

WATER

The foundation of performance is hydration, run out of water and you run out of the ability to perform. Your body can't cool itself and as exercise continues and core temperature rises, problems such as heat stroke may result.

Hydration is a crucial part of life itself, and water losses of a mere one or two percent of your body weight can impair function both mentally and physically.¹

Losses of seven percent or more may bring you down for the count, disrupting your delicate balance and resulting in total body collapse.

Dehydrate a muscle by just 3% and you will cause a loss of about 10% loss of contractile strength, and an 8% loss in speed.^{2 3}

The average sedentary adult male requires at least 12 cups of fluids per day, the average woman, nine cups. As athletes we require higher levels of water to survive, and where we get this water and what we put into it to prolong performance make the difference between winning and losing.

TAP WATER

The most important nutrient in your body is plain water and it is vitally important that we consume clean water. This does not unfortunately mean tap water, which on average contains around 550 part per million of contaminants. If you ingest this sort of level of pollution your brain, muscles and internal organs will all become contaminated and contribute massively to your toxic load, ability to detoxify and may complicate or directly cause a myriad of unwelcome symptoms.

When we consider the feminisation of nature concept and the fact that scientists have found that drugs and xenoestrogens are making their way into our water supply one must wonder what the consequences of this type of exposure are on our health. As 90% of excreted drugs can remain biologically active and recently Thomas A. Ternes, a German chemist found traces of 30 out of 60 commonly used pharmaceutical drugs to be present in treated water, sewage and rivers there seems to be a definite case for obtaining pure water for your consumption.

Possible results of drinking these types of contaminated water include:

- Increased hormonal imbalances
- Decreasing sperm counts as a national levels of sperm have decreased 4 fold since 1900
- Increased intake of environmental pollutants
- Antibiotic resistant virulent strains of bacteria⁴

¹ L.E. Armstrong and Y. Epstein, "Fluid-Electrolyte Balance During Labour and Exercise: Concepts and Misconceptions," Intern. J. of Sports Nutr. 1. (1999): 1-12

² Sawka MN, et al. Influence of hydration level and body fluids on exercise performance in the heat. Journal of the American Medical Association 1984; 252:1165-1169

³ Armstrong, LE, Costill DL, Fink WJ. Influence on diuretic-induced dehydration on competitive running performance. Medicine and Science in Sports and Exercise. 1985; 17:456-461

⁴ Information obtained from Science News vol 153, March 21, 1998."Drugged Waters: Does it matter that pharmaceuticals are turning up in water supplies?"

How do you obtain clean water?

Because the bottled water industry is largely self-regulating and may often contain similar pollutants found in tap water it is better to filter your own water. To prevent these toxic contaminants building up in your body the two best ways to purify your water include distilling and reverse osmosis. Distilling your water with a home distiller will result in your water being around 10-12 ppm. The next best and often most practical method is installing a reverse osmosis unit under the sink. These types of unit result in your water being taken from 550 ppm to 20-40 ppm, which when you consider the impact water has on your health is a massive and easily obtainable reduction in your toxic load.

While you are researching the best method for cleaning your water, you can use the charcoal filter based ones which you can keep in the fridge. If you like bottled water do yourself this favour;

DON'T REUSE PLASTIC BOTTLES, throw them away once you are done, don't leave them in hot environments for long and avoid leaving them in direct sunlight.

Some Concepts:

- Clear urine indicates proper hydration
- Thirst: poor indicator reliance on this mechanism results in 50-75% hydration. ⁴
- If you exercise remember to weigh yourself both before and after the workout.
- Drink before you exercise and often during exercise. 1-2 cups one hour before and half a cup or more each 15-20 mins during your event. ⁵

What should I put in my water to enhance performance? ⁶

Carbs, caffeine, sodium and protein. Plus the X factor

Optimal hydration will be obtained at around 4-8% solution, use lower concentrations for event where you lose more water, higher concentrations when you lose less.

4-8% solution mean 4-8g of solute (powdered product) per 100ml – it's quite a bit really.

SUGARS

The best sugars to use are maltodextrin as it assists hydration being low osmolality, but adding another sugar or 2 will enhance performance as sugars are absorbed through different transport mechanisms. The theory is that the more sugar that gets through the less endogenous carbohydrates you'll use, and carbohydrate sparing means more fuel to continue exercising.

CAFFEINE

⁵ W.A. Lutzka and S.J. Montain, "Water and Electrolyte Requirements for Exercise," Clin. Sports. Med. 18.3 (1999): 513-524

⁶ John Ivy 3rd Annual ISSN Conference and Expo 15-17 2006

Caffeine helps performance, that's why it was on the banned list in high amounts for so long. So taking some caffeine as part of your sports drink is a good idea. Not too much though 80mg per 500ml is about right. You could use a flat soda with caffeine in it as the base for your drink.

Caffeine helps in the following ways;

- Decreased perceived exertion
- Increased use of fatty acids for fuel
- Increased reaction time
- Increased endurance capacity

SODIUM

Electrolyte replacement is crucial to avoid hyponatremia, when too much fluid lowers plasma sodium concentrations –

This is a potentially life-threatening situation so include some sodium in your sports drinks, around 0.5g per 500ml is a good start.

An average litre of sweat contains about 1.15g of sodium and 1.5g of chloride, using sodium chloride then (salt) at a gram per litre will assist some electrolyte replenishment.

Most well-design sports drinks will contain the right amounts of sugar and sodium; Gatorade, Lucozade and Powerade all do versions of their drinks with added sodium.

PROTEIN

Adding protein to sports drinks is a new thing, larger companies don't do it due to margins, and shelf-life problems; you can go ahead and add 1-2g of protein per 100ml and enjoy, less fatigue and greater fluid retention than if you don't.

Aminos would also be a good idea too. BCAAs to counteract central fatigue, L-carnitine tartrate to enhance taste and recovery post training – you could also use some glutamine for digestive support.

X Factor

The taste ideally should be slightly tart, this encourages more fluid to be drunk and is generally better than sweeter tasting drinks.

Avoid drinks which have been made sweeter with artificial sweeteners if they already have plenty of carbohydrate in them.

The only justification for using sweeteners is to enhance and sugar free or very low sugar beverage, and you would not be choosing these for optimal performance anyhow.

Adding a small amount of lemon juice can help as does carnitine L tartrate, which may assist with fat burning and recovery and repair of damaged muscle tissue.

Volek JS. "L-carnitine L-tartrate supplementation favorably affects markers of recovery from exercise stress." Am J Physiol Endocrinol Metab. 282: E474-482, 2002.