

Fluid & Electrolyte Replenishment

for Endurance Athletes



Fluid & Electrolyte General Guidelines

- During training, experiment with fluid replacement drinks and adjust your drinking strategy based on workout intensity, duration and environmental conditions.
- During training and racing, the goal of drinking fluids is to avoid dehydration. Replacement of fluids should be based on an athlete's specific sweat rate and according to thirst. *Consuming fluids in excess of sweat rate is discouraged.*
- To increase gastric emptying, aim to consume ~ 4-8 oz of fluid every 15–20 min of exercise. It is important to consume the fluids slowly, rather than all at once (small, frequent sips!)
- Consuming beverages with sodium helps to stimulate thirst and retain fluids to maintain hydration status.
- Sweat rate is specific to each discipline of sport, so athletes should conduct this test for swimming, biking and running to formulate a customized hydration plan. Refer to the following link for more information:
<http://www.ironman.com/triathlon/news/articles/2015/11/calculate-your-sweat-rate.aspx#axzz48Rez7rAp>

Role of Electrolytes

- **Sodium** is the most critical electrolyte to replenish because, particularly for endurance athletes with a high sweat rate, it has the highest concentration in sweat of all the electrolytes. A general guideline is to aim for 500–700 mg sodium/liter of fluid consumed or 500-1000mg / hr of training/racing depending on how salty of a sweater you are.
- **Potassium** controls fluid & electrolyte balance, assists with nerve impulse transmission and aids in glucose utilization.
- **Magnesium** regulates muscle relaxation and aids electrolyte movement through cell membranes.
- **Calcium** plays a role in skeletal muscle contraction, nerve impulse transmission and synthesis / breakdown of glycogen.

Carbohydrate Content of Sports Drinks

Optimal Carbohydrate Concentration:

- The optimal range is 4–8% percent carbohydrate concentration for sports drinks (8% is equivalent to ~ 7g carb/4 oz)
- Concentrations < 4% do not provide adequate amounts of carbohydrate to maintain glucose metabolism.
- Concentrations > 8% delay gastrointestinal (GI) emptying and increase risk of GI distress. If the concentration of carbohydrate is > 8% (common with multi-hour bottles, soda or red bull) be sure to add water to dilute it or consume additional fluids alongside it.

Calculating Carbohydrate Percentage:

To calculate the carbohydrate percentage of a sports drink divide the carbohydrate content (g) by the fluid volume (ml) then multiply by 100.

$$[\text{Carbohydrate content (g)} / \text{Fluid volume (ml)}] \times 100$$

The absorption of water in the small intestines is dependent on the absorption of sodium, therefore the inclusion of low to moderate amounts of sodium will increase intestinal fluid absorption.

In general, you are aiming to consume a total of 30-60g of carb/hr depending on the extent to which you've trained your gut. Utilizing a mixture of glucose + fructose helps to optimize intestinal absorption.

