

Newsletter

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Sports Drinks and Athletic Performance.

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Hydration is imperative for optimal performance for all athletes. Athletes who develop a systematic method of ensuring they are consistently hydrated have better recovery and higher energy levels. When an athlete is adequately hydrated, their body is able to transport nutrients and oxygen to working muscles and aid muscle repair, remove lactic acid build up, eliminate nitrogenous waste and regulate body temperature. Losing as little as two percent of body weight through sweat can impair an athlete's ability to perform due to a low blood volume and less than optimal utilization of nutrients and oxygen.

Physiological Effects of Dehydration	Symptoms of Mild Dehydration	Symptoms of Severe Dehydration
<ul style="list-style-type: none"> · UP - body temperature & heart rate · DOWN - blood volume, cardiac output, sweat rate & urine output 	<ul style="list-style-type: none"> · Thirst · Fatigue · Small amounts of dark urine · Dizziness · Delayed gastric emptying 	<ul style="list-style-type: none"> · Muscle cramps · Shivering & absence of sweat · No urine output · Delirium · Loss of consciousness

Sports drinks have been researched extensively and generally provide an excellent alternative to plain water for hard working athletes. During intensive aerobic exercise, the body's preferred source of fuel is carbohydrate (rather than protein or fat) due to the efficiency of energy transfer to fatigued muscles. The majority of sports drinks are formulated to deliver carbohydrates, electrolytes and fluids in such a way that will minimize stomach upset and maximize intestinal absorption for delivery of energy to muscles.

Sports Drink Formulation

Water and Carbohydrate

These are the main ingredients found in sports drinks. The source of carbohydrate comes from mixtures of glucose, glucose polymers and fructose. This mixture is typically what varies among brands because different combinations of carbohydrate are used to improve digestion and flavor (for example glucose polymers taste less sweet). Research has shown that a sports drink made up of 4-8% carbohydrate (4-8g/100mL) is emptied by the stomach most efficiently and absorbed most easily by the small intestine. There are two reasons why pop and unsweetened fruit juices are not generally good choices of fluid during exercise:

- The carbohydrate concentration is 11-15% (11-15g/100mL) which is too high for optimal gastric emptying and intestinal absorption.
- Fructose is the main carbohydrate source and studies have shown that large amounts are not well absorbed and can result in stomach upset.

Electrolytes

Besides water, electrolytes are the major component of sweat. Sodium and chloride comprise the largest proportion of electrolytes in sweat, along with smaller amounts of potassium, magnesium, calcium, iron, copper and zinc. Sodium stimulates thirst and enhances the absorption of carbohydrate and water by the small intestine. Sports drinks typically contain 20-60mg sodium/100mL and may or may not contain small amounts of other electrolytes. Although higher levels of sodium would result in better fluid retention, the palatability of the drink would be compromised. During ultra endurance events such as adventure racing and Ironman triathlons, inadequate repletion of sodium can lead to a dangerous condition known as hyponatremia, however for most athletes engaged in prolonged exercise, the danger of this condition is relatively low if they remain well fuelled and hydrated.

Other ingredients

Some sports drinks may include protein, vitamins and herbs which affect flavor and price. There is little scientific evidence to show that addition of these substances will enhance sports performance.

Comparison of Sports Drinks and Other Fluids:

Fluid	Carbohydrate Concentration	Source of Carbohydrate	Sodium (mg/100mL)
Tap Water	N/A	N/A	Variable
Gatorade	6%	Sucrose, glucose	41mg
Powerade	8%	High fructose corn syrup, maltodextrin (glucose polymers)	22mg
Accelerade	7.75%	Sucrose, fructose, maltodextrin	56mg
eLoad	5.4%	Dextrose, sucrose	74-110mg
Coca Cola	12%	High fructose corn syrup, sucrose	3.6mg
Fruit Juice	11-15%	Fructose, sucrose	1.1mg

When to Use Sports Drinks

1. Prior to Exercise

Sports drinks provide an excellent source of easily digested carbohydrates to maximize muscle fuel storage for optimal performance. The sodium also encourages fluid intake and aids in fluid absorption and retention.

2. During Exercise

Sports drinks enhance performance by delivering carbohydrate and fluid during:

- high intensity exercise lasting sixty minutes or longer,
- moderate-high intensity exercise lasting more than 90 minutes (ex. running, cycling, rowing)
- Intermittent high intensity exercise (ex. Soccer, hockey, wrestling, gymnastics)

3. Recovery after Exercise

Re-hydration is a key component for maximizing recovery and adequately re-fuelling for subsequent training sessions or competition. Sports drinks should be used in combination with foods that supply the body with additional carbohydrates, protein, vitamins and minerals.

Summary

- Hydration is critical for optimal athletic performance.
- Solid research has made it evident that sports drinks enhance sports performance when used properly.
- Sports drinks comprised of a 4-8% carbohydrate concentration are most easily emptied by the stomach and absorbed in the small intestine.
- Sodium provided in sports drinks stimulates thirst and decreases urine losses.
- Sports drinks should be utilized during high intensity exercise and endurance sports.
- Tolerance and use of sports drinks will vary among individual athletes. A qualified sports dietitian can help athletes maximize the effectiveness of sports drinks.

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