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A CUTTING-EDGE PLAN to
FUEL YOUR BODY
BEYOND
"THE WALL"

The **NEW RULES** of
MARATHON and **HALF-MARATHON**
NUTRITION

Matt Fitzgerald
AUTHOR OF *Racing Weight*

Foreword by **KARA GOUCHER**, two-time Olympian,
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LIFELONG BOOKS

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PRAISE FOR **MATT FITZGERALD**

“Nutrition is a proven key to success in endurance sports yet the correct approach is often neglected and misunderstood—and the consequences can be devastating to both performance and health. It is extremely refreshing to see the applications of years of sound sports nutrition research spelled out in a precise, comprehensive, and easy-to-read fashion. *The New Rules of Marathon and Half-Marathon Nutrition* is a must-read for beginner and elite-level runners.”

—Kimberly Mueller, MS, RD, CSSD, sports dietitian, owner of Fuel Factor Nutrition Coaching, and elite marathoner

“Finally, a short-cut to avoiding the wall! Matt Fitzgerald has the recipe for fueling for a peak performance. All runners will find this book informative and enlightening with advice that will immediately make a difference in training as well as racing.”

—Greg McMillan, renowned running coach and creator of the McMillan Running Calculator

“I highly recommend reading *Racing Weight* even if you don’t need to lose any excess poundage. You’ll come away with a better understanding of your physiology and also of food.”

—Joe Friel, founder of TrainingBible Coaching and author of *The Triathlete’s Training Bible* and *The Cyclist’s Training Bible*

“*Racing Weight* answers the difficult questions athletes often have about dieting, including how to handle the off-season. The book gives readers a scientifically backed system to discover your optimum race weight, as well as five steps to achieve it.”

—*Triathlete* magazine

“Reaching an ideal weight for endurance sports is important, but doing it the right way is even more important. Matt Fitzgerald provides scientific and sound advice for anyone trying to achieve the ideal racing weight.”

—Scott Jurek, author of *Eat and Run*, seven-time winner of the Western States Endurance Run, and two-time winner of the Badwater Ultramarathon

“Fitzgerald is a fountain of information on current research studies and findings from the sciences of healthy nutrition and exercise performance.”

—*Ultrarunning* magazine

“Even if you are already a lean machine, you’ll likely still learn something from *Racing Weight*. From how to determine your optimum weight, to improving your diet and training around it, to controlling your appetite and making your own fuel—it’s all in this book.”

—BikeRadar

“The mysteries of weight and its relationship to performance are unlocked in Matt Fitzgerald’s *Racing Weight*. If you’ve got a basic handle on both training and nutrition, this book offers the means to improve both your diet and athletic performance.”

—DailyPeloton.com

“Fitzgerald is going to go down as one of the most competent and prolific authors of books for serious

runners covering just about every legitimate aspect of the all-important runner's lifestyle.”

—Letsrun.com

“It's not too hard to convince cyclists that they can improve their performance if they drop the weight to an optimum level. However, that's generally as useful as a physician telling a client the need to lose weight and then sending them out the office door. There are endless diet or nutrition books out there, but very few specifically catering to the endurance athlete. Into this void comes *Racing Weight* by Matt Fitzgerald.”

—Pezcyclingnews.com

*The **NEW RULES** of
MARATHON and HALF-MARATHON
NUTRITION*

ALSO BY **MATT FITZGERALD**

Iron War

Racing Weight

Brain Training for Runners

Performance Nutrition for Runners

*The **NEW RULES** of
MARATHON and HALF-MARATHON
NUTRITION*

*A CUTTING-EDGE PLAN TO
FUEL YOUR BODY BEYOND
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Matt Fitzgerald



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FOREWORD BY KARA GOUCHER

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ABOUT THE AUTHOR

BY KARA GOUCHER, ELITE RUNNER,
TWO-TIME OLYMPIAN AND FOUR-TIME NATIONAL CHAMPION

I hit the wall pretty hard in my first marathon. It was the 2008 ING New York City Marathon and I thought I was ready for it. The previous year I had won my first half marathon, beating marathon world record holder Paula Radcliffe in the process. My training for New York had gone really well. But less than 16 miles into the race my calves started to hurt, and things only got worse from there.

By the 20-mile mark the pain in my legs had climbed all the way up to my hips. When I finally reached Central Park, less than 2 miles from the finish line, I was ready to quit. I even looked for a place where I could pull off the course discreetly, but there were too many spectators, so I kept going.

When I crossed the finish line my first thought was that the race had been a total disaster, even though my third-place finish was the best by an American woman in the New York City Marathon since 1983, and my time of 2:25:53 was the fastest debut marathon ever by an American woman.

My second thought was that I couldn't wait to run another marathon.

That's the marathon for you. No matter who you are, your first marathon is bound to be the hardest thing you've ever done, but it hooks you. As soon as you finish it you can think of a dozen mistakes you made before the race and during the race, and you just know that if you fix them you can avoid hitting the wall the next time. There's something about the marathon that makes you want to master it.

Some of the biggest mistakes I made in my first marathon were nutritional. I hadn't done enough drinking practice in my training and as a result I dropped some of my bottles during the race and became dehydrated. I also hadn't done the homework necessary to find a sports drink that worked with my sensitive stomach, so what I was able to swallow did not sit well and became a painful distraction from the task at hand.

I worked on these issues and a few others and it paid off. I came nine seconds away from winning the 2009 Boston Marathon and I qualified for the 2012 Olympic Marathon. I couldn't have done these things if I hadn't gotten help along the way from sports nutrition experts including Matt Fitzgerald. When Nutrilite became my new nutrition sponsor I went to Matt for his opinion on its ROC20 sports drink. He checked it out for me and gave it a thumbs-up. I used it in the 2011 Boston Marathon, had no stomach issues, and ran a PR of 2:24:52 that made me the fourth-fastest American marathoner of all time.

I trust Matt's opinion on nutrition because it's always based on a combination of science, real-world experience, and practicality. This approach isn't as common as you might think. There's a lot of bad information floating around out there!

That's why I'm so happy that Matt has written *The New Rules of Marathon and Half-Marathon Nutrition*. Nutrition plays such a huge role in the marathon and also the half marathon, and now runners have somewhere they can turn to learn everything they need to know to fuel their bodies beyond the wall in these longer races.

I love the comprehensive approach that Matt has taken to this important subject. He covers everything from eating to reach your ideal racing weight to developing your own custom race nutrition plan, from the best meals and snacks for marathon and half-marathon training to nutrition on race

morning. Then he bundles it all together in combined nutrition-training plans (what a great idea!) to make the whole process incredibly simple.

What's also great about *The New Rules of Marathon and Half-Marathon Nutrition* is its focus on the most cutting-edge information and practices. I still haven't run the best marathon I'm capable of, and I believe that getting where I want to go as a marathoner will require that I keep learning and trying new things. I learned a lot from this book and I can't wait to see how I benefit from it, as I know you will, too.

My first marathon was the 1999 California International Marathon in Sacramento, California. I trained fairly seriously for it—up to 60 miles a week—and set an ambitious goal of breaking my friend Bernie’s personal best time of 2:45:24. During my long training runs, on the advice of Bernie himself, I drank Gatorade, which provides 14 g of precious carbohydrate energy per 8-ounce serving. I learned to appreciate just how much that sports drink helped me when I ran out of it during a 20-mile training run and bonked so badly that I had to stop at a gas station and call my girlfriend to beg a ride home.

Despite the setback I took comfort in knowing that I couldn’t run out of sports drink in the race itself because there would be well-stocked aid stations positioned at every mile or so. I neglected, however, to find out exactly which sports drink would be served at those aid stations and to plan my race fueling strategy accordingly. I just took what was offered, which turned out to be Ultimate Replenisher, a low-calorie sports drink that provides only 2.5 g of carbs per 8 ounces. Deprived of four-fifths of the energy they were accustomed to receiving while I ran, my muscles panicked and slowly shut down.

By the midpoint of the race I already knew I was in trouble. At 19 miles I was walking. Disgusted with myself, I tore off my race number, abandoned the course, and, with a feeling of *déjà vu*, called my brother Sean’s cell phone (my girlfriend hadn’t made the trip) from a pay phone outside a supermarket. Sean was waiting for me at the finish line, but I was going to tell him to come fetch me. No answer. I then realized that the only way to escape my nightmare was to finish the race, so I did. Somehow, a scant 53 minutes off my goal time.

This was my rude welcome to what I like to call the Wall-Hitters Club. It is not an exclusive club. In fact, three out of four participants in any given marathon slow down significantly in the second half of the race, or “hit the wall.” Hitting the wall in half marathons is less common but still far more common than in shorter events. Most often runners hit the wall after mile 20 in marathons and after mile 10 in half marathons, but some hit it sooner, as I did in my maiden 26.2miler. The wall does not discriminate by talent or experience level or by any other factor. Runners are almost as likely to hit the wall in their tenth marathon or half marathon as they are in their first. Runners at the front of the race are as likely to hit the wall as runners at the back. Men and women of all ages are equally vulnerable. Maybe you’ve got your own story or you’re hoping to avoid the wall in your first race. Either way, this book will help you.

Like most runners who experience disastrous first marathons, I did not give up but instead climbed back on the horse and tried again. And again. Learning from past mistakes I was eventually able to figure out how to get beyond the wall and I’ve since run many satisfying marathons. I also became a professional running coach so I could help other runners break through the wall. Along the way I developed a special interest in the nutritional aspect of overcoming the wall and got myself certified as a sports nutritionist as well. I’ve since served as a consultant to several sports nutrition companies, authored a few books on endurance nutrition, including *Performance Nutrition for Runners and Racers*, *Weight*, and provided nutritional advice to world-class runners, including Kara Goucher and Ryan Hall.

There are three main causes of hitting the wall. One is lack of fitness. Naturally, if you don’t train properly for a marathon or half marathon your chances of running out of gas before you finish a

greater. A second cause of hitting the wall is poor pacing. Marathons and half marathons are long enough that it's difficult for even experienced runners to accurately judge the most aggressive pace they can sustain from start to finish. Misjudging by as little as 1 percent and starting a marathon or half marathon just 5 seconds per mile too fast could bring on a catastrophe of fatigue with a few miles to go.

A third major cause of hitting the wall is a very broad category that we might file under the heading "Nutritional Errors." These are not limited to in-race mistakes such as taking in too little, too much, or the wrong types of fluid and fuel but also encompass training mistakes such as failing to consume proper recovery nutrition after hard workouts. My experience as an athlete, coach, and sports nutritionist has taught me that nutrition-related missteps are the most common cause of repeated encounters with the wall. They are also the most *overlooked* cause of disappointing marathons and half marathons (runners often never realize what they've done wrong) and are therefore in many instances the trickiest to solve as well. And it's not just nutrition-related mistakes per se that land runners in trouble but also nutrition-related missed opportunities stemming from lack of knowledge. (For example, did you know that relying on sports drinks too heavily in workouts could limit your body's fitness-building adaptations to training?)

The solution to bad pacing is relatively straightforward. If you ran too aggressively in your last race, try running more conservatively in your next one. Training properly so that you carry enough fitness into longer races to escape the wall is also something less than rocket science. There are lots of good books on marathon and half-marathon training. But a focused and comprehensive source of up-to-date information on fueling for these longer running events has been lacking. Long aware of this unfortunate gap, I have made it my mission to supply such a resource, which is now in your hands.

MARATHONS AND HALF MARATHONS are more popular than ever. Runners are attracted to these events because they represent the sport's ultimate challenge. Shorter races such as 5Ks and 10Ks are also challenging in their own ways, but they are not as challenging as longer races because there is no wall.

The challenge of marathons and half marathons is fundamentally metabolic in nature. To hit the wall is to run out of energy, which, of course, comes from food. The marathon especially tests the human body's capacity to store, economize, and utilize fuel derived from food. A runner can hit the wall in a race of any distance if he or she paces it poorly. I've seen runners hit the wall in 400-meter sprints. But hitting the wall is rare in races of up to 10K in distance because these events do not test the limits of human metabolism. With sensible pacing there is little risk of blowing up in such races.

Most runners recognize that longer races are a largely nutritional challenge. Fewer, however, understand that success in marathons and half marathons depends as much on what one eats while preparing for such events as it does on what one drinks during them. For every runner who hits the wall because of his or her failure to consume enough carbohydrate during the race, there are several who hit the wall because of their failure to consume enough carbs in their everyday training diet. To truly minimize your chances of hitting the wall in your next marathon or half marathon you need to choose the right things to put into your body before, during, and after every training run; at different points along the training process; during the critical last two weeks before an event; during the event; and during the more critical final twenty-four hours; and within the race itself.

As a marathon and/or half-marathon runner you should put as much thought and discipline into your diet and fueling practices as you put into your training, but chances are you don't—yet. That's nothing to be ashamed of, for you are not alone. This is precisely why so many bad marathons and half

marathons are to be blamed on nutritional mistakes and missed opportunities.

~~There are two reasons for the failure of runners to take nutrition as seriously as they take the training.~~ The first relates to why we run, and that's because we love running and are highly motivated to train hard in pursuit of challenging race goals. Training hard comes relatively easily to us. But the motivation and the discipline that are required to train hard and the motivation and the discipline that are required to eat carefully are two different animals. As a rule, we runners have far more motivation and discipline for exercise than the general population does, but we do not have more motivation and discipline for eating carefully. And we all know that the average person's level of motivation and discipline to eat carefully is not especially high!

The second reason many of us runners don't take nutrition as seriously as we take our training is that we aren't *really* convinced that nutrition is equally important. We may give lip service to the idea, but we don't embrace it in our heart. This is understandable. After all, there are many successful runners who train hard and have a poor diet, but there aren't any successful runners who have a terrific diet and don't train hard. Training *is* more important than diet in the sense that, if you're only going to do one thing right—train or eat—you are better off training right. But if your desire is to be the best runner you can be, then nutrition really is just as important as training, because you can't run the best marathon or half marathon you're capable of without nailing it. The large and ever-growing membership of the Wall-Hitters Club proves it.

As a sports nutritionist and nutrition writer I spend a lot of time talking to and educating runners about nutrition. In doing so I am repeatedly struck by how much help the majority of runners need in this area. There's so much that even many experienced and highly competitive runners don't know. (I can recall being the first person to inform a particular Olympic runner that taking in caffeine before a race wouldn't help her performance unless she had ingested zero caffeine for at least a week beforehand.) And today the problem is worse than ever, because over the past decade there have been many important advances in nutritional best practices for marathon and half-marathon training and competition—advances that have achieved little penetration in the general distance-running population. A runner whose nutrition regimen was “state of the art” in 2002 but hasn't changed since then is not getting the benefit of a number of effective practices that have come along in the meantime.

It's not entirely the fault of runners themselves that marathon and half-marathon nutrition practices generally lag behind training practices (although, as you'll see in [Chapter 9](#), I believe most runners could train more effectively too). It's also the fault of sports nutritionists like me. If nourishing and fueling the body properly is difficult, then my fellow professionals and I haven't done enough to make it easier. Runners understand plans and programs. Give a runner a good training plan and he or she will do the rest. In order to be practiced effectively, the “new rules” of marathon and half-marathon nutrition must be presented to runners in the simplest, most programmatic way possible. The purpose of this book is to do just that for you.

While many runners like to be told exactly how to train for their races, few runners want to be told exactly what to eat and drink throughout the process of training for and completing a marathon or half-marathon. That's not even possible given the variety of tastes and dietary restrictions and lifestyles in the running population. But what is possible is the provision of simple, concrete nutritional guidelines that runners can use to make the fueling dimension of the marathon and half-marathon experience nearly as systematic as the training and race execution dimensions. This book is intended to be the closest thing possible to a complete nutrition plan for these events.

Actually, it's a little more than that. Training and nutrition are not only coequal in their influence

on race outcomes but they also influence each other. So what every runner really needs is an integrated training and nutrition plan for marathons and half marathons. This book, which is divided into three parts, culminates in the presentation of a selection of such plans in the final chapters. The preceding chapters will take you step by step toward that destination.

Part One addresses the two most important nutritional objectives of marathon and half-marathon training: consuming enough carbohydrate to get the most out of your training and maintaining the high level of overall diet quality needed to shed excess body fat and get down to your optimal racing weight. Together, these two key features of the proper diet for marathon or half-marathon training—high carbohydrate intake and high diet quality—comprise what I call the Two-Rule Diet. In [Chapter 1](#) I will show you how to implement the Two-Rule Diet by recommending specific meals and snacks that are consistent with it. These are the nutritional equivalents of key workouts.

Part Two covers the umbrella topic of performance nutrition, which encompasses the critical matters of nutrition before, during, and after workouts; nutrition during the one- to three-week “taper” period before a race; immediate pre-race nutrition; fueling during events; and postrace nutrition.

Finally, in Part Three I will address the training component of what I call nutrition-training synergy and show you how to train in the way that best complements your nutritional efforts to push back the wall. This part also presents three complete integrated nutrition and training plans for the half-marathon and three more for the marathon.

In the following pages I’m going to expose you to many ideas that are unfamiliar to you, challenge some of the ideas about nutrition that are familiar to you, and ask you to do some things you have never done before. To accept what I am offering you will need to put some trust in me. How can you trust that the ideas I present are true and that the things I tell you to do will work? Because a great many runners have already used these ideas and methods successfully to tear down the wall and lift their running to the next level—some with my direct help, others by finding the same answers elsewhere. You will encounter a number of their stories in the pages to come. Now it’s your turn.

PART ONE
THE
TWO-RULE
DIET

MEETING YOUR CARBOHYDRATE NEEDS

Ben Rapoport hit the wall during the 2005 New York City Marathon. It happened in the Bronx around mile 17. The first half of the race had gone well. An experienced runner, Ben had passed the 13.1-mile mark in 1:31, on pace to qualify for Boston. But just a few miles down the road, the wheels came off. Ben's legs became leaden. The pain in his thighs was searing. He tried as hard as he could to maintain his pace, but it was impossible. He wound up running the second half of the race twenty minutes slower than the first and failing to punch his ticket to Boston.

Thousands of other participants in the New York City Marathon also hit the wall that day. But Ben Rapoport was different. He happened to be a brilliant twenty-five-year-old scientist in his second year of a joint program at Harvard Medical School and MIT, studying toward an MD and a PhD in electrical engineering. After his disappointing marathon experience Ben decided to channel his considerable brain power into figuring out how to avoid ever hitting the wall again. Five years later he published a scientific paper describing a calculator that he had invented to make hitting the wall avoidable not just for himself but for any runner.

To use the Rapoport Calculator, as it is known, a runner is first required to enter some basic information including his or her current body weight and VO₂ max (a measure of aerobic fitness). The calculator uses this information to spit out three specific recommendations to avoid hitting the wall: an appropriate target pace for the marathon, an amount of extra carbohydrate to consume in the final days before the marathon, and an amount of carbohydrate to consume during the marathon.

All three of these recommendations share a common purpose, which is to ensure that the runner does not use up all of the glycogen—a metabolic fuel derived from dietary carbohydrate—in his or her muscles and liver before reaching the finish line. The recommended pace is that which the calculator predicts to be the fastest pace the runner can sustain without depleting his or her glycogen supplies less than 26.2 miles, based on his or her fitness level. The prerace and in-race carbohydrate intake targets are intended to make adequate glycogen available for the marathon given the runner's size, recommended pace, and fitness level.

There are still some bugs left to be worked out of the Rapoport Calculator. When I used it I was told I could run a 2:12 marathon. Trust me: I can't. But while no simple formula can be counted on to get you beyond the wall, Ben Rapoport's calculator does offer a useful implicit definition of the wall: glycogen depletion. And defining a problem is always the first step toward overcoming it.

Glycogen stored in the muscles and liver is one of two forms in which carbohydrate exists in the body. The other form is glucose, which comes to the muscles from the bloodstream and is continuously replenished from liver glycogen stores. Carbohydrate—in both forms, glycogen and glucose—is one of two major energy sources for running. The second source of energy for running is fat, which is stored in the muscles along with glycogen and is also made available to the muscles through the bloodstream from adipose tissue.

The body stores enough carbohydrate to fuel 15 to 26 miles of running, but it stores enough fat to fuel more than 100 miles of running. So together the body's fat and carbohydrate resources are able to supply enough energy to fuel at least four and a half marathons. But if this is true, why do runners routinely hit the wall before they get to the finish line?

The problem is that runners do not have to deplete *both* their fat *and* their carbohydrate stores to hit the wall. Running low on carbohydrate fuel alone will do the job. In particular, running low on glycogen in the active muscles will accomplish this, since the body normally balances glycogen and

sample content of The New Rules of Marathon and Half-Marathon Nutrition: A Cutting-Edge Plan to Fuel Your Body Beyond "the Wall"

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