels include them to ensure we don't suffer from an electrolyte imbalance or a run-halting cramp. Electrolyte replacement becomes even more important in conditions that inspire high perspiration, like running in the heat of summer or engaging in an especially long outing, such as an ultramarathon.

Amino acids, the building blocks of protein, and whole proteins, usually in the form of whey, are also found in many products. Manufacturers include them in an attempt to reduce the effects of gluconeogenesis --the body's use of its own muscle tissue for energy-- a mechanism that kicks on after about two hours of intense exercise when the body's stored glycogen levels start to run dry.

### **A Round of Sports Drinks for the House**

Trail runners demand convenient, easy-to-consume high-energy sources, and energy drinks and gels can't be beat. Most gels offer around 100 calories per one ounce serving, so eating one every 45 minutes to an hour is a great way to budget your caloric intake. Just tear off the top of their single-serving package or take a glig from a reusable bottle, and wash down the syrupy goodness with a big

mouthful of water.

Energy drinks also offer up the calories, just not in such a concentrated way. Their real value is the electrolytes and minerals they provide -- great for cramp prevention. Most drinks also include vitamins, which quench free radicals and stop these unstable molecules from damaging healthy cells.

Ironically, free radicals are produced by oxidation in the body, so as exercise increases, so do their numbers. The flavor of energy drinks also deserves some credit, as many times it can also inspire you to drink. When using powders, never mix an energy drink richer than recommended. Also, many folks find even the manufacturer's mixing formula too much to handle, and dilute their drinks to make it compatible with their stomachs.

Your search for the perfect energy fuel may take some trial and error. Purchase a handful of gels and single-serving energy drink packets from different manufacturers and give them a shot. Ask your fellow trail fiends what they like -- just don't be influenced too easily. Like your favorite trail-shoe brand, energy foods can have a zealot-like following.

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