

Hydration – Sweating - Replacing Fluids

A smarter approach to optimizing sport performance

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Athletes, both casual and serious, strive to improve their performances and feel good before, during and after their activities. They typically get enough sleep, they maintain a healthy diet and they keep a workout schedule that helps them realize short and long term goals.

One thing commonly overlooked? Hydration, which can make or break a performance and optimal health.

Hydration seems to be a simple concept. Drink before, during and after activities to keep cool and refreshed. However, if an athlete wants to optimize the hydration process to reach another level of performance and maintain better health in general, it gets more complicated.

In this article, we discuss in more detail proper hydration, explain sweat ratios and go over what types of fluids are ideal. In addition, we will touch on how proper hydration has proven to be one of the most important things an athlete must do in order to optimize his or her performance.

Sweating: The Individual Approach Using Sweat Loss Calculator

One of the most common misconceptions about hydration is that people sweat roughly the same amount during workouts. For example, cyclists are often coached to drink one bottle of fluid per hour of training, regardless of ambient temperatures and the intensity of the ride. Bad advice. The level of perspiration is the result of many factors, including height, weight and body type. Thus, it's important to tailor hydration to the specific needs of the athlete. The "bottom line is that sweating provides the body it's cooling system, and without proper hydration, the cooling system will not work, shut down and decrease sports performance. Even more serious note, if the continuation of depriving the body with "proper" hydration, it can cause heat stress, body organ failure and loss of consciousness.

Humans fall into or between three body types: Ectomorph, Endomorph and Mesomorph. Ectomorphs are usually lean and long and have difficulty building body mass. Endomorphs are large, big-boned and store a great deal of body fat but can build mass and strength in training. And Mesomorphs have high metabolisms, are muscular and have low body fat. Each type of body type sweats at a different rate, which means they should hydrate at a different rate. How do we measure sweat ratios? An easy way to measure fluid loss is to weigh the athlete without clothes before and after an activity. The difference in weight – minus the weight of fluid consumed during the activity – is the amount he or she sweated. The chart below will help you calculate sweat loss.

Hourly Sweat Rate Formula

- (starting weight in kilograms) – (weight in kilograms after 1-hour exercise) + (fluid taken in during exercise in liters) = sweat loss ratio.
- If you weigh 60 kilograms prior to exercise and 59.5 kilograms afterward and consume 0.7 liters of fluid (the capacity of a typical cycling water bottle) during exercise for the hour, equates to a sweat loss ratio of 1.2
- $60 - 59.5 + 0.7 = 1.2$ which is the Sweat Loss Ratio (see chart below).

The next step is to use the sweat loss ratio to determine the optimal amount of hydration. The chart below can help.

- Low Sweat Loss Ratio < 1 need to drink at least 0.4-0.5 liter per hour
- Moderate Sweat Loss Ratio between 1-1.5 need to drink at least 0.7 -0.8 liter per hour
- High Sweat Loss Rate Ratio > 1.5 need to drink up to 1.1 liters per hour

One thing that is important to note: The tools to determine sweat loss ratio and optimal hydration we've provided here aren't 100 percent accurate. It's merely a tool to help an athlete determine the ideal level of hydration before and after activities. The athlete must explore, sometimes through trial and error, what works best for him or her. Also, remember that proper recovery is essential in order for the body to recharge and be ready for the next day's workouts.

Hydration: Types of fluids

What fluids should the athlete consume for rehydration? That depends on many variables, including the duration of workouts, the fitness level of the athlete and gastrointestinal conditioning. Drinks can be categorized into three basic groups: Isotonic, Hypertonic, and Hypotonic.

Isotonic drinks are common sports beverages found at the local supermarket. Powerade, Gatorade and similar drinks have roughly 8% carbohydrates and about 445mg of sodium per liter. This type of drink is best suited for high-intensity training (HIT workouts) or racing (aerobic threshold workouts) in order to get a blast of energy and fluid at the same time. However, isotonic drinks have proven to be problematic in that the absorption rate in the stomach, based on solubility, might cause stomach distress resulting in poor performance. Some athletes dilute their sports drink in an attempt to avoid stomach distress. However, keep in mind that dilution also lowers the intake of sodium and electrolytes, which might hinder proper hydration.

Hypertonic drinks also give the body a blast of energy, sometimes providing the extra oomph needed to complete a hard workout or race. Some athletes drink cola without carbonation, which is high in carbohydrates and contains some macronutrients as well. Keep in mind: Like isotonic drinks, there are issues with the solubility of hypertonic fluids, which might cause an upset stomach even after a workout or race.

Hypotonic drinks are the best option for training or racing that exceeds one hour. They are more effective than isotonic drinks at rehydrating the body because they have lower carbohydrate content, which enables the stomach to absorb the fluid faster. The downside of limited carbohydrates is the need to replace them – through a food source – in order to maintain energy levels.

Sports nutrition companies provide supplements including, but not limited to different types of sports drinks. They typically offer isotonic and hypotonic drinks but also hybrid versions, which might be ideal for both short- and long-duration workouts and racing. Once again, athletes should use trial and error to determine what works best for him or her based on body type.

Conclusion

The purpose of this article was to underscore the necessity of proper hydration. The athlete can use sweat ratio to help determine the amount of fluid he or she should consume before, during and after activities. We discussed body types, which play a role in hydration. We mentioned that outside influences – the weather, for example – can change the level of hydration necessary for optimal performance. And we went over the plusses and minuses of the three types of sports drinks. One last thing: It's always best to check with a physician and undergo various tests before embarking on an ambitious training program, including blood work and body mass index (BMI). Then, after at least three months, the same tests should be conducted to determine the progress of the athlete. And don't forget: Stay hydrated!

*A future article will address the concept of “over hydrating” commonly called Hypohydration (when fluid intake doesn't match water lost through sweat). ***

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