

## Special topic: Note #6

### Special Topic on Hydration and Dangers of Dehydration

#### R2RC Presents Hydration Hacks

**Dehydration is the number one reason that people SAG on the MS-150**

**The most important guideline is to DRINK before the ride, DRINK during the ride, DRINK after the ride but not just WATER!**

How much should I drink? That depends on you. Everyone is different. Read this article. It is from Cyclist magazine which is aimed towards racers, but the principles are the same.

<https://www.cyclist.co.uk/in-depth/how-much-fluid-should-you-drink-when-cycling>

**Here is another great article about dehydration. You may learn some things that surprise you but hopefully will help you.**

#### Dehydration 101 by Robb Wolf

"Dehydration means net water loss from the body. If you're losing more water than you're taking in, you're [considered dehydrated](#).

"Dehydration is often conflated with hypohydration, the low body water state that results from net water loss. Most people, when they talk about dehydration, are talking about hypohydration. Because of this, I'll be using the terms interchangeably.

"There are three main types of dehydration:

1. **Isotonic dehydration:** When sodium and water loss occur roughly equally. This is the most common form of dehydration—think sweat.
2. **Hypertonic dehydration:** When water losses exceed sodium losses. (Respiratory water loss, for example).
3. **Hypotonic dehydration:** When sodium loss exceeds water loss, mostly due to diuretics or regimens (like the keto diet or fasting) with a diuretic effect.

"Contrary to popular belief, healthy people are rarely dehydrated. Older people are slightly more likely (20-30%) to suffer low body water due to problems regulating thirst, diuretic drugs, and mobility issues—But widespread dehydration isn't really a thing.

"This wisdom hasn't yet penetrated our medical system. Let me share a quick story to illustrate.

"A few years ago I met with the dietetics staff of a medium-sized hospital. Super well-intentioned people, but too focused on chronic dehydration. They thought that drinking more water was the crucial intervention for their obese and diabetic patients. When I asked them how that approach was going in terms of patient outcomes, things got a little... tense.

"I'm not saying that dehydration is never a problem, but I am saying it's a smaller problem than is commonly believed. The logical next question is: how do you know you're dehydrated?"

### **Dehydration Symptoms**

"One way to check for hypohydration is to draw blood and measure its osmolality. If the concentration of electrolytes is high, you might be dehydrated. But not only is this test imperfect; it's also highly impractical.

"[Clinicians](#) also look at weight loss. Losing 3% of your body weight over 7 days might indicate dehydration, but it could also indicate water loss from glycogen depletion (if transitioning to keto or fasting) or fat loss. Not a great test either.

"That leaves you with symptoms. Individually, each symptom of dehydration (like headache) has dozens of potential causes. But if enough symptoms come together, it strengthens the case that you're dehydrated.

### **Dehydration Symptoms**

- Thirst
- Dry skin and lips
- Dark urine
- Decreased urinary volume
- Headache
- Mood and memory disruptions
- Muscle cramps
- Fatigue
- Constipation
- Lower blood pressure
- Nausea

- Dizziness or fainting
- Rapid heartbeat (tachycardia)

"The last few symptoms—low blood pressure, dizziness, fainting, tachycardia—are associated with severe hypohydration, sometimes [defined](#) as over 5% body water loss.

"As I mentioned earlier, some dehydration symptoms—headache, fatigue, and muscle cramps—mimic the symptoms of hyponatremia. Mixing the two up, however, can be hazardous and even [fatal](#). If you want to exacerbate hyponatremia, just give the patient sodium-free water.

"Anyone can mix up these symptoms though. So at the end of the article, I'll provide a simple hydration strategy to address both dehydration and hyponatremia. No osmolality measurements needed.

### **What Causes Dehydration?**

"There are four main causes of dehydration:

1. Losing water through skin
2. Losing water through the GI tract
3. Losing water through urine
4. Inadequate water intake

"Let's briefly review these.

#### **#1: Water loss through skin**

"When you sweat, you lose both water and sodium. This leads to isotonic dehydration.

"Both warm and cold climates increase sweat loss, and therefore increase dehydration risk. It's obvious why you sweat more in the heat. Sweat is how your body keeps from overheating. Without it, humans wouldn't have survived long as a species.

"Cold climate sweating is less intuitive, but think about it: once you start moving, you get hot and sweaty under those layers. Not only that, our thirst mechanism isn't as accurate when we're cold. Read my blog on [winter hydration](#) to go deep on this topic.

"Other factors affecting sweat loss include:

- The intensity of exercise
- If there's a breeze

- Humidity
- Various medical conditions—including hypoglycemia (low blood sugar), hyperthyroidism (overactive thyroid), and acromegaly (excess growth hormone)

"The more you sweat, the more likely you are to become dehydrated.

## **#2: Water loss through the gut**

"You lose water out both ends of the GI tract. If you have an infection that causes vomiting or diarrhea, it's crucial to continually replace both fluids and electrolytes. Also, certain drugs—along with excess magnesium—can have a laxative effect. These fluids will need to be replaced too.

## **#3: Water loss through urine**

"Your kidneys are the key organs for [regulating bodily fluids](#). If body water gets too low, your kidneys absorb more water through specialized cells called nephrons. If body water gets too high, the kidneys increase urinary volume.

"In healthy people, this system works fantastically. (Not so much in those with kidney disease). And it's not just the kidneys, but the brain, a bunch of hormones, and the thirst mechanism that keeps things running smoothly.

"Anything with a diuretic effect, however, may throw this system out of balance. This includes not only diuretic drugs, but diuretic eating patterns like the keto diet and intermittent fasting.

## **#4: Inadequate water intake**

"Thirst is an excellent guide to hydration needs. Below the conscious threshold, osmoreceptors in your brain are always monitoring your body water. When water gets too low, the osmoreceptors ping your hypothalamus to activate thirst. Now you're consciously thirsty.

"Drinking to thirst is usually sufficient to prevent dehydration, but here are a few situations where it might not be:

- [Activity at altitude](#)
- Exercise that causes excessive sweating
- Impaired thirst mechanism due to age-related disease

"Older folks, [in fact](#), run a higher risk of dehydration than everyone else. This is partly due to less effective thirst mechanisms, and partly due to immobility. If you can't get up for a drink of water, you're more likely to become dehydrated.

### **How Not To Rehydrate**

"Dogma holds that you should drink eight glasses of water per day to prevent dehydration. It's the poster you see hanging up on the middle school guidance counselor's wall.

"But you won't find any scientific references on that poster. There simply is no evidence supporting 8-glasses-per-day.

"In fact, the [evidence](#) goes the other way. The evidence says that drinking too much water is the real problem for folks, especially [elite endurance athletes](#). Why? Because drinking too much water dilutes blood sodium levels. It causes hyponatremia.

"I talked about this earlier. Exercise-associated hyponatremia is serious business. Many athletes have died from low sodium levels, but none—[according to MDAlert.com](#)—have died from dehydration.

"Even so, organizations like the American College of Sports Medicine (ACSM) continue to [recommend](#) aggressive fluid replacement tactics. They're a big reason why you see water stations every couple miles of a marathon course. And they're a big reason why so many distance runners end the race in a lethargic, discombobulated state. (Cognitive symptoms are a hallmark of hyponatremia).

"The average person won't develop severe hyponatremia, but I see plenty of subclinical low sodium that results from:

1. Drinking too much water
2. Not consuming enough sodium

"We can fix both those problems with a little knowledge and preparation.

### **Hydrating With Electrolytes**

"If you care about your health, you need to hydrate the right way. That means including electrolytes in your hydration strategy.

"Sodium (from salt) is the crucial electrolyte to manage. I just talked about what happens when sodium levels drop too low, but folks also tend to be deficient in potassium and magnesium. Both these minerals have dozens of crucial functions, so I recommend optimizing those as well.

"Here are some science-backed daily electrolyte intakes (diet and supplements combined):

- 4–6 grams sodium
- 3.5–5 grams potassium
- 400–600 mg magnesium

"Active, sweaty, and low-carb folks should probably bump up the sodium by a gram or two. A sweaty athlete can lose up to [7 grams of sodium](#) while hustling in the heat.

"To meet your electrolyte needs, consume [electrolyte-rich foods](#), be generous with the salt shaker, and put electrolytes in your water.

"Put electrolytes in your water? Yes. Putting electrolytes in your water—and drinking that electrolyte water to thirst—simultaneously prevents dehydration and hyponatremia. We recommend mixing your own [electrolyte homebrews](#) or using [LMNT](#) or an equivalent product."

Getting over heated and dehydrated takes the fun out of riding. So take your hydration seriously. You will ride better, feel better, ride longer more comfortably when you are hydrated properly.

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