

Hydration and Performance

Dr. Todd Stebleton

All right, so as Dr. Stark mentioned, my name is Todd Stebleton. I'm a certified clinical nutritionist and a certified personal trainer. And I got into nutrition out of necessity. I work with athletes. I work with movement. That's really my background is in the movement industry.

And as I started working with individuals and having some success, the cases that were presented to me became more challenging as time went on. So as you can imagine, when I first started with somebody, maybe their goal was to lose 10 pounds.

And as I had some success, then perhaps somebody was referred to me who wanted to lose 10 pounds but also had knee replacements a year ago. So there was a new level of challenge. And then after that, it was that same person but also had type 2 diabetes. And so as time went on, and as I became more successful in helping people, the presentations became more and more difficult.

One of my undergraduate degrees is in nutrition and dietetics. So I had a foundation for nutrition, but certainly not enough to really help anybody. And that's when I started to seek out some further education in the science of nutrition and essentially in '04, '05 acquired the CCN.

So nutrition has become a massive part of my life in terms of practice and working with individuals over the years, most recently, maybe within the last 10 years.

I'm not sure if your mic is on.


It's not on. Thank you.

OK. Mm-hmm.

So today we're going to talk about hydration. And hydration is not really a sexy topic but critical. What we're going to learn is that hydration is the consequence of good lifestyle. Hydration is the consequence of good lifestyle.

So it's difficult necessarily to work on hydration. I've mentioned this in previous presentations with different topics, particularly in the heart of posture. We don't work on posture. You earn posture through good lifestyle habits. So posture is a reflection of lifestyle, as is hydration.

Just like in sports, we don't work on winning. You work on the things you need to do so that you're more likely to win. And we're going to find the same thing is true of hydration. Although we can turn hydration around fairly quickly with some good changes in lifestyle behaviors. It certainly is more than drinking water, although that's part of it.



In my opinion, the degree of one's physical, mental, and emotional health is dependent on hydration status. If you want to see every system in the body fail quickly, get dehydrated. And things fail quickly.

So hydration is more or less the governor of health. Yes, there's many other variables, probably more than we can imagine. But hydration is certainly one of those indicators that's going to determine our degree of health.

Water is a carrier. It's a carrier for us. And when I was doing some research on this a handful of months ago, the verb "to water" really means to encourage health or growth. It doesn't necessarily mean to add H₂O. It means to encourage health and growth.

Water is the most abundant source on earth. It's approximately 70% of the earth. As with all living organisms, when humans are born, we're about 70% water. Pretty much all other living organisms are the same thing. We're predominantly water.

And what we're going to find is we are conduits of energy. We can think of water as being a great electrical conduit of energy. That's essentially what we are.


So as we get into water and hydration status, when we measure hydration status, we're actually measuring energetic status. The more energy a person has, the more hydrated they are. Or, better said, the more hydrated somebody is, the more potential they have for energy.

These are some basic signs of dehydration. The first signs that you're going to see are actually the same signs as toxicity, as published by the Journal of Clinical Chemistry in 1996. And these things include headaches, digestive distress, confusion, anxiety, sleep disturbance, allergy symptoms, and fatigue. Fatigue, of course, being low energy. Chronic inflammation or pain are another strong indicator for dehydration.

The Mayo Clinic suggests some other symptoms that are more easy to recognize for dehydration - dry skin, dry mouth, dark circles around the eyes. Now, as a clinical nutritionist, when I see dark circles around the eyes, I think of toxicity. But are they the same? Is toxicity and dehydration the same? Is inflammation and dehydration essentially the same? Is acidity and dehydration essentially the same? Dark urine, constipation, or hard stools, dry mucous membranes, sinus infections, dizziness, lightheaded, fever, and so on.

So when we look at hydration, when we look at how to hydrate, it's simply an understanding of why we dehydrate. So these are going to be the three things, the three takeaways, for today. If you want to improve hydration status in the body, we work on nutrient density, we work on body composition, and, lastly, water intake. Water intake still matters.

But if you want somebody to get hydrated, encouraging them to drink more water is not necessarily going to hydrate them. And we'll learn why as we go here.



One key takeaway is that water follows nutrients. Water follows nutrients. In other words, where there are nutrients, there is water. Where there is not nutrients, there is not much water.

We can look at this with soil. If we look at the areas of the world where there is the greatest amount of nutrient density, we can think of some of the different rainforests. And we find that there is a tremendous amount of water there, hence the term rainforest. When we look at the soils around the world where there's the least amount of nutritional value, such as desert climates, we find that they are very dry. Water and nutrients go together. Where there is one, there is the other.

We're going to learn in a little bit that as water is moved throughout the body, it has a tendency, it has a strong affinity to bind with hyaluronic acid, which becomes a carrier. And that is essentially how we are going to get nourished by moving water into the cells through an enzyme called hyaluronidase. But it's the binding of water with other nutrients that is the key.

Water resides primarily in soil and in rock. Volcanic soil is where we're going to have our greatest nourishment opportunity for plant growth. Why? It's the most nutrient dense, and it's well hydrated. It holds onto water because it's nutrient dense. So soil and rock are really the primary home for water.

The more nourished the body, the greater the ability to hold and move water. To hold and move water. The movement of water is critical. Having a lot of fluid inside of your body is not the goal. We could call that edema. But edema is not necessarily hydrating. It's a holding of fluid. But also the ability to move water across cell membranes is where we get hydration. And we're going to talk about that movement in a little bit.


When we look at body composition, this is more critical than we might think. People with a better body composition are better hydrated, period. People with poor body composition struggle to hydrate. Yes, there are other variables. But that is a very solid, reliable predictor of hydration.

Muscle contains 70% to 75% water by weight. So if we look at somebody's muscle mass, 3/4 of it is water by weight. Muscles are generally considered the storage components for nutrients.

Nutrients are stored in muscle tissue. Water follows nutrients. Therefore, muscle has an affinity for water so much so that the majority of its weight is actually water. Fat, on the other hand, has very little nutrient storage capability, but it does have a high degree of toxin storage capability.

We tend to store our toxins in our fatty tissue. 95% of environmental toxins are fat-soluble. So as people become more toxic, they either clear those toxins, if they're healthy enough, or they store those toxins in fatty tissue to deal with it on a day when they have the wherewithal to do it.

Fat is only 10% to 15% water by weight. That means that as people become progressively fat, they become progressively dehydrated. Does that make sense? As somebody improves their



body composition, you will see their hydration status improve regardless of water intake. As body composition improves, hydration status improves regardless of water intake.

One reason that overweight people have a much shorter life expectancy-- one of many, of course-- is that they cannot sustain the energy required to maintain normal physiological function. When we talk about the ability to maintain energy, we're also talking about hydration, as I mentioned earlier. The ability to create energy is dependent upon our hydration status.

Water intake. Drinking more water does not necessarily hydrate a person. We need to look into this deeper. So today, it's different than how it used to be. Our waterways, our water systems, our purification process, how water's delivered to our homes, we consume it differently today. Water is different than it used to be.

So today our water, as we know, has become quite toxic, so toxic that it's actually changing the structures sexually of those creatures who live in the water. So as the Mississippi flows into the Gulf, we're finding that many of these male fish are becoming feminized because of the estrogenic compounds. And many of the female fish are not able to reproduce because of estrogen toxicity from the water.


So what is happening is that as our water is becoming poorer in terms of health, as it is becoming more toxic, we need to filter it in order to create safety. So every major city has major filtration process. Many of us want to filter our water even more so, because we've seen on the news and other places that the amount of flame retardants, estrogenic compounds through things like pesticides and so forth are still getting into the water systems, even in nice places like Bloomington, Edina, Richfield, and so on.

So often what we're doing is what's called reverse osmosis for our water. And reverse osmosis is perhaps the most aggressive form of stripping water. So it's basically left with just H₂O. But remember, water originally is full of nutrients, particularly minerals, because it flows through rock, flows through soil. Water and minerals bind together.

So when we filter our water like with reverse osmosis technology, we are stripping out all of the bad, but we're also stripping out all the good. So people are drinking unnourished water. They're getting wet but not necessarily nourished.

So one of the things that will be a big takeaway for you when dealing with yourself and your loved ones, patients, and so on is that we want people to drink water that's very nourishing. And so we can do that simply by adding back some minerals that were once there. So we're not doing anything tricky by adding into it. We're just replacing what was already there. And we can do that with some real simple minerals.

We're going to talk a little bit today about how water gets into cells, which is where we get hydrated. I have a video coming up, and rather than me just kind of repeating it, I was able to



draw on a little whiteboard-- which is a little hard to see because of some glare, but you'll get the idea-- of how a person actually gets hydrated. And you'll see that in order for that to happen, we need water, because we need to drink water. We also need nutrients to activate certain enzymes to carry water and also to move it into the cells. And then of course we need healthy cell membranes where most of our enzymes reside in order to govern what gets in and out.

Tissue health can govern hydration status. I would also like to add that hydration status can govern tissue health. We move water through fascial tubules, through our fascial system. Fascia in this country is-- or, I should say, understanding of how fascia works in this country is light significantly compared to other countries. We think of fascia as connective tissue, and it is. But that's a small portion of what fascia does.

Fascia is actually an extension of our brain, and it goes everywhere in our body. There is nowhere that there isn't fascia. There is no beginning, and there's no end. It's not like a muscle where there's an origin and insertion. There's no beginning and end to it. It's a web that penetrates our body. It doesn't just go up to the spine. It goes through the bone tissue of the spine. It is a web that penetrates anything and everything. That is where we carry water. That is also where we carry messages and other forms.


In the movement industry today, we talk a lot about this. Especially with things like yoga, we talk a lot about mind-body connection, the mind-body connection. I'm here to tell you there's no mind-body connection, because there's no way it can be disconnected. Mind and body are the same thing. And it's the same thing because it's fascia.

And I bring that up because fascia is our delivery mechanism for fluid. So as somebody improves hydration, they improve their health. When people are bound up-- think of foam rolling, think of adhesions, right? When your tissues are bound up like this, you lose flow. You lose energetic flow, whether that be through blood, water, hydration, whatever the case might be.

As you improve the tissue compliance, you improve flow, right? It's like unkinking a hose. So as people improve their tissue, they improve their hydration. And as people improve their hydration, they improve their tissue. It works together.

So when we see people who are dehydrated, we see them have poor tissue compliance. Just imagine in your head that 66-year-old lifetime smoker. They look dehydrated, don't they? You can see it in their face. And if they drop something on the floor, and they bend over to pick it up, they're stiff. I have never seen a chronic smoker who's flexible. Their tissues are dehydrated and stiffened. As you dehydrate, you stiffen. OK? So tissue health and hydration status work together hand-in-hand.

Water that sits tends to breed infection. So when we talk about getting water inside the body versus hydration, they're different, which we're going to see in a second. But if we lack the



nutrients and if we don't have good tissue compliance to move fluid or water more specifically into cells, water sits.

In this video that I'm going to show you, that fluid in between cells, I refer to as extracellular water. In textbooks, more commonly, that's referred to as interstitial fluid. It's the same thing.

So as water sits there and becomes stagnant, becomes a breeding ground for infection, imagine your local ponds. Right? If a pond's fluid is stagnant, especially as it gets warm outside, we get a growth on top of it, and it becomes a very toxic environment. So typically the solution can be either dump a bunch of chemicals in it or we put a mechanism in there, like a little waterfall feature or something, that just moves the water. So that water motion, that water movement decreases an opportunity for an infection.

I was doing this presentation for a group related to cancer a few years ago. And as I was researching this concept of moving water from outside the cell to inside the cell, which is called your primary respiratory mechanism, by the way, I was also starting to see that the nutrients that activate the enzymes to do that are the same nutrients that we're finding are very anti-cancer, or very good at the prevention of cancer therapy. And I found that interesting. And I continued to look into that more. There's some real good relationship with what's happening between cancer, hydration, and the nutrients that are involved in both.


So as you're going to see in this video, I'm going to talk about polymers, which just means many parts, and how polymers break down to create hydration or to create movement across cell membranes. And that's essentially driven by hyaluronidase, which is an enzyme found in cell membranes. So here's that video.

Hi, guys. This is Todd with Real Active Wellness. Thanks for joining me again. We're going to take it to the next level when we talk about hydration. So there's a Hydration 1 video. This is Hydration 2.

Talk a little bit more about the biochemistry. So for those of you science enthusiasts, you're going to find this pretty fascinating.

When we look at hydration, what we need to do is we need to take the water that's in the body and move it into the cells. So the body is composed of hundreds of trillions of cells, and water lives inside the cells. That's called intracellular water. It also resides between all the cells. We call that extracellular water. The ratio of these two things are the greatest indicator for current health status.

The reasons that water shifts from inside to outside the cell, which is referred to as a negative fluid shift, is when our health becomes compromised. This could be because of toxicity. It could be because of inflammation. It could be because of acidity, lack of nutrients. There's a number of other variables. But these are probably the big three players.



We can measure that for less than \$1 using an FDA-approved clinical device. It's absolutely fascinating data. And then what we do with that data is we can help shape someone's nutrition, lifestyle, exercise program.

We should see about 60% of the water on the inside of the cell, 40% on the outside of the cell. If we see water start shifting out of the cell, we need to get it back in.

But let me tell you how it works. When we look at the cell membrane, we have a tubule here. And this tubule is made of fascia. And in order for the water to get inside the cell, it needs to go through this fascia chamber, this fascia tubule.

Now there's an enzyme right here, as the entire cell membrane is full of enzymes. They're more or less the gatekeepers of what gets in and out. The enzyme here is called hyaluronidase.

Now, when we hear this word-- "ase," by the way, means enzyme. But when we see this word, some of us might be thinking of hyaluronic acid, which we see in a lot of facial products to help with anti-aging and so forth. So if you buy those really nice moisturizers, chances are good it's going to have a lot of hyaluronic acid in it.


And the reason for it is because this enzyme, when activated, pulls, or at least allows, water to move into the cell. That's the gatekeeper for water displacement in and out of the cell.

Here's the coolest part about this. If you saw in my Hydration I video, I talked about how nutrient density is a critical factor to how hydrated one can become. Just like all other enzymes, this enzyme is highly dependent on nutrients to become active. When there's enough nutrients, it becomes active and will take this polymer, which is made up of many elements, and it will pull H₂O out and move in only when this enzyme is active. And that enzyme, again, is driven by certain nutrients.

As soon as those nutrients are depleted, it pulls the water back out along with the toxins and the inflammation and the general debris of metabolism. And so you have this really nice feeding, get rid of the waste, feeding, get rid of the waste. This, by the way, is called your primary respiratory mechanisms. It's how our body breathes without our lungs and our sinuses and so on.

So hyaluronidase is driven by nutrients, and those nutrients are the same nutrients that are found in our soil, which is where water comes from. So if you want to significantly improve your hydration, what you need to do is take a good clean water, reverse osmosis or some sort of filtered water, and you need to add back the nutrients that were originally part of the water structure. When we filter water, we not only remove the toxins, the bacterias, things of that nature. We also remove the good nutrients.

And then we start to make ourselves wet, not hydrated. Adding a pinch of a pink Himalayan sea salt or sometimes blue, sometimes gray, depending on what region of the world it came from,



will give you the nutrients that you need, that originally came with the water actually, to activate hyaluronidase so that you can actually hydrate rather than just stay wet. Activating this enzyme is critical.

The better you do that, the better you feel. That's how you hydrate. So that's some of the biochemistry of hydration. I hope--

OK, so I mentioned in there adding some sort of sea salt to your purifier cleansed drinking water. And this is maybe the least expensive yet most effective way to improve hydration as it relates to drinking water. Remember, there are other ways that we need to consider improving hydration, like improving body composition, and so on. But as far as consuming water with the intention of hydrating, adding a good quality mineral substance-- you can find these minerals in liquid drop forms. You can find in a good quality sea salt. This particular sea salt is very rich in sulfur. So as you can imagine, it smells like rotten eggs. But it's super nutrient-dense. So that allows us to move water into cells more effectively.

I want to point out that if somebody really wants to hydrate, what we really want to do is improve people's health status. Right? So there's a few students in here that went through a systemic detoxification protocol recently. And what we're going to find is that when people go through a really good quality detox, everyone's going to get more hydrated. And we can measure that.


And the reason that they get more hydrated is that instead of the water surrounding the area of toxicity, it can be used for other things. It can be used for other things such as working on developing ATP and so on. Which is another reason why people's energy improves as they get rid of toxins in the body.

So if somebody is having chronic inflammation, which is a large percentage of our population, it's difficult for them to have the hydration benefits. There's a nice saying that many of you have heard. I've heard over the years. It says the solution to pollution is dilution. The solution to pollution is dilution.

So when people are polluted or inflamed or acidic-- I think all three of those are essentially the same. When people are dealing with toxins, inflammation, and acidity, they will dilute that environment. In other words, they will move water from inside the cell to the outside of the cell where they can dilute this environment.

So if that is the case, which it often is, doing something as simple as adding a good quality sea salt is not necessarily going to fix their inflammatory toxicity or acidity problem, right? So there's more to it than water consumption.

As I mentioned earlier, hydration status is really the overall indicator or one overall indicator of health status. As people get more healthy, they become more hydrated.



Now what I want to talk about, or transition to, is moving from general health and lifestyle to more rigorous situations like an athlete's athletic performance. Because you can take a very healthy athlete, who has great body composition and, in general, good hydration status, and they can become dehydrated in a short amount of time through exertion. OK?

We also must realize that in a very short amount of time of high-intensity exertion, we are building acid very quickly in the body. And we will be diluting that polluted environment by shifting water from inside to outside the cell very quickly. It's generally not a lack of fluid in the athlete's body. It's where the fluid is.


So one of the things I'm going to recommend for all athletes that push themselves to the point where dehydration becomes a possibility is that they do a lot of good alkalizing components into their diet, pre-, during, and post-stress, post-exercise. Pre-, during, and post-event. Are you with me on that? So things like good quality vegetable formula, like Fruits & Greens formula, something like that, that is very alkalizing to the body, will help them stay much more hydrated to buffer the acidic environment.

Endura is a product. I'm not here to sell products. I'll tell you that right now. I'm going to share a few of them with you just so you have some ideas. Endura is a rehydration formula. So it is very, very high in electrolyte content, and it is generally used for endurance athletes. In fact, the development of this product was essentially inspired for, created for Lance Armstrong.

There's also some natural sugars, such as fructose-- not high-fructose corn syrup, but natural fruit sugars-- to help create an increase in insulin to migrate nutrients into cells faster. This product in particular is very, very high in magnesium. And there's different forms of magnesium. Some forms of magnesium are not necessarily hydrating, such as magnesium citrate. Magnesium citrate is very hydrophilic. It has a high affinity toward water.

And we tend to use magnesium citrate for people that are constipated and cannot move their bowel. It will draw water into the colon. It will help their smooth muscle tissue of the digestive tract relax, and they can move their bowel very effectively with the right dosage of magnesium citrate. Whereas other forms of magnesium, such as magnesium glycinate, for example, don't respond in the same way. They help with the hydration of the actual tissues.

One of the things that we're going to learn, or that we have learned, that we can start implementing immediately-- so when we think about how we implement some of these concepts that I was talking about with hydration, oftentimes headaches are a common consequence for athletes, especially endurance athletes, during the actual event. So it could be a soccer game, hockey game, distance running, whatever it might be. Headache is a very common symptom of dehydration. The solution to that is simply magnesium. And that works for a number of different mechanisms.



I was at a strength and mass workshop with Charles Poliquin, who's probably the world's authority when it comes to strength training and programming, in Arizona a couple of weeks ago. And somebody got a headache, and that was the first thing he brought up. Here, take this magnesium. So it's a well-known, highly regarded, most importantly, clinically effective solution for headaches when we are dealing with dehydration-derived headaches.

So Dynamic Recharge Drink is a newer component. And what you need to know about this, quite simply, is that this is to help sustain. So rather than just increase electrolytes, this is also composed of branched-chain amino acids as well as L glutamine, which is the most abundant amino acid in the body and governs, to a large extent, hydration among other things. And so this is for people who are looking to prevent breakdown catabolism during exercise. The amount of electrolytes in here are not what they are in Endura. Whereas Endura is purely an electrolyte hydration formula, this is electrolyte hydration but also some of the nutrients to prevent catabolism of muscle tissue.

There are a handful of articles that I will include. If any of you would like a copy of this PowerPoint, I'm happy to share it with you. I'll just need to get your email address. Or better yet, I'll just send the PowerPoint to Dr. Tim Stark, and he can distribute that to you.

But this is just one of a few of looking into the depth of hydration, particularly as it relates to hyaluronic acid and hyaluronidase. The information that has come out about it is not new. There is new information, certainly. But finding sources like 1934 on hyaluronic acid and hyaluronidase and their roles in hydration. It's been around for a long, long time. We just don't think about it and talk about it much.