

Ways to Boost Athletic Performance (Hydration and minerals)

Discussion between James DiNicolantonio, Siim Land
& Dr. Mercola

Authors of - WIN: Achieve Peak Athletic Performance, Optimize Recovery and Become a Champion- the of the best books ever written on hydration according to Mercola.

Another great book they wrote is Metabolic Autophagy

70% Max VO2 - you want to use both systems for metabolic flexibility (Exercising in a fasted state and eating 50 grams of complex carbohydrate 1 hour before)

Google VO2 Max calculator to find out your VO2 Max for your age and sex.

www.shapesense.com has one on their website.

Ingesting calories before exercise

The data is very clear - if you are performing at a vigorous pace consuming 50 grams of complex carbohydrates 1 hour before vigorous paced exercise you will preserve muscle glycogen levels and improve performance from both endurance and a peak power output. For competitive performance using carbohydrates as stated above will help performance

For weight training or cross fit - it is better to have some calories 1 hour before
If you are young and in competition. Otherwise you can exercise fasted

Training in a fasted state helps by sparing glycogen -

You are using fat as a source of fuel in a fasted state and spares glycogen which is good for anaerobic performance and carbohydrates as a fuel when needing aerobic performance - both are good. You will burn fat better in a fasted state if you are not interested in competing and you are older you will want to exercise in a fasted state - older people should be exercising for longevity - 50's - 60's 70's, 80's +. If you are a senior exercising in a fasted state the majority of the time is better over the long term.

The exploration of hydration as a powerful tool - How you want to hydrate -

The problem with drinking water without salt

Most people think hydrating with water is the best way to go but actually it can have negative implications in both endurance and vigorous exercise. Consuming just 5oz of water in 15min can be a problem, this amount exceeds gastric emptying. When you are doing vigorous exercise gastric emptying goes down. If you drink too much water you are going to bloat the system - water is just going to sit in the stomach. This can decrease vigorous exercise performance by 2.5%.

Drinking just plain water can increase the risk of muscle cramps - salt and electrolytes prevent the cramps. Salt in water helps both endurance and vigorous exercise. If you get the salt levels right you can decrease heart rate by 9 to 10 beats per minute. It can increase exercise duration for 20 to 21 minutes. This equals to a 20 to 25% increase in vigorous exercise endurance. It can decrease core body temperature - it keeps the core body temperature lower during exercise - this is super important. Mitochondrial energy can be inhibited by too much heat. Expand interstitial fluid and blood volume to decrease muscle cramps.

If your energy isn't high - take 1,000mg of sodium in fluid this is = to 1/2 a tsp of salt in 10 to 20 oz of fluid or 2,000mg of sodium = 1 tsp of salt in 1 liter of fluid so you can get a blood

volume increase of about 3% to 4%. You can train fairly well that is have plenty of energy to do the workout.

The goal is to lose 1.5 to 2% of your body weight through sweat which will induce mild dehydration. You do this multiple times and you get dehydration acclimation.

If you want to really increase performance you want to increase your blood volume by 8 to 10% because the blood volume drops within 5 minutes of vigorous exercise by about 8 to 10%. This is because blood flows away from the heart to the working skeletal muscles.

In performance nothing comes close to pre loading with salt and fluid.

For example: taking a salt solution can increase vigorous exercise by 10 to 20 min. Beta Alanine is considered the best supplement for performance and it only increases exercise by 1 min. So this salt loading increases performance 10 to 20x better.

Side note: (Magnesium Orotate - converts to BetaAlanine - taking Beta Alanine is a great precursor to Carnosine.)

Your normal blood level of sodium is 3,200mg per liter - so if you get close to that and if what you are consuming is slightly higher level of sodium than blood - 3,500mg to 4,000mg per liter. This level will boost your blood volume the best and absorb fluid the best.

1 teaspoon of table salt contains 2,325mg of salt so 1.5 teaspoons of salt = 3,500mg of sodium is a good dose to start with. Start drinking the salt solution 90 min before exercise and drink it slowly over 30min. (Sugar actually dehydrates you)

Add **Glycine** to the solution - just slightly less than a teaspoon - 4,000mg. (it tastes like sugar) and it facilitates the sodium being absorbed by the intestine. It also decreases core body temperature. It is an amino acid and acts as an inhibitory neurotransmitter and probably inhibits muscle cramps. You can purchase Glycine powder 1lb. from NOW foods

Why pickle juice works so quickly for muscle cramps - drinking 2.5oz can abort a muscle cramp in 30 to 90 seconds. The acetic acid in the pickle juice releases Glycine and that aborts a muscle cramp.

We lose salt in our sweat 1,200mg in sweat per liter - caffeine causes you to lose salt. 4 cups of coffee causes you to lose 1/2 tsp of salt.

Salt controls magnesium and calcium - 1 hour of exercise causes a loss of 5,000mg of sodium. If you don't have enough salt your body will pull the sodium from your bones and also magnesium and calcium.

How you want to rehydrate - Weigh yourself before and after exercise -

1 liter of water is 1 kilogram - 2.2 lbs.

You want to replace the 1,200mg of sodium you have lost from exercise per 2.2lbs of weight loss.

Competitive Performance - Triathalons, Marathons, Bike Races ect.

#1 boosting performance acutely - your strategy is different for training 3 months out before the competition - you want to do dehydration acclimation - this is a technique used for a big event a month or more in the future - you then rehydrate after the workout. By doing this on a regular basis you create a metabolic adaptation.

Improve performance overall later on - to **Dehydrate Acclimation** only drink when you are thirsty this will leave you mildly dehydrated. When you drop body weight by 1.5 to 2% through sweat loss after your training. Doing it this way trains your body to be dehydrated acclimated. When you become this way you lose less electrolytes and you have a more dilute sweat. It evaporates faster. You literally become a better cooling machine. This is how heat acclimation

through sauna sessions works as well. You rehydrate with 1,200mg of sodium per liter of fluid loss. 1,200 mg of sodium per 2.2 lbs (1 liter) of weight lost through sweating.

For the competition you do salt loading for the event. Consuming salt and fluids 90 minutes prior to the event. This will dramatically boost blood volume and increase performance. You don't do the high salt all the time - Only after you have been doing the dehydration acclimation for a while - you do it for the event.

If you are looking to acutely improve performance drink between 3,000 to 4,300 mg of sodium in 27oz to a full liter 33oz of fluid. Start drinking these fluids 90min before competition and slowly drink those fluids for 30 to 60 minutes add 1tsp of Glycine to improve the absorption of sodium and to lower body temperature.

Power output is increased dramatically by doing this - a 25 to 50% increase in how long you can do vigorous exercise. You experience dramatic reductions in feeling dizzy and in weight training you increase the number of reps and increases in power output. This study increased blood volume by 4% in cyclists - it was a 15min time trial in cyclists they were able to cycle a full kilometer longer in 15min. By preloading with salt and fluids. That was a 10% increase in power output.

Getting near fatigue - or till failure you will increase muscle growth and strength

Sauna and sweat:

You lose minerals when you do a sauna - you can lose 1.5mg of copper in a liter of sweat loss in a Sauna. You also lose 70mcgs of chromium and 150mcgs of iodine per hour of sauna - you also lose selenium, chromium, magnesium, calcium all the electrolytes you need.

There are huge benefits of sauna - you can do 4 sessions of sauna a week. Heat acclimation caused a gain of 4 minutes of vigorous exercise - its a heat acclimation. You have to reach an internal heat of 101 degree's.

2 to 3 weeks of sauna can give you the benefit of heat acclimation. Do a sauna every other day to maintain the heat benefits.

The benefits of alkalizing

Lactate is a good molecule - it buffers acid. You use it as a fuel when you exercise. When you vigorously exercise you go anaerobic and produce a lot of hydrogen ions because ATP demand exceeds supply. When that happens you basically retain acid.

If you get ahead of the problem like you do with salt solution - you reach peak alkalosis which is essentially boosting your bicarbonate levels decreasing acidity in the blood. You can dramatically increase performance by alkalizing, this is because many of the enzymes in the mitochondria are pH sensitive as the cell becomes more acidic. Becoming more acidic shuts down those enzymes and will shut down the production of ATP in the muscles causing the muscles to essentially cease to work.

You can buffer the pH of the body by adding Sodium Bicarbonate or Sodium Citrate (*Sodium Citrate is preferable - you can order the powder online*) You can breathe out acid but you still will deplete sodium bicarbonate. If you are eating a high meat diet this is very important to get more alkaline.

Purchase pH testing strips (*Nitrazine paper*) - use this to test your pH. levels.

A 7.4 urine pH is a good urinary pH - don't do it first thing in the morning - but wait 4 hours after breakfast. This is a good time to check your pH.

If your urinary pH is 6.8 or less you most likely are holding on to acid.

You can use citrates also to alkalize your pH - they bind to oxalates - oxalates are a hidden source of many diseases such as kidney stones. Oxalates are found in many vegetables such

as Kale, Chard, Rhubarb, Beets. When you eat them consume lemon juice in water - lemon juice is rich in citrates which carry oxalates out of the body.

Magnesium Citrate, Calcium Citrate are ways to help raise your pH. Again lemon juice is high in citrates. Sodium citrate you can get your pH more alkaline without upsetting the stomach.

It takes longer to get you more alkaline you should dose sodium citrate - 1 tsp. 4 hours before exercise - take it with food with 25 grams of carbs - 4 hours before performance. 5 grams of sodium citrate (1tsp.) A person on a carnivore diet (all meat diet) should take 5 grams - 3x a day.

Gerosteiner water is very alkaline

Eating a baked potato with steak will balance the low pH of the steak.

Protein intake

The RDA for protein is too low. Elderly people should consume more protein. The optimal peak is 1.6 grams of protein per kilogram body weight . That's the maximal protein threshold. An example: 150lb person = 68 kg. = 109 grams of protein. 1 Kilo is = to 2.2lbs.

In weight loss programs high protein diet persons lose more weight.

Seniors need more protein - it reduces the risk of frailty - 0.7 to 1.2 grams of protein per kilogram of body weight.

Protein intakes for Athletes:

30 grams of protein 4x a day for athletes - even more for weight training - for muscle protein synthesis.

Recovery for exercise - high dose fish oils - 4 grams a day will make a big difference in muscle soreness.

Beet root juice - increases Nitric Oxide and increases blood flow to the muscles.

Cool water recovery for the muscles:

Submerging the body in cold water - head out of water recovery - below 64 to 84 degree bath is a very effective technique. The cooler the shorter time needed for recovery. Do not go below 64 degrees though.

Cooling the body with the glabrous skin - the palms of the hands and soles of the feet the ears and the cheeks (hairless parts of the body are the glabrous skin) when soaked in cold water cool the body faster - this is why soaking the feet in cold water works to cool the entire body - much better

Cooling the glabrous skin - use water - putting your palms and the soles of the feet in 30min of cold water. 64 to 84 degree water is best to cool the body - 64 degree water 20 to 30 min will cool the body.