natural running
the simple path to stronger, healthier running

DISCOVER HOW YOU WERE MEANT TO RUN

by danny abshire
with brian metzler
Praise for Danny Abshire and *Natural Running*

“Danny Abshire is one of the lead voices in the natural running revolution.”
—Danny Dreyer, author of *ChiRunning*

“Running efficiently is a precursor to running any distance fast and exuberantly. No one knows this better than Danny Abshire, whose lifelong study of the body in motion has helped many champions reach their goals, me included. *Natural Running* is the definitive guide for anyone who craves the joy of effortless and timeless runs.”
—Lorraine Moller, four-time Olympian, Olympic bronze medalist, and cofounder of Lydiard Online Training Systems

“Danny Abshire’s approach gives hope to those who have struggled with injuries and uncomfortable running. He brings a simple, sensible, and usable approach to transforming your running so you can reach your potential. Danny’s knowledge of running form and biomechanics can help all runners become more efficient.”
—Mark Allen, six-time Ironman® world champion and coauthor of *Fit Soul, Fit Body: 9 Keys to a Healthier, Happier You*

“Danny Abshire has devoted his professional life to studying and teaching proper and efficient running technique. He has worked with some of the best runners and triathletes in the history of endurance sports, and just speaking to him will make you a better runner.”
—Craig Alexander, two-time Ironman® world champion

“For two decades Danny Abshire has been a lone voice in the wilderness, patiently showing the fortunate few the correct way to run. Now the rest of the running world gets the chance to learn from Abshire’s running-form wisdom in *Natural Running*. With the pendulum finally swinging toward proper running shoes and technique, I expect *Natural Running* to be the standard reference source for years to come.”
—Mike Sandrock, author of *Running with the Legends*
“Danny Abshire has an innate knowledge of running biomechanics and an ability to translate his knowledge into a fix for running injuries.”
—Paul Huddle, triathlon coach, contributor to Triathlete magazine, and author of Start to Finish Ironman Training: 24 Weeks to an Endurance Triathlon

“Danny Abshire is the leading authority on natural running form, period.”
—Ian Adamson, seven-time Adventure Race world champion

“Danny Abshire is the true leader of the re-evolution back to more natural running.”
—Mark Cucuzzella, MD, associate professor of family medicine, West Virginia University School of Medicine

“Danny Abshire’s gifted instruction has excited my students at MIT for several years. His running clinics have inspired us to think about how we run and how to do so without pain. Danny can look at someone’s running style; tweak it; and then make them a more efficient, faster running machine.”
—Dr. Patti Christie, lecturer at Massachusetts Institute of Technology (MIT)

“Danny Abshire has a passion for helping people to run the way nature intended humans to run.”
—Dr. Alexander Slocum, professor of mechanical engineering, MIT
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What Is Natural Running?

Running is one of the most natural things we do as human beings. We were, quite literally, born to run. From prehistoric days, when running ensured survival, to today, when more people are pounding the pavement for fitness and pleasure than ever before, running has long been a part of the very fabric of who we are. Very little compares to the euphoria of being fit and feeling good out on a run. With a breeze in your face and everything else in your dust, running is at once invigorating and calming, inspiring and transcending.

But if running is so natural, why do so many runners end up sidelined? Why is the running population getting slower? Training programs, shoes, and running gear are highly advanced, seemingly giving runners every advantage, especially compared to when the running boom began in the 1970s. So why have median marathon finishing times gotten longer? And why are more runners getting injured than ever before? The American Medical Athletic Association reports that every year 37 to 50 percent of runners suffer running injuries severe enough to reduce or stop training or cause them to seek medical care (Wilk et al. 2009; Van Mechelen 1994).
With almost 44 million runners in the United States (according to a 2009 survey by the Sports Goods Manufacturers Association), that percentage range means 16 to 22 million runners are getting hurt every year. Compare that to a 1989 study that reported 48 percent of runners suffered some sort of running injury annually (Van Middelkoop et al. 2008). Twenty years of more advanced shoes and training plans, but the same number of injuries? What gives?

There has to be a better way, a healthier way, to enjoy such a primal, euphoric, and truly natural activity, whether your goal is reaching a new personal best in a marathon or simply enjoying an easy jog a few times a week to stay fit.

There is a better way to run. It’s called natural running, which is in essence running the way your body was meant to run: purely, efficiently, and uninhibitedly.

Natural running is not a new concept. In fact, it has been around since at least as far back as that first Neanderthal 10K. As barefoot runners chasing down sustenance in prehistoric times, humans more than likely ran with an upright form, a compact arm swing, a high cadence, and foot strikes at their midfoot below their center of mass, rather than crashing to the ground with their heels on every step. We know this because that’s how the human body moves most efficiently and economically when unshod or (perhaps) in thin-soled animal-skin slippers on natural surfaces. Two million years of evolution haven’t changed how we were intended to run. Anatomy just hasn’t evolved that much, according to Dr. Daniel Lieberman, an evolutionary biologist and professor who runs the Skeletal Biology Lab at Harvard University and has closely studied the impacts of barefoot running. Lieberman’s landmark 2010 study (Lieberman et al. 2010) in essence proved that we haven’t lost the ability to run naturally. His study is one of many recent research endeavors showing that human beings run more efficiently and with less impact while running barefoot than in shoes.

The problem is not that we have forgotten how to run naturally; it’s more that we have fallen prey to unnatural influences in the modern world—namely running shoe designs and the hard surfaces we typically run on. The good news is that by understanding what natural running
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Imagine yourself running barefoot across the soft grass of a soccer field or along the smooth, wet sand at the beach (see Figure 1.1). This evokes a good feeling, right? No matter how fast or experienced you are as a runner or what your level of fitness is today, you’ll more than likely be transported back to a simpler time in your life. You will simply run, naturally, smoothly, efficiently. Nothing more, nothing less. Your body will move freely and easily, your limbs in harmony with your feet, almost as if you’re skimming across the surface of the earth. Why is this? Because that’s the way your body has been designed to move. It’s only through the advent of modern footwear—especially overcushioned running shoes—that we have (recently) evolved as heavy heel-strikers.

No matter how fast you’re running, your body is in harmony with the ground beneath you, moving freely and easily, springing almost effortlessly with each footstep as you move from point A to point B. Muscles in your legs and core engage easily to continue your forward momentum, and like your ancient ancestors, you are probably running with an upright posture and a slight forward lean; a compact, consistent arm swing; and low-impact footsteps near the ball of your foot.
natural running

Your body uses the sensory feedback gained from each foot’s interaction with the ground to help you move as safely and efficiently as possible over any surface. That interaction, known as afferent feedback, is gained from an area under the forefoot section of your foot, where your body is naturally and most effectively balanced with gravity for any type of athletic movement.

The moment your forefoot senses the ground, your brain uses that feedback and positions your body to run as efficiently and in as balanced a way as possible. Within that foot–brain interaction, there is an understanding that the soft surface is not only safe but will help cushion the impact of each step and accommodate the position of your foot. That’s natural running in a natural world.

Now picture yourself running barefoot across a sidewalk, street, or wood floor. Because your brain interprets the potential danger of the hard surface beneath your feet (which will offer no cushioning to help reduce the impact of each step), it naturally puts you in position to run with very light foot strikes that will help you avoid the blunt force trauma of hitting the concrete or another hard surface. To do that, you’ll land at the midfoot/forefoot portion of your foot (the ball of the foot, but not the toes) and quickly lift your foot off the ground instead of pushing off with excessive muscular force. I call this self-regulating your impact. Your brain knows from both instinct and experience that landing on your heels while running barefoot on a hard surface will result in painful and debilitating injury. Your body isn’t engineered to accommodate the trauma of repeated heel striking, which is why you naturally avoid a heel-striking gait, especially on harder surfaces. That’s natural running adapting to an unnatural world.

In sum, natural running is running the way the human body was meant to run in its purest form across any surface, smooth, soft, jagged, or hard. Because we run in overbuilt footwear in an unnatural world full of concrete, pavement, and even hard-packed dirt trails that aren’t necessarily safe for bare feet, we need to relearn how to run naturally, wearing lightweight shoes that offer some degree of protection while allowing us to mimic the sensation of running barefoot.
Running 101

Almost anyone can run, no matter how fit or athletically inclined. Many people take up running because it seems so uncomplicated compared to other sports. You really don’t need a lot of expensive equipment, you don’t have to go anywhere but out your front door to participate, you don’t have to pay dues to an exclusive club, and you don’t have to take lessons to get started. Most people figure that if they invest in a pair of running shoes and put in some sweat equity by running every day, the returns of improved health, increased happiness, and a self-generating, lifelong passion are almost guaranteed.

Although running is certainly one of the most accessible sports you can pursue, this kind of oversimplification has sidelined countless runners. Millions of people have signed up for races and run marathons, but few have actually considered the importance of good form or training. You take lessons on how to better swing a golf club or a tennis racket, or to learn the proper techniques for shooting a basketball or throwing a curve ball, but what about running? You might have finished a marathon—or several—but unless you’re an elite athlete, chances are you’ve never been instructed how to run properly. You might follow a detailed online program, do workouts with a local running group, or even follow a training plan from an expert coach. But preparation for a race, whether it’s a 5K or a marathon, is typically focused on different types of workouts, not on how you should actually run.

Does it really matter how you run? Yes, because if you run without learning proper form, you could wind up being woefully inefficient, and worse yet, set yourself up for a variety of debilitating injuries. Two of the biggest mistakes distance runners fall prey to are (1) running with a heel strike, which causes abrupt braking of forward momentum and leads to excessive rotation in feet, ankles, knees, legs, and hips; and (2) using too much muscular force to create forward propulsion. Each of these form flaws contributes to too much vertical oscillation in every stride, which leads to inefficiency and considerably more impact, rotation, and muscle and tendon stress on the body.
Common Running Form Mistakes

Braking Impact/Excessive Rotation. If you find yourself landing hard on your heels and braking your forward momentum on every stride, you are overstriding. This means your foot isn’t landing below your center of mass, so your ankle is relegated to being a loose adapter, which allows for excessive rotational forces. As your foot is free to roll inward or outward, so too are your ankle, lower leg, knee, upper leg, hips, and spine. By running that way, you’re putting various muscles, joints, and soft tissues at risk of overuse injuries from the excessive rotation that starts in your foot and goes up your body. Also, this type of landing increases impact forces to the heel, knee, hip, and lower back.

Excessive Muscular Force. If you’re running with a heel-striking gait and braking your forward momentum on every stride, you need extra muscular force to regenerate that momentum. With every heel-strike in front of your center of mass, your upper body is pushed backward behind your center of mass.

That compromised position causes you to spend extended time on the ground from the heel-strike phase to the mid-stance phase (discussed in Chapter 4) of your gait as your upper body moves forward and becomes balanced over your midfoot. Now you need to push off hard with excessive muscular force to maintain your relative speed. As you push off your toes like a sprinter, your propulsive muscles (the calf muscle group, hamstrings) and the connective tissue of your lower leg, ankle, and foot (primarily the plantar fascia and Achilles tendon) will be in jeopardy of fatiguing, straining, or injury.

These two form mistakes are common responses to being out of balance with gravity, which is often the case when running in overbuilt running shoes with a high heel lift on unnatural surfaces. It’s not that you can’t run this way; you might be comfortable running in an inefficient manner and maybe you have even set a new marathon PR running this way. After all, for the past 30 years most running shoes have had a high heel lift that has encouraged heel striking. But if you are running somewhat efficiently with a very inefficient form, your running economy (the ability to process
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oxygen efficiently while running) is negatively affected because you're expending considerably more energy mitigating the hard impacts and pushing off to begin a new stride.

Combined, these two form mistakes contribute to the most common running overuse injuries, including shin splits, plantar fasciitis, Achilles tendonitis, iliotibial band issues, and patellofemoral pain. Those injuries can be frustrating by-products of what should be an otherwise enjoyable and healthy experience. You might get away with running inefficiently for years, but it will eventually catch up with you.

If this is the way you've been running, or if you have suffered overuse injuries, don’t despair. You can learn a better way to run. Natural running is based on how your feet move when you run barefoot. Though that doesn’t mean you should ditch your shoes and start running barefoot today, you can certainly improve your form, become a stronger runner, and run more efficiently, as if you were running barefoot.

Rediscovering Your Natural Running Form

Running barefoot is the most primal form of natural running. It takes us back to our primitive roots, but also back to our own youthful moments of running across a carpeted floor as a toddler; through a soft, grassy park as a juvenile; or along the shoreline of a sandy beach as an adolescent. And although we have moved on, both as a human species and from childhood to adolescence and eventually to adulthood, that primal connection to natural running remains. Natural running is engrained in all of us and always will be, even though our current fitness levels, relatively sedentary lifestyles, inappropriate shoes, abnormal injuries, and other variables of the unnatural, modern world make it seem hopelessly remote. Despite bad habits, bodily changes, and dangerous surfaces, natural running is absolutely attainable if we take the appropriate steps to find and nurture it.

Though its roots are ancient, only in recent years has barefoot running attained mainstream notoriety and science-based credibility. Christopher McDougall’s best-selling Born to Run (2009), combined with the completion of numerous scientific studies, set forth in the
mainstream media the idea that most runners need to reexamine how they run and exposed the negative influence that modern footwear has had on the act of running.

For years, high-level runners from around the world have used barefoot running in small doses to develop proprioception (the body’s ability to sense the ground and immediately react by positioning and moving itself accordingly), improve balance, and strengthen the small muscles in their feet and lower legs, especially as preparation for running in ultralight racing shoes or track spikes. Those muscles are typically underutilized and even deconditioned while running in shoes with thick midsoles and a high heel lift and therefore can’t do what they are supposed to do—absorb impact force, control rotational forces, and release stored energy—a problem that is compounded by the fact that most of us wear soft or heel-lifted shoes nearly all the time, both at work and play.

**The Shoe’s Impact on Form**

If you wear a high-heel running shoe, which most recreational runners do today, it is very difficult to run with natural running form. But running shoes weren’t always built that way. At the start of the American running boom in the early 1970s, most people were running in lightweight shoes that consisted of a rubber outsole, a thin foam midsole, and a lightweight nylon upper. Although simple by today’s standards, some of those early shoes were pretty good at letting the foot and body move naturally without the need for excessive muscular force. Those shoes also allowed a runner to obtain valuable sensory feedback from the foot’s interaction with the ground and to self-regulate impact.

As footwear technology advanced over the years, running shoes generally became cushier, softer, thicker, and heavier. Heel heights increased to accommodate new midsole cushioning technologies such as air bags and gel packets meant to cushion runners from the hard surfaces of road running. Compared to the original running shoes of the mid-1960s or to the animal-skin moccasins of primitive peoples, running shoes started to look almost cartoonish.
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Although some of the design innovations were driven by performance, the end result in many cases was anything but performance oriented. And that’s why, more than 30 years later, thousands of people run with inefficient mechanics predicated on a heel-striking gait. Not only is that form not optimal for running fast, it can lead to numerous overuse injuries. But beyond that, the excessive pounding and pushing caused by constantly braking and using muscular force to start a new stride leaves the runner with a debilitating feeling that is contrary to the exhilarating sensation of running with natural, efficient form.

Large, overbuilt heel crash pads and steep heel-to-toe ramp angles (see Figure 1.2) in modern shoe design are the biggest culprits in allowing, and in fact encouraging, a heel-striking gait—especially for those new to the sport who haven’t had instruction or experience with more efficient mechanics. Even if you want to run with a natural midfoot/forefoot stride pattern, the geometry and heel height of many shoes will not allow your foot to land naturally—namely parallel to the ground—because the hefty heel gets in the way. It’s the first thing that hits the ground as your foot swings through the gait cycle. Another problematic aspect is the soft foam midsole, which dampens the foot’s sensory intake (because it’s harder to feel the ground), thus thwarting the relay of information back to the brain about how the rest of the body should be positioned. So if shoes are the problem, shouldn’t we all just run barefoot? Yes and no.

Figure 1.2 | Cutaway of standard running shoe showing a 14.7 percent rise in ramp angle from toe to heel
Barefoot Running

If you’re used to running in a shoe with a built-up heel, running barefoot can be a fascinating experience of freedom and the first step in developing natural running mechanics. Running unshod, your foot naturally seeks out the ground by landing at the midfoot, where it receives afferent feedback and immediately tells the body how to move as efficiently and effectively as possible. That same feedback can be gained while wearing shoes, but it is considerably dampened by thick levels of foam and much harder to interpret with a heel-striking gait.

So what about running barefoot all the time? No way, say most doctors, podiatrists, physical therapists, coaches, and elite runners, who concur that it’s neither practical nor safe to run barefoot. Running barefoot for several miles on a paved road or concrete sidewalks sounds terribly painful, not to mention impractical and even dangerous. I’m not saying you can’t, but you could be setting yourself up for other injuries if you do.

However, under controlled circumstances, barefoot running can be quite good for you, whether you’re an elite athlete, a new runner, or somewhere in between. Done regularly in small doses, barefoot running can improve your mechanics and teach your body to land lightly at your midfoot, even while wearing shoes. I discuss barefoot running as an effective training tool more thoroughly in Chapter 9.

The principle behind barefoot running makes a lot of sense, but so does the principle behind shoes. Most of us don’t live in a part of the world where soft dirt roads or sandy beaches connect towns and cities. Our modern world is heavily paved and therefore not conducive to running barefoot. Shoes will protect your feet from hazards like glass, gravel, and debris, and wearing shoes gives you thermal properties that are lacking when you run barefoot on hot pavement or frozen sidewalks. The bottom line is that although running barefoot in small doses can help make you a better natural runner, it isn’t the answer. A better solution is to run with lightweight shoes that allow your feet to mimic the flexibility and motion of barefoot running while still offering protection from unnatural surfaces and helping to transfer downward energy into forward propulsion.
Adopting Natural Running

Natural running will make you a stronger, more efficient runner. This book is about teaching you how to do that. It doesn’t offer miracle cures, training shortcuts, or immunity from injury. Instead, it will help you help yourself, by better understanding the physics of running and the science of the foot, while showing you how to transition to natural running gradually and teaching you how to maintain that form for the rest of your life.

Natural running is all about feet, form, and whole body freedom. The key is running in a relaxed manner and having the awareness to touch the ground lightly with each footstep, lifting quickly on every stride. Combined with an upright posture that includes a slight lean at the waist and a compact arm swing, this stride leads to the optimally efficient running mechanics your body is predisposed to, which can result in less impact and fewer rotational forces on the foot and body.

There’s no such thing as perfect running form, but we can all work on running mechanics and improving efficiency. Doing so will make you a more efficient runner, which means you’ll use less energy in every stride and boost your running economy. Ultimately, improved form can make you faster.

Adopting natural running isn’t difficult, but it takes focus and a commitment to replacing old, familiar habits, which can be challenging to break, with new ones. Understanding and improving your running mechanics, getting lightweight training shoes that are better suited for a natural running gait, and working continually on building and maintaining your strength and technique with drills are all part of the process of becoming an informed runner and thereby a better one.

The first part of this book explores some of the relevant history of running and the significant impacts of the evolution of running shoes on running form. Then I take you into my lab, where we take a closer look at how the human body moves, the biomechanics of the foot, and the physics of natural running as well as examine common running injuries, how they occur, and how they can be avoided. Finally, I make all of this applicable to you and your running, helping you transition to a more natural style of running with practical tips, specific drills, and an eight-week training plan.
One of the primary ways to improve your running technique is through form drills. Form drills are easy to do and don’t take a lot of time, but they’re often overlooked, forgotten, or ignored when a workout is completed. Taking an extra 5 to 15 minutes to do form drills several times per week will make you more fluid, more efficient, and even faster for both short and long distances.

Most drills take the aspects of good form—a compact arm swing, soft foot strikes with the foot under your center of mass, quick leg turnover, an upright posture with a slight forward lean at the waist—and accentuate these in a quick, repetitive motion that trains the body to be comfortable with those movements during your regular running mechanics. Some drills are aimed at building smaller muscles (such as the intrinsic group and lumbrical group in the foot), while others help your neuromuscular system fire quicker.

Transitioning to natural running isn’t the same for any two people. For some, it might entail fixing a few bad habits, making better choices with footwear, and committing to the form drills. For others, it might require starting from scratch and forgetting everything you thought you knew about running. But fear not, the transition to natural running can begin immediately—as soon as today—and it’s not overly complex. It might take time and adherence to detail, but the end result will make you a stronger, healthier, and quite possibly faster runner. More than that, it will help you tap into a newfound enthusiasm and euphoria perhaps missing up to now in your running. So have patience. Once you learn to run naturally, you’ll run faster and healthier not just for today, but for the rest of your life.
Dynamic Strength and Form Drills

drill, line up a few objects on the ground (such as a hardcover book or a rolled-up sweatshirt). Start striding toward the object, lifting a leg as your body moves forward deliberately and with a consistent arm swing, avoiding contact with each object as you step over it.

4. Body Balance

This drill helps you better recognize and sense a centered and balanced position, so crucial in natural running form. Start the drill by running in place. Now tilt your body forward, noticing that you begin to run forward. After a few steps, return to an upright position, running in place as before. Now tilt your body backward and notice that you begin to move backward. Alternate this forward and backward motion, noting your overall sense of balance.

Group 3

1. Skipping Drills

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About the Authors

Danny Abshire, cofounder of Newton Running, lives in Colorado with his wife of 24 years, Jennifer, and their two sons. A lifetime runner, he has competed in distances from 1 mile to 100 miles. Danny and Jennifer started Active Imprints, making custom foot supports, in 1988. For the past 15 years, he has worked as a running form coach and guest speaker around the country. He has spent the past 10 years designing Newton running shoes.

Brian Metzler has run more than 50,000 miles in his life, tested more than 750 pairs of running shoes, and raced just about every distance from 50 yards to 100 miles. He is a senior editor at Running Times and has written about endurance sports for Runner’s World, Triathlete, Inside Triathlon, Men’s Health, Men’s Journal, and Outside; was the founding editor and associate publisher of Trail Runner and Adventure Sports magazines; and is the author of Running Colorado’s Front Range.
“Natural Running is the definitive guide for anyone who craves the joy of effortless and timeless runs.”
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— Mark Allen, six-time Ironman world champion and coauthor of Fit Soul: Fit Body: 9 Keys to a Healthier, Happier You

Danny Abshire is a passionate lifelong runner and cofounder of Newton Running, where he has spent 10 years designing and refining Newton running shoes. He has worked closely with thousands of athletes, from beginners to Olympic elite runners, helping them improve their running form and technique.

Brian Metzler is a senior editor for Running Times and has written about endurance sports for Runner’s World, Triathlete, Inside Triathlon, Men’s Health, Men’s Journal, and Outside.