

# CeraSport® Hydration

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## Advantages of CeraSport Oral Hydration for Athletes

**T**he recommendations of the American Dietetic Association, Dietitians of Canada, and the American College of Sports Medicine with regard to nutrition and athletic performance are attached. This short commentary highlights some of the points included in these recommendations and provides insights into the benefits of the Cera Products Sports drinks. The commentary focuses on the section of the recommendations regarding "Hydration," starting on page found on page 517, and it will include text boxes from this section.

*American Dietetic Association. Position of the American Dietetic Association, Dietitians of Canada, and the American College of Sports Medicine: Nutrition and Athletic performance. J Am Diet Assoc. 2009;109:509-527.*

### **Hydration is critical before during and after exercise.**

If one does not maintain proper hydration, performance deteriorates, but even more importantly, inadequate hydration is dangerous. The target to insure that there is less than a 2% loss in body weight during exercise. The recommendations then include specific advice about drinking before, during and after exercise. For example, one who weighs about 175 pounds should drink about a half liter of water or sports drink prior to exercise. There is no benefit of drinking more than this. During exercise, the amount to drink depends on the volume of sweat being lost. For vigorous exercise, most people will lose more than a liter per hour.

Though the focus on sweat loss is the volume of water that is lost, the sweat also contains considerable concentrations of sodium. Although the article suggests that sweat concentrations average about 50 meq per liter, this is highly dependent on the conditioning of the person and sodium concentrations of persons in good physical condition generally are in the range of 20 to 30 meq per liter. Concentrations of other electrolytes (e.g. potassium and others) are much less. During exercise, the suggestion is to drink a sufficient amount so that the body weight does not lessen more than 2%. Since there are individual differences between different people, ideally, one should measure the weights of persons before and after exercise in order to customize the amount of fluid to provide. This may not always be possible.

**Before Exercise. At least 4 hours before exercise, individuals should drink about 5 to 7 mL/kg body weight (~2 to 3 mL/lb) of water or a sport beverage.**

**"Being well hydrated is an important consideration for optimal exercise performance. Because dehydration increases the risk of potentially life threatening heat injury such as heat stroke, athletes should strive for dehydration before, during, and after exercise. Dehydration (loss of >2% body weight) can compromise aerobic exercise performance, particularly in hot weather, and may impair mental/cognitive performance."**

The fluids that are consumed should contain a mixture of water, salts and carbohydrates. The water and the sodium in the drink are included to replace the water and salt being lost in the sweat, and carbohydrate is included to provide energy.

### **Glucose mediated transport of salt and water.**

Not mentioned in the paper, but an absolutely critical role for the carbohydrate, in addition to providing energy, is the provision of glucose-mediated transport of salt and water. In other words, if the fluid consisted only of salty water, even if it were in the correct proportions, it would not be absorbed efficiently without the carbohydrate. In fact, if one were to drink large quantities of salty water while vigorously exercising, this would set a situation in which the fluid simply ran through the gut, causing watery diarrhea. (This would hardly be welcome by any person who is vigorously exercising.) If carbohydrate is included in the drink, in the correct proportions, this facilitates the absorption of salt and water, and directs these ingredients into the blood stream where they are needed, not into the toilet. The concentration of these various constituents (water, salt and carbohydrate) is also critical to maximize the absorption since getting these wrong can also lead to diarrhea, cramps and poor absorption.

While the paper recommends a solution with 6 to 8% carbohydrate for prolonged exercise, it also cautions that a solution which is hypertonic or has excessive carbohydrate has reduced gastric emptying. Unfortunately, this concept is not fully explained.

It is true that energy requirements during exercise can be very high and thus, one would want to supply a considerable

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**Because many athletes do not consume enough fluids during exercise to balance fluid losses, they complete their exercise session dehydrated to some extent...**

**Rapid and complete recovery from excessive dehydration can be accomplished by drinking at least 16 to 24 oz (450 to 675 mL) of fluid for every pound (0.5 kg) of body weight lost during exercise.**

quantity of carbohydrate. On the other hand, if drink contains excessive concentrations of sugar, it becomes hypertonic. The hypertonic drink is detrimental in two ways. Firstly, it reduces gastric emptying leading to a feeling of fullness, and it also reduces the amount of fluid that can be absorbed from the intestine. Secondly, the hypertonic fluid draws water into the intestine through osmotic forces. Thus, rather than being absorbed, the drink actually pulls fluid into the guts lumen. The notion that hypertonic fluids reduces absorption is known as the "osmotic penalty."

#### **How does CeraSport and EX1 address osmotic penalty and maximize glucose mediated absorption?**

The sports drinks from Cera focus on physiologic performance by combining the correct concentrations of salts, and carbohydrate in a form that maintains a low osmolarity. By utilizing rice digests, the carbohydrates remain in larger molecules, and thus do not contribute substantially to the osmolarity of the drink. By contrast, most other drinks use simple sugars, and each molecule of sugar adds to the osmolarity of the drink. Thus, sports drinks from Cera provides additional carbohydrate, with its glucose carrying capacity, without paying the osmotic penalty. With its low osmolarity, CeraSport and EX1 pass quickly through the stomach, enter the small intestine where it is absorbed very rapidly. The intestinal enzymes digest the larger carbohydrates into glucose which is then quickly absorbed, carrying water and salt with it. Because of this rapid transit through the stomach and quick absorption from the intestine, cramping and a full feeling does not occur. Other hypertonic sports drinks attempt to provide more calories by increasing the concentration of sugars, but in the process, this leads to bloating, cramping and even diarrhea; hardly good when exercising.

**Routine measurement of pre and post exercise body weights will assist practitioners in determining sweat rates and customizing fluid replacement programs for individual athletes**

#### **Hyponatremia (water intoxication).**

This is a serious subject which should not be overlooked. If simply water is the drink used during vigorous exercise the person can develop severe hyponatremia because the water is being replaced, but not the salt. Normally, the concentration of sodium in blood should be about 140 mEq/L, but if excessive salt is lost in the sweat, and is being replaced by water without salt, the sodium concentration can drop to very low levels. This

can result in muscle cramps, very poor performance, collapse, and even in death if not corrected. Some very fit marathon runners have died due to this condition, but other less severe complications are not uncommon. Hyponatremia is not a complicated physiological situation for the person who is sweating; it is simply a matter of replacing the electrolytes being lost in the sweat. If one does this in an intelligent manner, this should not be a problem, but unfortunately, it is a common condition if the salts are not replaced by a sports drink which provides optimal absorption of both salts and water.

**The risk for dehydration and heat injury increases dramatically in hot, humid environments...**

**Factors contributing to dehydration in cold environments include respiratory fluid losses, as well as sweat losses that occur when insulated clothing is worn during intense exercise.**

#### **Hydration after exercise.**

If the person knew the weight loss which occurred from the exercise, he/she could estimate fairly precisely how much sports drink to consume after exercise using the old rule of a "pint is a pound." If one lost two pounds during the exercise, the person should drink a quart. The precise amount or timing of the drink is not so critical since the body can adapt over the time the person is resting, however, if the person were to again have to become very active, it would be critical to be as fit as possible prior to the next exertion. Thus, the optimal sports drink, in this situation would critical.

#### **Hot and humid, or cold environments.**

Special environments increase the risk from dehydration. These include hot and humid environments, heavy clothes, cold climate and high altitude. Each of these requires special attention to appropriate replacement of fluids with the best sports drink to replace sweat losses.

**Beverages containing 6% to 8% carbohydrate are recommended for exercise events lasting longer than 1 hour...**

**Gastric emptying is reduced with hypertonic fluids or when carbohydrate concentration is >8%.**

#### **Summary**

Replacing water and salt due to sweat loss is a critical concern to persons who are exercising vigorously. The best sports drink to replace these losses are those from Cera Products, Inc, either CeraSport or EX1. They provide the proper concentrations of salts with carbohydrates that do not increase the osmolarity. Thus, CeraSport and EX1 maximize absorption without the osmotic penalty associated with other sports which have excessive concentrations of simple sugars. CeraSport and EX1 fulfills the description of an optimal sports drink.