On Rehydration

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There has been a long-standing argument about how to properly hydrate during SCA activities. There are proponents of everything from pure water up through full-strength sports drinks with various additives. While the Ether sings with the debate and sports drink companies rake in the guineas, recent studies have thrown some light on this arcane topic.

In order for the body to operate at peak efficiency, it needs to do four things: 1) maintain body temperature 2) maintain hydration 3) maintain energy levels, and 4) maintain electrolytes (salts, especially sodium).

Peak exercise efficiency occurs at a body temperature slightly above normal (thus the recommendation to "warm up" prior to exercise). To keep from overheating, the body produces sweat which cools by evaporation. The sweat contains water and salt, however the concentration of salt in sweat is less than in the blood. Therefore, when you sweat, you lose water faster than you lose salt. As you become more used to the heat, the sweat becomes even more dilute and you lose even more water in proportion to the salt loss. This means it is much more important to replace water than salt, at least in the short run. Most SCA combat activities don't last long enough to require additional energy supplements (such as carbohydrates) during that activity. Energy can be replenished by having a small snack between bouts in a list. During extended melees or wars there may be benefit to rehydrating with a carbohydrate-containing drink.

What is the best way to replenish what the body needs? At a minimum, you should be drinking water. The best method is taking small amounts frequently, such as 8 oz (240 mL) every 15 minutes. Long distance runners that drink 500 mL (one pint) an hour during a race lose 5 – 6% of their body weight – all from water loss. Daily water requirements range from 2 L (2 quarts) in normal climates with low exercise to 15 L (4 gallons) with heavy exercise in the desert. If you want to know how much water you're loosing, weigh yourself before and after exercise (naked – you don't want to weigh the sweat soaked into clothing). The difference is the amount of water you've lost. The best way to tell if you're adequately hydrated is by paying attention to your urine. If it's been more than a couple of hours since you've visited the Port-a-Castle, you're probably not adequately hydrated. Your urine should be no darker than weak lemonade. Also, if you're thirsty, you're already 1 – 3% dehydrated.

The salt losses are more than adequately replaced by eating a normal diet. The goal is to replace water loss minute-by-minute and salt losses day-by-day. While there have been reports in the news and sports magazines about people having problems from drinking excessive water (hyponatremia or water intoxication), this is actually very rare and usually only seen in endurance races such as ultramarathons where the participant drinks excessive amounts of water over several hours of participation. Dehydration is much more common in SCA activities. Don't hold off drinking water for fear of this rare condition.

The down-side to water is not everybody finds it tasty, especially when you have to choke down the amounts it takes to remain well-hydrated. This is probably the biggest reason to use a flavoring in the water. Also, water will sometimes satisfy your thirst before you've drunk

enough to replenish your body's stores. Some salt in the water will also help encourage drinking more.

The ideas about effects of the carbohydrate (sugar) content of sports drinks has changed over the years. Some studies from the 1960s showed that carbohydrates in drinks slowed the rate that they are absorbed from the stomach. This is the reasoning behind the recommendation to dilute sports drinks in half. More recent studies have shown this not to be true. However, drinks with more than about 10% carbohydrate content can cause cramps, nausea, and diarrhea. Not something you want to have in the finals of Crown Tourney, or, as one author put it, "You'll be running, but not necessarily on the field!" Products that are under 8% carbohydrate do not need to be diluted. Gatorade® at its recommended strength is 6% carbohydrate, and therefore does not need to be diluted. Diluting the drinks can make the mixes go farther and can make limited money and/or supplies last longer. The composition of several sports drinks can be found at:

http://www.powerbar.com/Products/Beverage/BevSystem/ProductComparsonChart10-16.pdf

A misconception commonly encountered is that drinking cold drinks causes stomach cramps and delays stomach emptying. This has not been borne out in experimental trials. In fact, cold liquids stimulate the emptying of the stomach. Cool drinks are probably still better tolerated than ice cold (ever get a 'brain freeze'?)

If you use carbohydrate-containing drinks, be careful that the containers are protected from insects. Bees and other stinging insects especially like sweet drinks. Rapidly swigging down a drink that contains a bee quenching his thirst can be very surprising for both the bee and the drinker, with disastrous results for both. Sports-top bottles are great for keeping the insects out and are easy to squirt through most helms. Soda cans are terrible as you can't see what you're drinking – be it hornet or cigarette butt! Make sure sweet liquids are properly stored and reusable containers are thoroughly cleaned as bacteria grow most heartily in sweet liquids.

Drinks that should be avoided are those that contain alcohol, caffeine, carbonation, and fruit juices. Alcohol and caffeine cause the kidneys to produce more urine, making dehydration worse. Make sure you are thinking ahead – don't overindulge on these dehydrating drinks the day before being exposed to hot environments or heavy exercise. Start the day with a full tank. Carbonation can cause you to feel more full due to the release of carbon dioxide in the stomach reducing the amount of fluid you'll drink and possibly causing cramping and discomfort during exercise. Soft drinks are both carbonated and have high carbohydrate concentrations. Fruit juices are typically well above the recommended 10% carbohydrate level. Salt tablets should never be used as they irritate the stomach and can easily send a person's salt levels too high, which can also be life-threatening. Since the average diet contains well above the required amounts of sodium, salt tablets are never recommended.

Some drinks add supplements as "energy enhancers." These are essentially all marketing hype and have not been shown to improve performance. Some additives can be dangerous, if not deadly. Ephedra has recently been removed from the US market due to its association with numerous deaths, including several from heat stroke. Other additives for improved energy (usually caffeine or its "natural" cousin guarana) should be avoided for the reasons previously

stated. Creatine has been commonly used as a muscle-building and recovery aid. It has been associated with dehydration and has been associated with at least one death due to dehydration. Creatine pulls water into the muscle and out of the circulation. That's how it makes the muscles look bigger, but the gain is water, not muscle. It has been shown to improve certain quick-energy burst activities such as sprinting, but the improvements have been extremely minimal (about 1 second of extra energy). The advantages are certainly not enough to justify the cost or the risk. Likewise protein supplements put an additional load on the kidneys without any significant gains over what you get in a normal diet.

A very well-liked drink that I call "Friar Galen's Holy Water" has been loved by fighters at many hot summer practices is made by slicing and squeezing a dozen lemons and six oranges into the ubiquitous 5-gallon water container. Add 2½ to 3 gallons of water and a bag of ice. It's more flavorful if it sets for a few hours before adding the ice and serving. If you want to make it very close in carbohydrate and sodium content to Gatorade®, add 3 cups of sugar and 3 tsp of table salt to the basic mix. Based on 3 gallons of water this mix will contain 6% carbohydrate and 635 mg of sodium per liter.

Don't let the hype of the drink companies get in the way of taking proper care of yourself or your SCA brethren. A drink that has the proper balance of nutrients does no good if no one will drink it. Pick a flavoring system that your local group likes and will drink plenty of and make sure everyone is staying adequately hydrated. The makers of the Camel Back® system got it right when they said: "Hydrate or Die!"

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