



## Hydration Status and Sports Drinks for Athletes

by Dr. Russell Tigges

Orthopedic Associates of Dutchess County

Proper hydration before exercise, monitoring your hydration status during exercise, and replacing fluid losses post-exercise are vital to ensure your body has the fluids it needs to optimally perform and to recover quickly.

Just a decade ago, drinking as much water as one could handle during exercise was the greatest emphasis. Now however, it is recommended to try and replace 75-100% of your sweat losses during and after exercise. But don't depend on your thirst mechanism to tell you when and how much to drink. Thirst is a poor indicator of hydration status, as an athlete can lose over 1.5 L of body water before they become thirsty!

Individuals sweat at different rates, and sweat losses of 1-2% of body weight can affect body function and harm exercise performance. A loss of 3% of your body weight increases the risk of muscle cramps and heat exhaustion. Losses of 5% or more of body weight in the form of sweat can cause a heat stroke.

Knowing how to approximate your own fluid needs during a workout, and recognizing the signs and symptoms of dehydration, are vital to your athletic performance. Weigh yourself before and after exercise to monitor your fluid losses. As a guideline, you should replace each kg of body weight lost during exercise with 1 Liter of fluid.

Hyponatremia is a potentially fatal condition of low blood sodium levels. This can happen during prolonged exercise if sodium levels are not properly replenished, with salty snacks or electrolyte sports drinks. It can also happen from drinking too much water, which effectively dilutes the sodium content of the blood. Sodium losses range from 2.5-3.5g/L of sweat ( which is equal to about ½ tsp of salt). Salt losses can vary significantly from person to person. Research has shown that ingesting 0.5-1.2 gm of sodium/Liter is effective in preventing hyponatremia. This is equal to about a ¼ tsp of salt per liter of water.

The composition of our blood is measured in plasma osmolality. This is a measure of the concentration of sodium, potassium, chloride , glucose and other ions in the blood. This osmolality is affected by changes in water content, increasing with dehydration and decreasing with over hydration. Normal plasma osmolality is 275-300. This is similar to the osmolality of most sport drinks.





The composition of sports drinks can be divided into 3 groups: isotonic, hypotonic and hypertonic. Most sport drinks are isotonic, and help to replenish the fluids and electrolytes lost in a similar ratio to that normally found in the human body. Isotonic sports drinks, like Gatorade and Powerade, contain similar concentrations of salt and sugar as in the blood.

Hypotonic drinks like water are more effective in cases of severe dehydration. These drinks are not ideal for exercise longer than 1 hour.

Hypertonic drinks such as fruit juice and milk may cause gastric distress due to the large amounts of sugar, and may exacerbate dehydration by stimulating less water absorption. These drinks are best suited for refueling and rehydrating after exercise.

Sports drinks are a convenient way to replace water, carbohydrate and sodium losses during and after exercise. Replacing the large amounts of sodium lost in sweat may help endurance athletes perform better. Dilute glucose and electrolyte solutions help to maximize the rate of water uptake in the small intestine.

Sport drinks are a great way to ensure both sodium and fluids are consumed, but these needs can also be met by eating salty foods and drinking water.

Studies show that the optimal water and sodium uptake occurs with solutions containing 60-100mmol/L of glucose and 50-120 mmol/L of sodium.

How to Make Your Sports Drink.....

- 1) Mix Kool Aid ( to your taste) + 8 tsp sugar +1/2 tsp salt in 1 L of water
- 2) Mix fruit juice + 8 tsp sugar + ½ tsp salt in 1 L water