



Waterlogged: The Serious Problem of Overhydration in Endurance Sports

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"Drink as much as you can, even before you feel thirsty." That's been the mantra to athletes and coaches for the past three decades, and bottled water and sports drinks have flourished into billion-dollar industries in the same short time. The problem is that an overhydrated athlete is at a performance disadvantage and at risk of exercise-associated hyponatremia (EAH)--a potentially fatal condition.

Dr. Tim Noakes takes you inside the science of athlete hydration for a fascinating look at the human body's need for water and how it uses the liquids it ingests. He also chronicles the shaky research that reported findings contrary to results in nearly all of Noakes' extensive and since-confirmed studies.

In *Waterlogged*, Noakes sets the record straight, exposing the myths surrounding dehydration and presenting up-to-date hydration guidelines for endurance sport and prolonged training activities. Enough with oversold sports drinks and obsessing over water consumption before, during, and after every workout, he says. Time for the facts--and the prevention of any more needless fatalities.

Waterlogged: The Serious Problem of Overhydration in Endurance Sports Details

Date : Published May 1st 2012 by Human Kinetics Publishers

ISBN : 9781450424974

Author : Tim Noakes

Format : Paperback 428 pages

Genre : Sports and Games, Sports, Health, Fitness, Nonfiction, Reference

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Jordan White says

Very heavy scientifically but some incredible information. Concepts in this book are certainly not the normative for our day and age, but Noakes proves his theories time and again. Very interesting stuff.

Andd Becker says

Dr. Noakes debunks the myth that a marathon runner must drink as much as possible during a race to optimize performance and to prevent dehydration. The author points to the dangers of fluid overload. Scientific studies by Dr. Noakes and by other researchers prove conclusively that exercise-associated hyponatremia (EAH) and exercise-associated hyponatremic encephalopathy (EAHE) are caused by abnormal fluid retention in certain athletes who drink copious amounts of fluids during (and sometimes after) prolonged exercise lasting at least four hours. Athletes with SIADH (a syndrome of inappropriate ADH secretion) are predisposed to EAH or EAHE because they do not excrete fluid excess before it accumulates. Dr. Noakes advises coaches and athletes to develop strategies to prevent overconsumption of water and sports drinks. He gives guidelines for how much to drink. The American College of Sports Medicine (ACSM) adopted the author's 2003 drinking guidelines. But the Gatorade Sports Science Institute (GSSI)... The author provides a chart showing cases of EAH and EAHE from 1983 to 1998, listing age, gender, event, treatment, recovery time, and other categories.

He presents case studies in detail. There is knowledge, when reading about each life and death, that the death could have been prevented if only there had been a don't-drink-to-excess philosophy. The author describes a body of research by himself and by others, over the years, that supports the conclusion that excessive fluids cause EAH and EAHE. Additionally, he documents research that has reached incorrect conclusions.

At greatest risk to develop EAHE are female marathon runners who run a race at a slow pace for more than four hours, gaining weight from drinking to excess before and during running.

During the late 1980s there were cases of EAH and EAHE in the military because the prevailing practice was to drink before becoming thirsty.

In various triathlons and events that the author names, there have been illnesses and fatalities resulting from the misguided notion that drinking to the athlete's level of tolerance is necessary to prevent heatstroke and sodium deficiency.

The author recommends replacing overdrinking with drinking only according to thirst. In this way, EAH and EAHE can be prevented. There will be no deaths from possible incorrect diagnoses of dehydration and consequent inappropriate treatments with fluids.

Gatorade lovers might argue that the oversupply of hyponic fluids (sports drinks) containing electrolytes can prevent EAH. But there is no evidence for this view.

I received this book free through the goodreads FIRST READS program.

Jeannie says

I heard that this book was an easy read. That's funny. I don't think so and it is a lot boring, at least it was to me. I agree with what it said however. The idea of drinking several ounces of water prior to a marathon and

then drinking at every aid station that is 1 mile apart is definitely way too much!!! It talked about the history of what athletes would drink or not drink at events, which species of animals sweat, which don't and why, salt balance in the body, sports drink industry and their changes and the book explained terms that I have never even heard of like EAH (Exercise Associated Hyponatremia! Good to know. I of course will say sure, every runner should read it, good info to know. But, it was not an easy read.

AJ says

This is a pretty fascinating read, especially if you're one of many athletes who've been told time and again to drink water copiously while exercising. I've heard reports about hyponatremia but always assumed it was because of inadequate sodium intake, and this book explains how that is not the case. Noakes goes through an incredible literature review in this book and lays out the evidence that hyponatremia is caused by consuming too much water. At times this book gets very repetitive, the biology terms are not always well defined for the layperson, and the use of acronyms gets extremely confusing (especially in the case of EAPH vs EAHE). I think a much shorter book more tailored to laypeople would be a great resource for runners. It's too bad the overall message of this book has been ignored and continues to be ignored in the US.

Peter says

A very thorough and readable book on a subject of importance to any endurance athlete. Read this and you will have a whole new understanding of how to drink and eat for running, cycling, or triathlon races. I am not spoiling it by saying that more people suffer from over-drinking in races than from not drinking enough. There is a lot of detail here, but it is well presented. You will never view Gatorade the same again.

Stephen Redwood says

It's hard to imagine a more detailed account being written of what happens to hydration, salts and carb levels during prolonged exercise. A full description of how we evolved to cope with heat and low hydration sets the scene (we are a lot more efficient than other mammals and our brain shuts us down before dehydration kills us). Then an exhaustive analysis of past research and the author's own research shows how the guidelines pushed by Gatorade and other sports drinks producers can lead to fatal over drinking (producing Exercise Associated Hyponatremia). Noakes' guidelines are blessedly simple: drink only as thirst dictates, take in carbs during long events, no need to take in extra salt (the body keeps a homeostatic balance that you are not going to break through in even an ultra event like an Ironman). There's a lot of repetition and it's a long read, but the central messages are important and worth understanding for any serious endurance athlete.

Keith says

I've been itching to read this book ever since it was published last year (2012), but I didn't want to buy a copy because, after all, how often do I need to read about the bad advice so often given to drink water to excess. Now that I am taking an Anatomy and Physiology class (Principles of Anatomy and Physiology With A Brief Atlas of the Skeleton, Surface Anatomy,) my interest got high enough to hunt it down. The Flagstaff

Public Library was kind enough to buy a copy at my request. I only had to read a little to decide to award it 5 stars because of 1) it's crucial importance, 2) Noakes writing style is delightful, and 3) the research is there to back up what he says.

Once I finally got this book in hand, I didn't want to put it down.

I've finished the book. I will not attempt any comprehensive summary because I could not do justice to it with a summary. There is way too much in here for me to summarize.

Before reading it, I thought it was simple: 'Don't drink too much.' It turns out to be much more complex than that. It is the story of the development of the sports drink industry, of a drink made with common household ingredients: Sugar, salt, and a dash of lemon. It is a story of marketing mixed with bad science, obfuscation more marketing, more bad science, and more obfuscation, repeated endlessly. It is a tale far too familiar - that when you look closely, the same pattern can be found throughout the centuries. A familiar example from a past century is the battle to get doctors to wash their hands. And, by the way, the danger from drinking too much Gatorade, or other sports drink is the same as the danger from drinking too much water. Drinking more Gatorade when over-hydrated, will make it worse. More sodium in the diet does not help either. Not everyone is at equal risk either. (Read the book)

I am astonished at how persistently the repetition of these falsehoods extended over 30 years. Even now, recommendations about exercise performance, hydration, dehydration, and the medical treatment of collapsed runners cling to a version of the hydration myth. It wouldn't be quite so bad if medical personnel knew how to treat collapsed runners, but because of the breadth of the misinformation campaign, deaths have followed the application of exactly the wrong medical treatment. (The correct treatment for severe cases is injection of a hypotonic solution.)

That little summary does not do justice to the detailed tale of how this condition became the major health risk for amateur endurance athletes. (Professionals are not at the same risk.) (Read the book.)

Appendix A: Deaths from over-hydration; Many or all are detailed in the text

Appendix B: 31 pages of over-hydration cases documented in the scientific literature

Appendix C: 2 pages of heatstroke cases documented in the scientific literature

32 pages of references in a small font

16 page index

Dave says

Fascinating read! This book has completely changed how I view hydration. The conclusions reached are completely against the current dogma regarding hydration and sodium intake, but the book is exhaustively researched and referenced. I now see that many of my problems in marathons and beyond have been due to over hydrating, not dehydration or lack of sodium. We'll see if following the guidelines in this book make my next ultra better.

elstaffe says

I had no idea what to expect from this book, as I (disclaimer) received it for free through Goodreads' First Reads giveaway program. I was pleasantly surprised to find that it contained an abundance of citations and facts to back up the author's claims. Not being familiar with the field of endurance sports at all, I found this book to be very informative, if somewhat repetitive.

Jill says

Intense read, full of science and it goes against basically EVERYTHING that our world is preaching when it comes to endurance sports these days. But it's thought-provoking and I think everybody who coaches athletes should read it at some point.

<http://wp.me/p1zKLL-1wp>

Lynne says

I won this book for free through Goodreads First Reads. Looking forward to reading it. Thank you.

Benjamin Espen says

I received this book for free from LibraryThing's Early Reviewers Program.

In the early 2000s, I was talking with a park ranger at the Grand Canyon. He told me he never really had to help anyone with serious dehydration in the Park. Too much water, leading to a salt deficit, was more common in his experience. Ten years later, I got a copy of this book for free. Timothy Noakes explained, at length, why that park ranger was right.

Noakes runs through a massive amount of material relating to human physiology, looking at the biomechanics of running, the hormonal signals that regulate thirst, and all of the associated research. When I first read this book in 2012, I realized I was completely in over my head. I found Noakes' arguments interesting, but I lack subject matter expertise to really be able to assess the details of his arguments. Which is a pity, because I suspect he might have a point, but it is prudent to see what the best counterarguments are, in the best Thomistic fashion.

I'm also cautious simply because this is a field with lots of axes to grind. Like Gary Taubes, Noakes is a bit of a contrarian, and in this book he claims that Gatorade is partly responsible for the idea that we need to drink all the time during exercise, in order to maximize revenues. I don't have an opinion on this. I find it possible, at least, but I'm not interested enough to find out whether it is true. And to be fair, Noakes is suspicious of Gatorade because he realized that the free shoes Nike used to send him colored his views on running injuries (p xvi).

I also don't think it matters to the core argument of the book. Which is extremely reasonable: only drink when you are thirsty. Even when you run or bike for a really long time. As evidence for this, Noakes can point to historical examples like the early and mid-twentieth century practice of marathon runners to not drink anything during the entire race (pp xiii, 38, 210), or the endurance hunting practiced in places as various as the Kalahari and the American Southwest, where you run an antelope to exhaustion and then kill it

easily (p 10).

After establishing this recommendation, Noakes looks at the etiology of exercise-associated hyponatremia (EAH) and exercise-associated hyponatremic encephalopathy (EAHE), which he believes are caused by overdrinking during endurance exercise, especially marathon running. Noakes has documented 1600 cases of EAH and EAHE in an Appendix, and he has plotted the incidence over time.

The clear implication of this juxtaposition of charts is that Gatorade is to blame. I'm not sure of this. For example, Noakes doesn't adjust the incidence of EAH and EAHE for the increasing numbers of people participating in endurance sports, which implies a gradual lessening of average fitness, or the numbers of people participating who fall below some threshold of fitness. On the other hand, Noakes does have some evidence that physicians and scientists who got money from Gatorade advocated for the drinking guidelines that he thinks are causing EAH and EAHE in endurance athletes. On the gripping hand, Noakes has some evidence that reducing the availability of fluids during races decreases the incidence of EAH and EAHE (p 303), and that the US military saw a reduction in incidence of both after fluid intake guidelines were changed (p 321).

Noakes also mentions the cases of EAH in the American Southwest, specifically the Grand Canyon, citing a 1999 paper (Backer, Shopes, et al 1999), which brings us full circle, to that anonymous park ranger I met a few years later. Despite the criticisms I have made, I think Noakes is on to something. In part, that is because his core recommendation is pretty sensible. But it is also because where he says something that outrages conventional opinion, I have seen something with my own eyes, or heard with my own ears, evidence that supports Noakes. This increases the probability he is right, but it isn't quite definitive evidence. Since this isn't my field, I'll call that close enough.

Wendy says

If you're an endurance athlete who has ever been told that you should drink before you're thirsty or that you should drink sports drinks with electrolytes to prevent your blood sodium levels from dropping too low, you should read this book. Noakes meticulously outlines the science that proves that a lot of the conventional advice given about hydration is at best useless, and at worst, potentially fatal.

It's also a fascinating look at how the combination of faulty assumptions and commercial interests can skew the interpretation of scientific research. It was actually a bit shocking to me how little we really know about the causes of heatstroke or exercise-induced cramping. Because these conditions are difficult to produce in controlled laboratory conditions, much of what we know has been based on anecdotes or on experiments with less than ideal design.

It's also a very readable book, despite the quantity of detailed scientific data that Noakes discusses. (It might help that I've got a background in chemistry, and went in knowing what "millimolar" means.) I did find that the book got a bit repetitive towards the end - Noakes rightly takes seriously his obligation as a scientist to address all alternative hypotheses and interpretations of the data, but if you're just someone who wants to know how much you should drink while running, you've probably absorbed everything you really need to know by halfway through the book.

Andy says

Awesome read - I'm doubting anyone EVER tried so hard (and succeeded) to prove a point. Charts, graphs, studies, personal experience, and interviews, all woven perfectly together.

The only downside? I shoulda read this before buying my last hydration pack;-)

Here's the 5¢ tour...

- Drink only when you're thirsty
 - If you eat a lotta salt, you sweat/pea a lotta salt
 - Cool down
 - Never trust a Gatorade
 - Relax your body will self regulate (almost) everything
-

Adam Schwartz-Lowe says

A great, very technical, description on how hydration works and the importance of not over hydrating during endurance events.

I also have never read so much about rectal temperatures, nor do I expect to in the future.
